THE TRANSFORMATION OF HIGHER EDUCATION BY MEANS OF TECHNO-PARKS: CASE OF TURKEY

GAMZE SART

BOĞAZİÇİ UNIVERSITY

2013

THE TRANSFORMATION OF HIGHER EDUCATION BY MEANS OF

TECHNO-PARKS: CASE OF TURKEY

Dissertation submitted to the

Institute for Graduate Studies in the Social Sciences

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Educational Sciences

by

Gamze Sart

Boğaziçi University

2013

Thesis Abstract

Gamze Sart, "The Transformation of Higher Education by means of Techno-Parks: Case Of Turkey"

This study aims to explore the transformation of the universities by means of the techno-parks in Turkey. To conduct a critical phenomenological analysis, the study is divided two different parts in which the first part generates a perspective from outside by analyzing critically related documents about the reasons behind the transformation of the higher education and the development of the techno-parks. The university-industry-government partnership, which forces to make changes in the universities and "human capital," is studied together with the science and technology policies and national strategies, which are taken into consideration with the arrangements and mechanisms in the techno-parks at the universities. The second part, as a case study, explores a perspective from inside by asking personal experiences and perceptions of the participants related to the same questions of the first part, which are the reasons behind the transformation of the higher education and the development of the techno-parks. The segregation in terms of gender, the implications of science and technology policies, and spatial redevelopment, which generate exacerbation of economic and spatial inequality, and political transformation, were critically analyzed by the data collected from the participants of the focus group. Exacerbation of economic and spatial inequality was analyzed together with economic and political transformation by questioning commercialization, marketization, commodification, managerialism, massification, privatization, internalization, rationalization, vocationalization, liberalization, revaluation, devaluation, reterritorialization, and entrepreneurialization of the higher education.

After analyzing the related documents about the reasons behind the transformation of higher education it is so clear that the reasons are not only national, but also supranational where innovation and knowledge are taken as drivers of the competitiveness and growth. The transformation in the higher education is seen as the marketization of the universities by means of generating technological knowledge, which is commodified in the global market economy so that the integration of the universities has been enforced by the government and by the private industry. The benefits are mainly taken by the political stakeholders and private sector because the unemployment rate and the country's current account deficit can be decreased, while the competitiveness in the knowledge economy is increased. The effects of the techno-parks are serious on the academic missions of universities, while changing innovation system so that the missions of universities are re-defined. Hence, knowledge as a commodity can be sold in the market and techno-parks and universities have become the headquarters of corporations. The analyses show that as a phenomenon, universities are not capable of absorbing the increasing demand so that techno-parks open new liberalization in commodification of knowledge. In order to make all these changes. The transformation towards entrepreneurialization has profoundly produced different problems-inequalities, segregation, and social injustices.

Tez Özeti

Gamze Sart, "Yüksek Öğretimin Dönüşümü: Teknoparklar-Türkiye Örneği"

Bu çalışmada Türkiye'deki teknoparkların gelişiminin nedenleri ve gelişimin tarihsel süreci ile birlikte teknoparkların yüksek öğrenimine olan etkisi araştırılmaktadır. Değişimin süreçleri ilk önce doküman analizi yapılarak, teknoparkların gelişiminin nedenleri, tarihsel gelişimi, "insan sermayesi," bilim ve teknoloji politikaları ile ulusal stratejileri ve uygulamaları üzerinden irdelenmiştir. Bu kavramları analiz ederken, üniversite-sanayi-devlet işbirliğinin üniversitelerdeki ne tür değişiklikleri zorladığı incelenmiş ve "insan sermayesi" olarak adlandırılan yeni düzenlemeler ve mekanizmalar dikkate alınmıştır. Bilim ve teknoloji politikaları ile ulusal stratejilerin ne denli üniversitelerde teknoparklar vasıtasıyla üniversite-sanayi-devlet işbirliğini zorladığını ve bu süreçte akademik insan gücünün "insan sermayesi" olarak tanımlanması ve üniversitelerin gerçek amacından uzaklaşarak bilginin metalaşması üzerinden üniversitelerin teknoparklar vasıtasıyla değişimi açıklanmaktadır. Türkiye'deki teknoparkların bilgi ve teknoloji odaklı ekonomik gelişim ne kadar etkili olduğuna, üniversitelerin nasıl üniversite-sanayi-devlet işbirliği içinde yeni roller üstlendiğine bakılmaktadır. Bu süreçte üniversitelerde ve teknoparklarda yer alan kurum, kuruluş ve bireylerin üstlendiği roller analiz edilmektedir. Tüm bu değişime neden olan bilim ve teknoloji ile ilgi politikalar üzerinde durulurken bu yeni politikaların değişik uygulamalarının etkilerine bakılmaktadır. İkinci kısımda ise nitel araştırma yapılarak teknoparkların neden olduğu değişimlere katılımcıların verdiği bilgilerden yararlanılarak değinilmiştir. Bu perspektifte ayrıca bir odak grup oluşturularak teknoparkların ayrımcılığa, şehir planlamasına, sosyolojik ve ekonomik değişikliklere ve eşitsizliklere neden olup olmadığına bakılmıştır. Yüksek öğretimdeki dönüşüm kavramsallaştırılmıştır. Bir vaka çalışması olarak, kişisel deneyimlerden yararlanılarak dönüşümün görünmeyen veya bilinmeyen nedenleri araştırılmıştır.

Teknoparkların cinsiyet bakımından ayrımcılığa, bilim ve teknoloji politikaları ile mekansal yeniden yapılanmaya neden olduğu katılımcılar tarafından dile getirilmiştir. Bunun yanında ekonomik ve mekansal eşitsizlikle birlikte politik dönüşüme neden olmaktadır. Ayrıca, yüksek öğrenimin piyasalaşması, metalaşması, özelleşmesi, rasyonalizasyonu, meslekileşmesi, liberalizasyonu, eğitimin devalüasyonu, ticaretleşmesi, ve şirketleşmesi gerçekleşmektedir. Yüksek öğretimindeki dönüşüm, devlet ve özel sektör tarafından uygulanmaya konulmuştur. Böylece küresel piyasa ekonomisinde metalaşmış olan teknoloji ve bilgiyi üreten üniversitelerin piyasalaşması kaçınılmaz olarak katılımcılar tarafından tespit edilmiştir. Yeni Pazar ekonomisinde rekabet gücünü arttırmak, işsizlik oranını düşürmek ve cari açığı azaltabilmek için üniversitenin piyasaya entegre olması beklenmektedir. Teknoparklar üniversitelerin toplumsal görevleri yeniden tanımlarken, özellikle akademik kişilerin rollerini de yeniden şekillendirmektedir. Sonuç olarak, meta olarak bilginin piyasalaşması teknoparklar ve üniversitelerin artık şirketler için bir merkez haline gelmesini sağlamıştır. Bu durum üniversitelerin gerçek amacından uzaklaşmasına ve daha fazla pazar merkezli olmalarına neden olmaktadır.

CURRICULUM VITAE

NAME OF AUTHOR: Gamze Sart
PLACE OF BIRTH: Istanbul, Turkey
DATE OF BIRTH: 27 January 1967

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:
Boğaziçi University.
Boğaziçi University.
Boğaziçi University.

DEGREES AWARDED:
Doctor of Philosophy in Education Science, 2012, Boğaziçi University.
Master of Arts in Education Science, 2008, Department of Education Sciences, Boğaziçi University.
Master of Arts in Psychology, 2006, Department of Psychology, Istanbul Commerce University.
Bachelor of Political Science, 1991, Boğaziçi University.

AREAS OF SPECIAL INTEREST: Higher Education, Innovation, Techno-parks, Peace Education and Resolution, Mediation, Leadership, Career Counseling, Gifted and Talented Youth, Emotional, Social and Cultural Intelligence

PROFESSIONAL EXPERIENCE:
Academic Personnel, Department of Psychological Counseling and Guidance, Yeditepe University, 2010-current.
Member of the Board, Peace Education Research Center, Boğaziçi University, Istanbul, 2010-current.
Part-time Academic Personnel, Department of Psychological Counseling and Guidance, Yeditepe University, Istanbul, 2007-2010.
Counselor and Educational Psychologist, ABA Education Center, Istanbul, 2000-current.
Research Assistant, European Commission, Economic and Political Committee, Strasbourg, 1991-1992.

PUBLICATIONS:
Sart, Gamze. “Emotional Intelligence in Peace and Conflict Resolution.” Lambert Academic Publishing (ISBN 3848423545), 2012.
Sart, Gamze. “Children and Adolescents with Emotional and Behavioral Disorders.” Translation. Nobel Academic Publishing, 2012.
Sart, Gamze. (2012). “Psychology Life.” Gerrig, Richard J.& Zimbardo, G. Philiph, Translation. Nobel Academic Publishing, 2012 .
Sart, Gamze. “The Effects of Peace and Conflict Resolution Education on Emotional Intelligence, Self Confidence, and Conflict Resolution Skills.” Master’s Thesis, Boğaziçi University, 2008.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my advisor, Prof. Fatma Gök and to my committee members Prof. Fuat Ercan, Assoc. Prof. Asım Karaömerlioğlu, Assoc. Prof. Özlem Unlühisarcikli, and Assist. Prof. Ayşe Caner. They supported me with sincere interest and valuable ideas.

I also want to thank to the academic people and the administrative personnel of the Boğaziçi University and Yeditepe University during my studies.

I would also like to thank Prof. Susan Robertson for going over a great amount of material within a very short time, her invaluable assistance and her encouragement in the preparation of my thesis. I have learned a lot from her. I would, especially like to thank all the interviewees who had participated in the study. Being with them is an invaluable experience for me.

I wish to express my deepest gratitude to my friend Huseyin Gavsi Ceylanoglu, who have guided and supported me, like other selected members in Eyup. He helped me to realize the power inside of me. Thank you very much for everything.

I would like to thank to my lovely parents and my sister Zeynep Hande Sart. I wish to express my deepest appreciation to ABA and DIVAN Bebek members, together with my students, for their invaluable support, help, understanding, encouragement, and positive approach in every step of this study. I feel very lucky to have the chance to work together with them. And, I do not forget how MIU MIU touched in each obstacle to make change in my mood.

While writing this thesis, I learned who was my friend who was not and who was sincere who was not. I learned the meaning of loneliness, emptiness, violence, bullying, mobbing, and suffer. I learned the meaning of courage, power, support, effort, self-respect, and dignity. I hope that my lovely son Mustafa Gazioğlu would know the meaning of love, fidelity, emancipation, and compassion, and I would be just here to generate awareness.

This study is dedicated to all who wish silence and happiness in their hearts, particularly those women who wish to make changes...

Thanks for all deeply...

CONTENTS

TABLES

FIGURES

ABBREVIATIONS

ARBIS	Researcher Information System
ASO	Ankara Sanayi Odası
BERD	Business Enterprise Research and Development
BEST	Business Environment Simplification Taskforce
BTP-UP	National Science and Technology Policies Implementation
CMP	Common Mind Platform
COST	European Cooperation in Science and Technology
CRT	Cathode Ray Tube
DEIK	Foreign Economic Relations Board of Turkey
DIE	State Institute of Statistics
DPT	State Planning Organization
EICC	Local Business Consultants System
EIS	European Union's most recent Innovation Scoreboard
ERDF	European Union Economic and Regional Development
ECA	Europe and Central Asia
ECSC	European Coal and Steel Community
EIB	European Investment Bank
EPO	European Patent Office
ERA-NET	European Research Area Net
EURAXESS	European Commission Researchers in Motion Network
EUREKA	Europe-wide Network for Market Oriented Products
EVRENA	Global Researcher Support Program
FB7	Seventh Framework Program
FDI	Foreign Direct Investment
GAP	Southeastern Anatolia Project
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GOSB	Gebze Organized Industrial Zone Techno-park
HRST	Human Resources for Science and Technology
HSIP	Highway Safety Improvement Program
ICSU	International Council for Science
ICT	Information and Communication Technologies
IGEM	İhracatı Geliştirme Etüd Merkezi
IGEME	Export Promotion Center of Turkey
IMF	International Monetary Fund
INAREK	Research Ethics Committee of Bogazici University
INCO-NET	European Commission International Cooperation Network
IP	Intellectual Property
IPR	Intellectual Property Rights
IST	Information and Software Technology
ITP	Industrial Technology Project

ITU	Istanbul Technical University
ISBAP	Initiatives to Establish Scientific and Technological Cooperation Networks and Platforms, Technology
JPO	Japan Patent Office
KAP	Kazusa Academia Park
KTP	Knowledge Transfer Partnerships
KOSGEB	Small and Medium Industry Development Organization
KOSGET	Small Industry Development Organization
MAM	Marmara Research Centre
METU	Middle East Technical University
MIT	Massachusetts Institute of Technology
MoIT	Ministry of Trade and Industry
MPM	National Productivity Centre
NYU	New York University
OAP	Ortak Akıl Platformu®
OECD	Organization for Economic Co-operation and
OKIK	Medium and Small Enterprises Board
OSD	Auto Industrialists' Association
ÖSYM	Ölçme, Seçme ve Yerleştirme Merkezi
RTD	Research and technology Development
S&T	Science and Technology
SBIR	Small Business Innovation Research
SEGEM	Industrial Training and Development Centre
SMEs	Small and Medium Sized Enterprises
SPO	State Planning Organization
STI	Science, Technology and Innovation
SCST	Supreme Council for Science and Technology
TAEK	Turkish Atomic Energy Agency
TARAL	Turkish Research Area
TDZ	Technology Development Zone
TEKMER	Technology Development Centers
TESK	Confederation of Turkish Tradesmen and Craftsmen
TEYDEB	Presidency of Technology and Innovation Support
TGB	Teknology Girişim Bölgesi
THE	Times Higher Education
TICA	Turkish International Cooperation Agency
TIT	Tokyo Institute of Technology
TOBB	Union of Chambers of Commerce, Industry, Maritime Trade and Commodity Exchanges of Turkey
TOSYÖV	Turkish Foundation for Small and Medium Business
TPI	Turkish Patent Institute
TSIP	Tainan Science-based Industrial Park
TTGV	Technology Development Foundation of Turkey
TTO	Technology Transfer Office

TÜBA	Turkish Academy of Sciences
TUBITAK	Scientific and Technical Research Council of Turkey
TURK TELECOM	Turkish Telecommunication Corporation
TURKTRADE	Turkish Foreign Trade Association
TUSIAD	Turkish Industrialists' and Businessmen's Association
UKSPA	United Kingdom Science Park Association
UNDP	United Nations Development Program
URAK	Competitive Advantage Turkey
USPTO	United States Patent and Trademark Office
VAT	Value-Added Tax
YASED	Foreign Investors' Association
YÖK	Higher Education Council

CHAPTER I

INTRODUCTION

In the Post-1980s era of neo-liberal globalization, education in general and higher education in particular has been going through a radical change process. Over the past two decades, universities have been forced to serve the capital accumulation process become more accountable to the wider public and to contribute directly to neoliberal capitalist economic development by taking on a range of "third stream" activities (Robertson & Kitagawa, 2010, p. 6). These activities include the incubation of start-up firms, the commercialization of knowledge, the development of knowledge transfer partnerships, and the delivery of entrepreneurship courses. Therefore, the mission of the university is changing and expanding from its previously two basic core functions - teaching and research (Robertson & Kitagawa, 2010). The motor changes are considered by some experts to be the transformation of the university as the "entrepreneurial university" (Etzkowitz, 2003); the "service university" (Cummings, 1998); the "enterprise university" (Marginson & Considine, 2000); "academic capitalism" (Slaughter & Rhoades, 2004); and "profit-oriented university companies" (Ercan, 2010).

In addition, as Fuat Ercan (2010) explains the transformation of higher education in his studies, higher education is no longer merely an economic or socializing agent, but also constitutes consumption. In other words, higher education processes become individualized and reconstituted as a relationship between the producer and consumer. This represents an ideological shift from the perspective of education as a fundamental right to the understanding that education is governed by consumer orientation and activities geared to consumer satisfaction. It also manifests itself in major structural and cultural changes to conventional university practices and the academic labor process. Hence, higher education is becoming as a service encounter between academic labor and student-customers. This situation demonstrates that higher education is in the process of commodification. Commodification also leads to management and production processes, which seek to improve the quality of the delivered product as determined by customer satisfaction. Knights (2003) has analyzed this situation and stated that the ways that higher education institutions are drawn into the market, producing and selling knowledge as a commodity.

It was not until the 1980s that an entrepreneurial role for universities became increasingly part of mainstream policy and practice (Lawton Smith, 2007). After the developments in the United States of America, particularly as a consequence of Bayh-Dole Act in 1980, governments in a range of countries, including the United Kingdom, Australia, Sweden, Germany, Italy and Japan, all introduced policy measures to encourage industry and university partnership activities (Nedeva, 2008). Additionally, the same kind of policies is seen as realities in Turkey.

Robertson and Kitagawa point out that the activities of many universities have changed over twenty years and these activities are described as "third stream‟ or "third sector." Hence, patents, such as pharmaceutical products, the trademarking of business ideas, spinout firms that might involve investments from the university and the business sector and so on has become important. These activities, however, are often criticized by academics as peripheral to the central task of teaching and research (Robertson & Kitagawa, 2011, p. 6-8).

They argue that knowledge has now been created for economic benefits, which have served for economic development, technological change, and industrial growth. Because of rapid globalization, the concept of "competitiveness" becomes the economic strategy of nations, states, regions, cities, and companies. Different policies have been created and implemented to increase the nation's competitive advantage and economic prosperity. Most of the corporations benefit from research and development R&D, which has been generated by universities, because they are physically close to each other or "technological neighbors" (Robertson & Kitagawa, p. 8). As these researchers emphasize, universities have become center of attractions for high levels of public and private investments, which have increased patent activity (Robertson & Kitagawa, 2011, p. 9). All these activities are organized at the special spaces established by the universities, mainly called techno-parks. These new spaces in higher education have dramatically promoted the university-industry-government innovation relationship. As Robertson has explained as follows:

> These institutions are located in places and are inextricably linked to these surroundings— geographically, socially, economically, and politically— and the new spatial framework of urban history can help interpret the actions and consequences of universities, particularly techno-parks in the course of institutional growth. Furthermore, universities are bound up in the key movements and events in the history, a set of historical agents in metropolitan settings with urban politicians, homeowner associations, real estate developers, labor unions and immigrant groups. Like these other actors in the history, as universities techno-parks are implicated in racial, ethnical and gender segregation, radical politics, urban redevelopment, exacerbation of economic and spatial inequality, economic and political transformation, and even electoral politics. (Robertson, 2010, p. 3).

The rationale behind the techno-park application in Turkey, however, can be seen in law 4691 (2001), which regulates the establishment, operation, management and control of Technology Development Zones, and the authority and responsibility of the related people. The aim of this law is:

> To create collaboration between research institutes and industry in order to help the country in economy, international competition and export trading, production of technological knowledge, develop innovations in products and procedures, increase the quality or standard of product, increase the efficiency, lower the cost of production, commercialize the information, support the technology dense production and entrepreneurship, adapt small and middle scale enterprises to new and high technology, generate investment capabilities in technology dense areas with the permission of the Scientific and Technical Research Council of Turkey, create employment opportunity to the people who are researchers and scientists, help the transfer of technology, and create a technological infrastructure which helps to the entrance of foreign capital. (Law 4691, p. 1).

In 2010, Turkey has also declared a national level program, called "Vision 2023 Turkish National Technology Foresight Program" (Turkish Ministry of Economics, 2012). Along with the Technology Foresight Program involved three sub-projects called "R&D Manpower," "Technological Capabilities Inventory" and "National R&D Infrastructure," which aimed to improve organizing, coordinating and promoting basic and applied research. Additionally, the program has planned to direct research activities to the targets of the national development plan, while setting research priorities. In the program, it is stated that higher education institutions are the only places to conduct all these activities. This Program has also developed technology policies in order to make universities integrate with the industrial, employment and investment policies in Turkey. Furthermore, as it is stated in the Program nine technology and policy relevant sectors are prioritized and selected which underpin the competitiveness and economic development in the country, including information and communication, energy and natural resources, health and pharmaceuticals, defense, aeronautics and space industries, agriculture and food, manufacturing and materials, transportation and tourism, chemicals and textiles, and construction and infrastructure (TUBITAK, 2011, p. 6-8). Besides nine economic sectors, two cross cutting thematic areas are covered in the Program, which are education and human resources, and environment and sustainable development (TUBITAK, 2011, p. 11). Consequently, it is clear that the functions of universities are redefined in this context.

Analyzing this program, Saritas reports that all public institutions, including public universities, are taken into consideration, as these technological areas in their R&D activities, R&D funding, and undergraduate and graduate education and research programs (Saritas et al., 2006). Hence, in the last decade, 43 techno-parks, which have different backgrounds and capacities, have become established and active in order to manifest all of the decisions and goals laid out in the program. The latest incentives in 2012 have prepared the road map in order to achieve the goals aimed for in the "Vision 2023 Turkish National Technology Foresight Program." The fundamentals of the New Incentive Regime for Turkey is declared in the framework which covers general investment incentive scheme, regional investment incentive scheme, large scale investment incentive scheme, and strategic investment incentive scheme. In all these incentives, again the techno-parks play an important and crucial role in implementing the new policies by taking responsibility in generating R&D and labor. All these changes and challenges have forced the universities' structures and value systems to transform, while changing the main purposes of the universities.

In this context, techno-parks have become agents of change while transforming and even transcending most of the universities, which are losing their main purposes, such as producing solidarity, social, cultural, and economic justice, and equality. However, their short term and even long term negative effects have not been widely studied, particularly in Turkey in which it is a new issue. The main reason for this is that techno-parks are seen as new opportunities to decrease unemployment and to increase competitiveness in the regional and global markets. More importantly however, there are two separate views in the academic arena; the predominant one seeing techno-parks as a new opportunity for transforming the universities positively and actively. However, some academics claim that not all the techno-parks will be successful and most universities' structures will be negatively impacted while losing their main purposes.

Furthermore, the pressure of global market conditions prevents innovation, creativity, and even reform efforts, and most of these activities are defined under the umbrella of the techno-parks. Those, which have better opportunities, have better chances. Most of the higher education institutions are challenged to perform their main activities. Some authoritarian management runs the institutions in a top-to- bottom style using new management methods in the techno-parks. Under the guise of "social networking," opportunities are given especially to those who are close to the management or have similar political connections. In other words, most of the research funds and projects are channeled to specific firms using the incentives in the techno-parks. More importantly, those firms enjoy tax breaks and other legal privileges. Consequently, specific subjects are favored for study and analysis, which directly and indirectly affect academic freedom and the quality of the research by emphasizing applied and action-oriented research. As a result, one of the main missions of the universities, traditionally considered reformists with social responsibilities, will become confused with this insertion of global market demands. Universities with these new policies and demands may begin to neglect civil society or the community. If universities become more focused on the techno-parks to survive under ‘market conditions,’ they may ignore other responsibilities, in the process actually increasing the amount social injustices and inequalities rather than working to develop better conditions in their communities. Among all these groups, the most important vulnerable groups at risk are women, ethnic minorities, immigrants, the young, the elderly, people with disabilities, and the working class who do not usually have access to attend the best universities and have positions in these techno-parks. Consequently, the techno-parks have been forcing directly and indirectly the universities to institute these changes, while they are losing their main purposes and missions, transforming, and even becoming supplanted.

Statement of Purpose

This study is an attempt to understand the changing form and scope of higher education and role of the techno-parks in Turkey. Hence, the main purpose of this study is to analyze the critical milestones in the development of the techno-parks in Turkey, which transform the universities while changing the purpose of higher education and creating inequalities and social injustices.

Research Questions

The research questions of this study problematize the role of techno-parks in the transformation of Turkish higher education. In this study, there are ten research questions, which are developed using four levels of "Education Questions" in the "Multi-Scalar Governance of Education" Analysis explained by Dale and Robertson (2008). In each research question, the level of the "Education Question" is given related to the "Multi-Scalar Governance of Education" Analysis. In that way, the use of techno-parks in Turkey as a strategy for transforming higher education is conceptualized and problematized by answering the following research questions:

1. How do techno-parks develop in Turkey? (Level 1, Educational Practice)
2. What are the science and technology policies and national strategies that shape and organize the techno-parks? (Level 2, Education Politics)
3. In what ways are the techno-parks integrated into the university-industry-government partnership, as a function of the capital accumulation process while also changing the fundamental principles of education? (Level 3, Politics of Education)
4. How do key managers and clients at the techno-parks, academics, and student interns at the universities work together within and beyond the university-industry-government partnership? (Level 3, Politics of Education)
5. What are the arrangements and mechanisms of the techno-parks that promote the university-industry-government partnership? (Level 3, Politics of Education)

6. What kinds of economic, educational, cultural, and spatial inequality are caused by the techno-parks? (Level 4, Outcomes)
7. Do techno-parks create any segregation? (Level 4, Outcomes)
8. What are the roles of techno-parks in urban redevelopment? (Level 4, Outcomes)
9. Do techno-parks create economic, educational, political, and cultural transformations? (Level 4, Outcomes)
10. If so, in what ways do techno-parks create economic, educational, political, and cultural transformations, while changing the purpose of higher education? (Level 4, Outcomes)

In recent times, much has been studied about techno-parks in the world and Turkey, but still there is a strong need to understand the dynamics of the techno-parks and the transformation of the higher education from the perspective of the social, cultural, economic, spatial, and even educational changes which develop segregation, inequalities, and social injustices. This study aims to contribute to the existing literature by explaining how techno-parks signify the transformation of higher education in the neoliberal policies.

In the following chapters, the transformation of the higher education from the context of the techno-parks is taken into account first by overviewing related literature in the second chapter. Then, in the third chapter, the methodology of this study is given by articulating the structure of this study in order to conduct the research. After the chapter of methodology, the forth chapter is about the findings of the study where in two different parts the results of the study are given. In the first part of the findings, the results are conducted systematically by analyzing systematically the various documents in order to answer the first five research questions. Then in the second part, the results are conducted systematically by interviewing people from the field, where the ten research questions are answered. Finally in the fifth chapter, the final remarks and discussions are prepared in order to summarize systematically the results of the research questions while clarifying and articulating how the transformation of the higher education has been in the process by opening and running the techno-parks. In this transformation, the effects of the techno-parks on social, cultural, economic, spatial, and educational are explained as well in order to critically examine how the techno-parks transform and change the higher education sector, which been suffering a loss of its main and traditional purposes as a result of neo-liberal policies.

CHAPTER II

LITERATURE REVIEW

This chapter aims to explore the literature regarding the transformation of the higher education and techno-parks in the world and Turkey in the post 1980 era. In order to analyze the related literature, the dynamics of the "Multi-Scalar Governance of Education" Analysis (Dale & Robertson, 2007, p. 8) is used. According to Dale and Robertson (2008), the discourses and practices, particularly related to the *technology* of the education sector, are becoming more complex than ever before because of international pressure. As Roger Dale and Susan Robertson (2007) mention, "education sectors have changed and are changing under the pressure of the political and economic aspects on the technological aspects" (p. 8). Additionally, there is no doubt that education, particularly higher education, plays an important and crucial role as an economic sector in the era of neo-liberal globalization. Therefore "existing assumptions and forms of analysis and methodologies [can be] unhelpful, even misleading" (Dale & Robertson, 2007, p. 9).

Hence, Dale and Robertson (2007) explain a new approach in order to analyze changes in governance of education from "sub-national" and "supranational" aspects, which is defined as "Multi-Scalar Governance of Education" Analysis (p. 8). As the details are given in the Figure 1, Dale and Robertson (2007) define "Multi-Scalar Governance of Education" Analysis as follows:

> One of the key effects of globalization on education is an evident shift away from a predominantly national education system to a more fragmented, multi-scalar and multi- sectoral distribution of activity that now involves new players, new ways of thinking about

knowledge production and distribution, and new challenges in terms of ensuring the distribution of opportunities for access and social mobility. One way of conceptualizing the changing nature, scope and sites involved in the work of education is to see a new 'functional and scalar division of the labor of education.' (Dale and Robertson, 2007, p. 8).

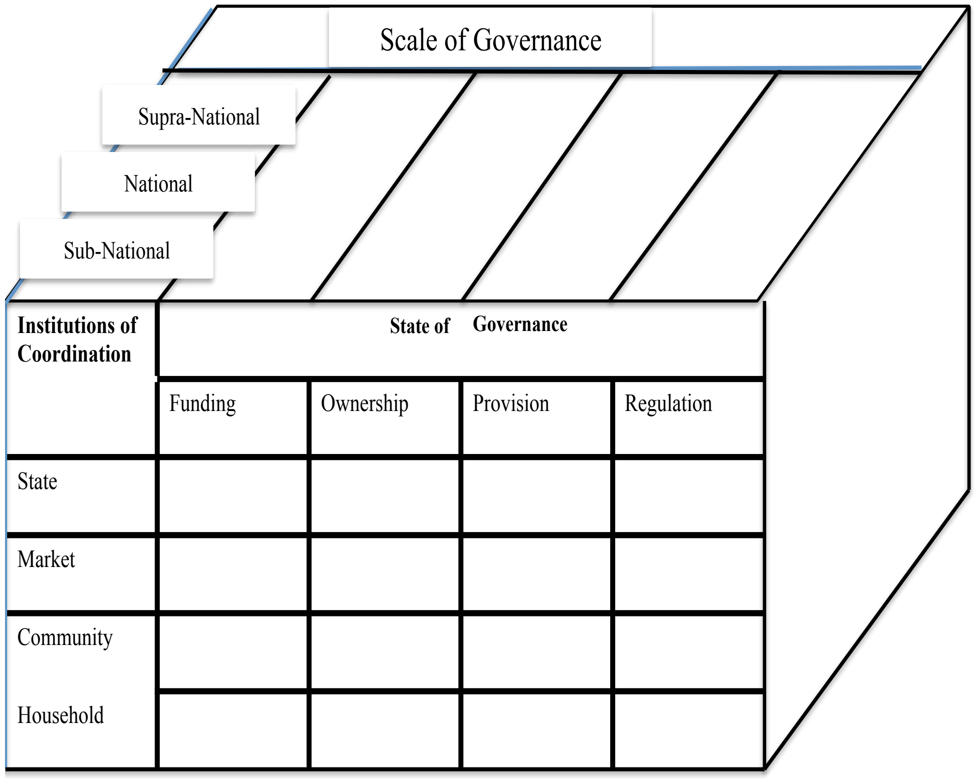


Figure 1.The Multi-Scalar Governance of Education (Dale, Bonal & Robertson, 2002, p. 478).

Furthermore, according to Dale, Bonal and Robertson (2002), "scale" refers to territories, such as "local, sub-regional, national, supra-regional, or global levels" (p. 479) where particular activities take place, such as the state level, market level, community level, or household level. While analyzing these activities in the state, market, community and household, it is important to problematize funding, ownership, provision, and regulations, as well (Dale, Bonal & Robertson, 2002). As Dale, Bonal, and Robertson clarify, one of these scales might be dominant over the others, particularly in the era of globalization. As they emphasize:

> The scales are effective through social processes such as legal codes, monetary regimes, networks, state regulatory institutions, and so on. While scales appear fixed, over the medium term and long haul, we can see that they are fluid and dynamic; they are produced, contested, and trans-formed through a range of sociopolitical and discursive processes, strategies, and struggles over what that social space contains. Struggles take place at different scales engaging an array of actors and interests, for example, capital, national states, para-state organizations, labor unions, local social movements, and supranational organizations. (Dale, Bonal & Robertson, 2002, p. 479).

For that reason, as Dale and Robertson (2007) have significantly pointed out, the "Multi-Scale Governance of Education" Analysis since education cannot be studied and understood as a single term education or higher education" (p. 4) rather it can be understood and studied by asking a series of questions. Furthermore, Dale and Robertson (2007) suggest a diagram in order to decrease the complexity in governing education by categorizing it into 4 types of activity. By utilizing the Figure 1 directly, "all the cells can be empirically studied" (p. 6). Thus, the diagram also reflects "the argument that it is neither 'natural' nor essential that all these activities are carried out by the state, or by any other single agency" (Dale & Robertson, 2007, p. 7). In that way, levels, agents, activities and scales have hybrid combinations. For instance, according them, "public private partnerships, complex forms of ownership, and scales from local to supranational" (p. 7) could be understood better (Dale & Robertson, 2007).

Additionally, according to Dale and Robertson (2008), "this essentially entails stipulative representations of 'education' with a set of variables or questions," (p. 9) given in Table 1. These "Education Questions" are used on for the educational issues in the global era. Therefore, in the "Multi-Scalar

Governance of Education" Analysis, the "Education Questions" are develop and explained by Dale and Robertson as follows:

> The basic idea behind the 'Education Questions' is that rather than assuming/accepting that we all mean the same thing when we are talking about education, we pose a set of precise questions that can frame discussions and provide a basis for coherent discussion and systematic comparison. The questions also open other questions about governance and consequence since knowledge—its production, circulation, consumption and transformation—is a highly political process. (Dale & Robertson, 2008, p. 9).

Table 1. Education Questions (Dale & Robertson, 2008, p. 9)

LEVEL	EDUCATION QUESTIONS
Level 1 Educational Practice	Who is taught, (or learns through processes explicitly designed to foster learning), what, how and why, when, where, by/from whom, under what immediate circumstances and broader conditions, and with what results? How, by whom and for what purposes is this evaluated?
Level 2 Education Politics	How, in pursuit of what manifest and latent social, economic, political and educational purposes; under what pattern of coordination of education governance; by whom; and following what (sectoral and cultural) path dependencies, are these things problematized decided, administered,and managed?
Level 3 Politics of Education	What functional, scalar and sectoral divisions of labor of educational governance are in place? In what ways are the core problems of capitalism (accumulation, social order and legitimation) reflected in the mandate, capacity and governance of education? How and what scales are contradictions between the solutions addressed? How are the boundaries of the 'education sector' defined and how do they overlap with and relate to other sectors? What 'education-related' activities are undertaken within other sectors? How is the education sector related to the citizenship and gender regimes? How, at what scale and in what sectoral configurations does education contribute to the extra-economic embedding/stabilization of accumulation? What is the nature of intra- and inter-scalar and intra- and inter-sectoral relations (contradiction, cooperation, mutual difference?)
Level 4 Outcomes	What are the individual, private, public, collective and community outcomes of 'Education', at each scalar level?

Hence, the transformation of higher education in Turkey with the use of techno-parks is analyzed critically by first overviewing the related literature according to these "Education Questions" which are the components of the "Multi-Scalar Governance of Education" Analysis. In the "Education Questions" as Dale and Robertson (2008) explain, there are four levels, "Educational Practices, Educational Politics, Politics of Education, and their Outcomes," (p. 8), which need to be questioned level by level in order to understand the dynamics of education.

In Level 1, the "Educational Practices" (Dale & Robertson, 2008), the practices and processes related to education issues are taken explicitly into account by asking of these higher education transformations: "what, where, how and why, when, where, by/from whom, under what circumstances and broader conditions, and with what results?" (p. 9). Additionally, how, by whom, and for what purposes these transformations have occurred are specifically examined in order to evaluate the practices and the processes in the techno-parks. Hence, the literature review is done to answer how the techno-parks develop in the world and in Turkey. Giving a general perspective related to the techno-parks, various techno-parks and their applications around the world are overviewed, including the case of Silicon Valley and its social networks as new value systems. More importantly, the historical background and the development process of the techno-parks in Turkey up until the present day will be shown, in order to study and understand the changes and transformation in higher education.

In Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9), the transformation of the higher education by means of the techno-parks is overviewed in the related literature. Therefore, the questions regarding the "social, economic, political and educational purposes" of these relationships are systematically analyzed, while taking into account "funding, provision, ownership and regulation of educational governance" (Dale & Robertson, 2008, p. 9). Hence, science and technology policies are discussed in order to give major reasons behind the transformation in higher education.

In Level 3, the "Politics of Education" (Dale & Robertson, 2008, p. 9) of "Education Questions" in the "Multi-Scalar Governance of Education" Analysis, higher education and the techno-parks are systematically and critically checked from the related documents. Hence, as explained by Dale and Robertson (2008) "what functional, scalar, and sectorial divisions of labor of educational governance are in place" (p. 9) is asked, in order to understand "the core problems of capitalism, which are accumulation, social order and legitimation, in the context of the "mandate, capacity, and governance of education" (p. 9). Additionally, regarding the transformation of higher education by means of techno-parks, "the boundaries of the education sector" is critically examined in order to understand "how the education sector overlaps with and relates to the other sectors" (Dale & Robertson, 2008, p. 9). As a result, in the literature review, the changes in knowledge-based economies are described, taking into account university-industry-government partnership together with the changes in the working force and new arrangements and mechanisms.

Finally, as Level 4, the "Outcomes" (Dale & Robertson, 2008, p. 9), the last "Education Question" in the "Multi-Scalar Governance of Education" Analysis, the related literature is systematically and critically overviewed in order to understand the outcomes related to the transformation of the higher education by means of the techno-parks. In order to analyze clearly the changes in the higher education, economic, social, educational, cultural, and spatial inequalities are articulated. Since the global markets have forced the world of higher education to make changes in the dynamics of the global university hierarchy, the commodification of higher education is analyzed, with a view towards vocationalism and the utilitarian conceptions of education as reasons for this inequality.

In the light of these four levels of "Education Questions" in "Multi-Scalar Governance of Education" Analysis, the transformation of higher education and techno-parks has systematically articulated. The following part is about the development of techno-parks and their impacts on the higher education as Level 1 of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. Additionally, all the studies and thesis done in Turkey are taken into account under the four levels of the "Education Questions" rather than giving separately at the end of the literature review.

Development of Techno-parks: Effects on Higher Education

In this part, the literature review is used to examine the development of the techno-parks and their effects on the transformation of higher education as Level 1, which is "Educational Practices" (Dale & Robertson, 2008) of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. From the development standpoint, the different types of techno-parks are firstly explained by taking into account techno-parks, science parks, innovative centers, science centers, science towns, and business incubators. Then, the establishment models of techno-parks are critically discussed to understand how the techno-parks have been changing the higher education. Furthermore, techno-park applications around the world are analyzed, including case of Silicon Valley and social network as value systems in Silicon Valley in order to point out that the applications of the techno-parks are contemporary phenomena in the world. The nations are intensively investing in techno-parks at the universities since they see that techno-parks as the places to produce and transmit knowledge for the technology-based economies. From this perspective, techno-parks in Turkey are systematically analyzed to clarify how the universities have been changing by means of techno-parks.

When critically analyzed, techno-parks have come to play important and crucial roles in redefining the boundaries of the university, the industry, and the government, particularly in terms of the individual property (IP) rights. Even though working organizations and employments vary from one institution to another, the conventional work structure is highly flexible and deeply rooted in high-tech labor markets. Therefore, the academics are the ones who are the best in rapidly changing skills in the volatile employment conditions, as Kodolak (2007) mentions. The changes make people to be mobile in the market where job definitions of workers are not clear and they work mostly in-between the projects. Castells explains that the flexible structures in organizations force new forms of networking and hierarchies (Castells, 1996, p. 2-3). Additionally, highly intellectual and well-educated people are needed who work mainly in the universities. However, there are bureaucratic limitations in the universities so that the new flexible organizations called techno-parks have developed to make easily mobile the employees who have academic qualifications. Furthermore, according to Beyhan, “nonstandard employment is another prominent feature of high-tech workplaces," which have experienced rapid growth in various forms of nonstandard employment, including temporary projects (1999, p. 48). The academic faculty and graduate students are well-fit because they are flexible, highly well-educated, highly intellectual, close to the newest knowledge, international, and not asking commitments for the growing trends in highly flexible, technological and innovative markets (Beyhan, 1999, p. 48).

According to the technology and knowledge-based economists, Seo (2006) emphasizes that the competitiveness in twenty-first century is directly related to building an efficient innovation system "for creating, diffusing, and utilizing the knowledge" (p. 18) by building in a particular region called techno-parks at the universities, like in Silicon Valley. The main function in the regional innovation system is "to create, diffuse, adopt and utilize the knowledge" (Seo, 2006, p. 18) in order to be globally competitive center in business and technology. Besides all these activities, science policies are provided in the region where the innovation takes place by improving university-industry-government partnership, which is becoming influential in innovation-based economies. For instance, Silicon Valley generates over "10 percent of the country's patents and receives over 30 percent of all U.S. venture-capital investments in business and technology with less than 1 percent of the U.S. population" (Seo, 2006, p. 34). Even though they have created significant problems and inequalities, the reason why most techno-parks have become so popular is by changing science and technology policies to engage in growing high-tech economies called innovation systems.

Consequently, according to Lawton Smith (2007), innovation systems, or the "idea economy" (p. 3), is improved by creating new ideas, methods, product designs, services, and businesses in specific regions, mainly at the university campuses. Additionally, innovation systems at the techno-parks are arranged to improve and promote basic and applied research to ensure the educational system, which prepares not only university students but also children and adults to become successful and profitable in a changing-innovative environment. Meanwhile, managers are trained to work in a globally integrated economy across boundaries of culture and geography, which requires an interdisciplinary approach in their education (Lawton Smith, 2007). An innovative platform as an innovation system has been created where people interact more often to cooperate and are legally protected and financially supported for the benefits of the private sectors instead of public sectors and individuals. The cultural diversity of different ethnic traditions, viewpoints, and value systems is purposely welcomed on a personal and professional level in order to strength unity in the community for the benefits of the corporations at the techno-parks.

However, the innovation systems, first mentioned in 1996 by Coenen (2007) were criticized particularly because they might not be applicable everywhere, like older industrial regions or countries with low economic conditions (Lawton Smith, 2007). While the universities are playing an important role, much research fails and the individuals are manipulated. In most cases, the relationship between the universities and the government are rearranged for the benefits of the corporations. Therefore, the relations are becoming interrelated instead of linear (Lawton Smith, 2007). Since 1990s, the governments' roles cannot be denied in the continued development and sustainability of the techno-parks with different regulatory oversight and funding, together with the local government for research and development and regulatory supports. In other words, as Penska mentions, the first significant strategy is developing “alliances among governmental entities through bi-lateral initiatives” (2010, p. 6). The activities have been influencing each other. The governments with the World Bank, the OECD, and IMF policies have complementary or supportive regulatory policies to manage the needs of the universities and the corporations at the local and national level. The governments have purposefully helped investments by improving networks and linkages among actors, institutions, and organizations. In that way, as Penska (2010) points out that a university-government-industry becomes an integrated and interactive phenomenon for neoliberal policies.

Unlike the first innovation approach (Lundvall, 1992), where innovation is seen primarily in the corporations, the latest studies show that the university and the government play more critical roles than the corporations. In a rapidly changing technological environment, the dominant role of the university can be seen by “generating intellectual and human capital as the source of innovation,” as Penska clarifies (2010, p. 6) In addition to the role of the universities, governments become important “in assisting innovation networks with programs, funding, and policies to support innovation and commercialization of discoveries” (Penska, 2010, p. 6).

According to Penska (2010), the interactions of the universities, industries and governments, as actors and institutions, are increased to empower different reciprocal relationships where institutional boundaries are broken. For that reason, the dynamic system is “co-evolutionary”, in order to help and increase the processes of innovation and commercialization. In the beginning, the government’s role was to fund research in a linear process, in order to develop new products and services in the market. However, since World War II, technological innovation has become more and more significant for economic advancement and the competitive advantage of countries. Therefore knowledge is considered as *intellectual capital* for those who create it, and “human capital” is considered to be the primary factor of production produced in special environments. Technological knowledge increases returns of capital in a specific economic geography. In that way, the geographic areas, economies, and clusters become important with the recognition where knowledge and technological changes can be seen. In other words, knowledge has become openly recognized as a public good, and the government helps facilitate and foster its development (Penska, 2010, p. 7).

In that way, universities have become recognized due to innovation while most companies try to be close to the universities to take advantage of knowledge. Hence, the new class has been emerged in interactive innovation systems and learning regions. Innovation is developed by these actors and institutions, which are strongly related to R&D in their activities. Consequently, private sectors companies, using the facilities of the universities and the policies of the government, are empowered in order to have better positions in the competitive global market by transferring technology through networks and alliances as innovation systems. The creation of knowledge, the formation of innovator or entrepreneur networks, and the clustering of these activities improve innovation of the private sectors. Therefore, planning, science and public policy, higher education policy, and economic policies are reorganized in specific regions, mainly in the techno-parks. The main role of these places is to improve innovation by increasing knowledge as the foundation of innovation, and by accumulating learning in a social context even though it is used for private industries rather than public good. As Penska (2010) claims:

> Because of rapid globalization, the concept of "competitiveness" becomes the economic strategy of nations, states, regions, cities, and companies. Different policies have been thought to increase the nation's competitive advantage and economic prosperity by opening new locations to develop innovation. Most of the corporations benefit from R&D, which has been generated by other companies and universities because they are physically close to each other or they are "technological neighbors". It is also seen in the states, like in California where high levels of public and private investments have increased patent activity which helps control technology based economy. (Penska, 2010, p. 22).

Hence, under neoliberal policies, technology is taken as the cornerstone of the nations' prosperity in the highly competitive global economic system. Among all these countries, the US has been playing the world leader role by creating, producing, and deploying innovative technology. In the technological and economic development, at least 80% of economic growth depends on innovation, which has been generated in special regions, particularly near the universities like Stanford in California. Even though individual brilliance and initiative in garage workshops was the origin of some of today's innovative giants, like Microsoft and Apple, the active involvement of the governments today, particularly the military, is critical to the rise of the techno-parks, like Silicon Valley. The personal computer (PC) has been embodied by the collaboration of the private innovators and the active government, with the help of intelligentsia at the universities. As Zachary Arnold mentions:

> Behind so many great advances in American technology lies an often-silent and neglected force: public investment. Technologies ranging from rail transport to nuclear energy and from microchips to the Internet were all invented by government-supported researchers, developed with public funding or first deployed through government purchasing and incentives; likewise, public investments routinely trained the high-caliber human capital or

> built the enabling infrastructures required for the widespread deployment of many of these technologies. Far from being a hindrance to innovation, the state historically has been one of its greatest drivers, playing a critical role in the development of many of the technologies and industries that now form the bedrock of modern society. (2009, p. 12).

Most of the time, the agencies of the military and the government promoted vital basic research by funding them directly based on their needs by giving them specific projects. As economist Vernon Ruttan points out:

> The role of the military in driving the development of computer, semiconductor and software technologies cannot be overemphasized. Markets that were almost completely dependent on the defense, energy and space industries nourished these technologies. In other words, the active needs of the federal government, particularly the U.S. military and space programs, have been increased critically the importance of Silicon Valley because the Valley has been working as the active labs of the government. The Air Force's SAGE air defense project, for instance, is the main reason of many innovations in computing design and production, including cheap manufacturing of computer memory, communication between computers, and the use of keyboard terminals. (2009, p. 8).

The government had been intensively involved in the development of computer software by funding the basic R&D that led to early computer programs and programming languages for defense agencies. Hence, a large proportion of the defense-spending budget was used in technologically innovative regions, particularly in the academic world, like establishing the first university computer science programs at MIT and Stanford. As Arnold clarifies, "the Department of Defense was the single largest purchaser of software well into the 1980's, ensuring the consistent market demand that fueled an ever-growing industry" (2011, p. 12). Besides funding and direct acquisition, the governments are also involved in the innovators and engineers of the innovative industry. As Arnold writes, "Many of the minds behind the groundbreaking work at Xerox's Palo Alto Research Center (PARC), the famous computer research center, and at corporations like Microsoft and Apple came straight from government agencies" (p. 12). More importantly, many programmers, system designers, and computer theorists who have been supporting university programs come to work at Xerox PARC, which are government-funded programs. For that reason, it is possible to see the cooperation between different universities – like Stanford, San Jose, and Berkley - with the help of government policies. Even though, in the rise of many innovations, the role of the government is not mentioned in the popular media, in reality public funding built the foundations of many innovations, like the PC, which are then used for the benefits of the corporations. The government's role is not only funding investments in research, hardware and software development, and highly developed engineering education, but also encouraging transformative, technological, and innovative environment to build a massive industry from the ground up for the private sector. The legal environment, on the other hand, is developed by the government as well in order to strengthen the industries in the stock markets. Additionally, the government helps the development of private equity, including bankruptcy laws to stimulate entrepreneurial demands for venture capital. Instead of protecting individuals and institutions by having intellectual property law, the techno-parks work as organizational communities where internal and external well-developed legal systems have been developed and used for different purposes of the private sectors. As a result, the partnership and collaboration of the universities, governments and industries are organized for the profit-oriented activities, which transform the structure and the purpose of higher education. Since the Obama administration declared technological innovation is a key aspect of achieving the most urgent national priorities - health care, education, and the energy infrastructure, particularly alternative energy (Talbot, 2009) - the corporations lobby and advocate that techno-parks should be supported by the government in these specific areas, in order to cope with the latest emerging developments and market challenges. The new policies have resulted in the creation of a smart and secure technology infrastructure for the benefits of the corporations. While supporting the R&D, the purpose of the governments is developing the workforce in the regions for political reasons. In that way, as Chopra mentions that "the main goals are to promote the use of technology in addressing the nation's biggest issues: healthcare IT, smart grids and education, and to promote an open government culture the transparency, participation and collaboration" (Talbot, 2009, p. 1). In light of this evidence, it is clearly seen that governments see the techno-parks as new places to decrease unemployment, while increasing their nations' positions of power in the highly competitive global economy. In order to understand the dynamics in the techno-parks, the rationale behind the techno-parks' creation is discussed in the following title.

Rationale behind the Techno-parks

As Hansson and his friends (2005) mention, together with incubators, technology centers and the other similar entities, the techno-parks are a group of "political instruments that promote technology development and regional growth" (p. 57). The most important role of a techno-park is to create an environment in which basic science studies at universities are transformed into commercially viable innovations. As Hansson and his friends clarify:

> The major expectation of universities from a techno-parks is commercialization of their research generating funds for future

> studies while the entrepreneurs and smaller high-tech companies want high quality prestigious accommodation, a close association with the university, other similar businesses on site and the managerial services provided by the park staff. Large multinational businesses, on the other hand, see the techno-parks as the providers of flexibility for short-term projects and proximity to already established cooperation partners at universities. (2005, p. 14).

Additionally, the local governments expect the techno-parks to support regional growth, while the national governments expect that the techno-parks should increase the technological capability of the country and so on. As a result, each stakeholder in the techno-park has a specific goal to be achieved. However, the common goals are to transform the scientific research into commercially valuable projects as Hu (2005) mentions. Before overviewing the literature review, it is important to clarify the various organizations called techno-parks. In the world, there are various organizations, which are mainly called techno-parks, science parks, innovative centers, science centers, science towns, and business incubators. In each institution, these centers have different names, different structures, different managements, and even different functions. The general meaning of the different types of institutions is given below as techno-parks, science parks, innovative centers, science centers, science towns, and business incubators, before going further.

Techno-parks, Science Parks, Innovative Centers, Science Centers, Science Towns, and Business Incubators

As Polat (2007) mentions, a *techno-park* is defined as high-tech park, which is formally set up as a legal organization. This can be also a technology development center "with its own territory organized on the basis of a scientific research center or educational institution, such as a university" (Polat, 2007, p. 57). These organizations are under the control of national policies. Another type of organization is also called a techno-park, where separate commercial firms working in different technological directions are physically organized in one office building or a closed territory of offices. The activities in the techno-parks are not related with any production or means in the creation of intellectual property. In these organizations, as Hu (2005) has explained the formal process is followed by selecting "innovative projects" (p. 8). Being a member of a techno-park is enough to conduct a research project. In recent years, techno-parks have become so popular that the name is even used for office centers, which have little-to-no connection with technology research. The name "techno-park" is used in trade centers of home appliances and domestic electronics as well, like *techno-polis* (Polat, 2007; Hu, 2005).

Moreover, a *science park* is the same type of technology development center, which is seen in a techno-park. It has its own territory, which is usually organized with an educational institution- a university (Polat, 2007). Some universities have preferred to use techno-parks instead of science parks or vice versa.

Additionally, as Polat (2010) clarifies, an *innovative center* is used for technology development organizations, which is "a formal legal entity and is aimed at the development of innovative ideas, the selection of innovations, searching for financial resources for innovative developments, and service provisioning" (p. 65). In many cases, the "innovative center" is an organization, which is smaller than a techno-park and focuses on developing and selling technologies, solutions and services throughout the technological sector, including IT. They are different than real techno-parks in terms of lack of finances, poor technology and material inventory, lack of focus on a concrete technology, unclear organizational structure, and absence of common juridical entity. Since they have weaknesses, the innovative center community is usually represented by a number of regional organizations, with less capability to be promoted widely and thus less opportunity to grow from a small company into a large organization (Polat, 2007, p. 65). The "innovative center" has been called for a long time, but it is used less often now due to the old-fashioned operating style and unclear focus of its activities. Some of these organizations have transformed into solution providers, with system integration and service provisioning capabilities. At the same time, there are respectable and well-known organizations around the world known as innovative centers, and they are strongly supported by both local and national governments (Polat, 2007).

A *science center*, furthermore, focuses on not only engineering technology but also medicine and education. As Polat (2007) explains, "science centers have lost their original meaning, which was initially related to the wide area of services, very often obscure ones, which were provided by IT firms at the time of their founding back in the early 1990s" (66). The term "science centers" is also used for "innovative centers" (Polat, 2007).

Another kind is a *science town,* a well-known type of technology development and production settlement. It is created for the specific purpose of researching, developing and producing certain complex technological solutions. As Polat (2007) points out, the majority of the population of such towns is engaged in the production cycle in the science town.

And last but not least, a *business incubator* is a general legal term that describes an organization whose main purpose is to support startups and small firms that do not have enough capabilities to develop innovative ideas. Business incubators rent out office space with the appropriate infrastructure and provide necessary services, such as accounting, consulting and legal services. Usually, the term is used together with other related descriptive terms to characterize the focus of an organization (Polat, 2007).

As Monck and his friends (1988) mention, a number of entities are more concept-based rather than being acting models, such as *innovative cities, innovative clusters* or *territorial innovative clusters*. Implementation of these models in the high-tech industry very much depends on government economic policies. According to the linkage between university and the companies could be formed in many ways, such as transfer of people, transfer of knowledge, companies sponsoring the research and access to the university facilities (Monck et al., 1988). The major goals for techno-park establishment can be summarized as follows by Link and Scott (2007):

> Creation and growth of new technology based enterprises; Turning research and development activities to investments; Encouraging entrepreneurship; Increasing the number and types of economical activities of the region; Promoting technology transfer; Commercialization of the university's inventions and know-hows; increasing the education capabilities; Generating employment opportunities for the university graduates who stay in the region; Making profit from the park; Creation of employment opportunities, which pay higher salaries; and Developing chances and capabilities for workers. (p. 11).

Hence, the structure and the function of the techno-parks are changing from one region to another and even from one nation to another. In this study, the name of the *techno-park* is used in general in order to study critically how they have been transforming the universities. In the following title, the establishment models of the techno-parks are analyzed to understand the dynamics in higher education and its transformation.

Establishment Models of Techno-parks

The structure and the function of techno-parks may vary from country to country, and from one university to another in the same country. As Polat (2007) clarifies, techno-parks can be classified using some models based on ownership structure and functions. Below the model based on ownership and the model based on functions are highlighted.

Model Based on Ownership

The techno-parks can be classified into five models based on ownership. As Polat (2007) mentions, in the state weighted model, governments can directly have the major part of the techno-park establishment or becomes the only founder. In this model, the state cooperates with the regional or local government institutions in order to complete the infrastructure, such as the water, electricity, and communication networks. The state plays important and crucial role not only as an owner of the infrastructure but also regulates the incentives, tax cuts, privileges, or easy credits. For instance, in Great Britain, the state fund comprises 60 per cent of funding. On the other hand, in Turkey this percentage is nearly 53 per cent. University weighted model, the universities create major sources for techno-park, which is established inside of the university or near to it in this model. For instance, in England, universities like

Cambridge, Surrey, and Heriot Watt have their own techno-parks. This is also the common model in Turkey as in the case of ITU, ODTU, Hacettepe and Bilkent techno-parks. On the other hand, in the private enterprise model, universities generate partnerships with the strong financial institutions in order to construct the buildings of techno-parks. These kinds of parks are established in the areas that have high rents and high land prices. The major aim of these kinds of techno-parks is profit. Ankara Cyberpark is the best instance of application this model in Turkey. It is a local government-weighted model; in recent years, the local governments have started to establish techno-parks as a way of regional development or generating the new employment opportunities, especially in growing and developing cities. Some parks in England established their infrastructures and financial capabilities with the help of the European Union Economic and Regional Development Fund (ERDF), European Coal and Steel Community (ECSC) and European Investment Bank (EIB). In Turkey, the Mersin Techno Park and Ulutek TGB are the examples of this kind of techno-park. Mixed models, universities, local governments, banks or associations collectively establish techno-parks. In these types of techno-parks, capital ratios can be found in different percentages. In Turkey, most techno-parks belong to this model such as Göller Bölgesi Technocity, Kocaeli University TGB, and Konya Technocity (Polat, 2007).

Model Based on Function

The first and major purpose of the techno-park is nurturing small and middle enterprises or new start-ups, as well as for firms to conduct research and development or technology transfers, and to produce or assemble advanced technology products. As Polat (2007) clarifies, the orientation of techno-parks can simply be categorized into three types with respect to the goals and functions. The first is innovation/incubation-oriented techno-park. This kind of techno-park tries to stimulate industrial innovation and technology development. They generate an environment to attract R&D personnel from universities and research institutes. Innovation/incubation oriented techno-parks are usually seen around the universities and research institutes. The second is research and development oriented techno-park: for this type of techno-park; the main goal is to develop and innovate the technologies mostly related to industry, or to promote industrial upgrading. The attraction of firms, which operate in a region, and the evaluation of measures are the major key elements in order to encourage firms to participate in research and development. The best place for this kind of techno-parks is near universities or research institutes. The major targets of production-oriented techno-parks are to increase the speed of economic growth and establish new regional industries. When items are produced in production-oriented techno-parks, these items share some special characteristics like large market potential wide use, high value addition and technology intense (Polat, 2007).

In order to understand the changes in the techno-parks, it is better to overview the literature review related to the techno-parks applications in the world. Hence, in the following title, the techno-parks' applications in the world are given.

Techno-parks' Applications in the World

As mentioned in the World Bank Report (2012), the first examples of techno-parks are in the US. These are Stanford Research Park, established in 1951, and Cornell Business & Technology Park, established in 1952. A few new techno-parks were additionally founded until 1972. After that year, the number of techno-parks started to increase, with a boom in mid-1980s. There are nearly 200 techno-parks in the U.S.A. Then, the techno-park idea enlarged to Asian countries. International support played an important place in the techno-park applications in developing countries. For instance, many countries, such as China, Korea, Taiwan, Singapore, Australia, Russia, Hungary, and Turkey have opened techno-parks with the help of United Nations Development Program (UNDP). Silicon Valley, for instance, is the world's center for producing advanced information technologies: semiconductors, microcomputers, computer peripherals, and lasers. Its economy is among the fastest growing and wealthiest in the United States. The total number of high tech firms in Silicon Valley was about 8000 in 1983. Certain factors were vital to the rise of Silicon Valley, such as an availability of technical expertise, infrastructure, venture capital, job mobility, and information-exchange networks. Sixty percent of the Nobel prizes were taken in Silicon Valley. Moreover, all innovations in electronic industry were made in this techno-park as given in the Report of World Bank in 2012 (p. 2-4).

The establishment of Route 128 in MIT started in 1933 and continued up to 1951 in Massachusetts. In the 1970s, more than 800 companies were located in the park. The lowest unemployment rate in U.S.A. in 1988 was in this

Massachusetts region. This techno-polis is close to a free market economy. As it is mentioned in the World Bank Report (2012), it has abandoned the three Rs: no regulations, no rules, and no restrictions. The major function area is electronics in Route 128. The last example is the Research Triangle Park. It started its functions at the end of the 1950s. North Carolina's Research Triangle Park is still pretty small compared to the size of Silicon Valley and Route 128. Thus, the cooperation with universities produced a beneficial result of Research Triangle Park (World Bank, 2012).

After the United States, the first examples of European techno-parks started in England, which today has the highest number of techno-parks in Europe. In 1972, the first U.K. techno-parks were established in Cambridge and Heriot-watt. The policies that stress the importance of cooperation between the universities and the industry had a great role in the establishment of these techno-parks. After the success of these techno-parks, establishment of other techno-parks continued until the end of 1980s. In 1983 the number of techno-parks was 8; this number reached to 38 in 1989. By 1992, there were 32 parks in operation, as most of the older U.K. universities had adopted this organizational innovation. Over time, more "polytechnics" or "new" universities also established such a facility, so that by 1999, there were 46 fully operational university techno-parks in the U.K. Today, 85 techno-parks are registered to the United Kingdom Science Park Association (UKSPA), which reports that 80 per cent of the techno-park firms have fewer than 15 employees and that over half of the firms located on these facilities are engaged in R&D and new product development. It is possible to compare this employment level with other

European countries to see the placement of England with respect to employment opportunity (World Bank, 2012).

The other techno-parks in EU are not as well developed as in the US. In Greek techno-parks, the average employment size is 5 employees, while the average employment size is 26.7 employees in Spain and 26.6 employees in Ireland. In France, a private non-profit company founded the first techno-park of Sophia-Antipolis in a non-urbanized area in Southern France near Nice in 1969. The French techno-park movement's real and major aim was to increase the speed of the regional economic development. Technology transfer activities had therefore been realized among the Research and Development (R&D) offices of the corporations, which are found mostly in the same region. The average size of the French techno-parks is much bigger than English ones. Three key factors have sustained the development of Sophia-Antipolis: the cross-fertilization of ideas, individuals, and organizations. However, in England the situation is completely different. The major goal of techno-park in England is to create competition, finding solution to unemployment and recession in the economy (World Bank, 2012).

After the United States and Europe, techno-parks started to appear in East Asia, especially in Japan, Korea, and Taiwan. In Japan, the main aims of the institution are to escape from the difficulties associated with the cities and promote the growth of the less developed regions by creating an attractive area for the industry and academy. The real development strategy depends on the natural resources of the regions. An increasing number of techno-parks began operation in the latter half of the 1989s. Techno-parks in regional innovation systems act as catalysts that facilitate localized knowledge flow. The Tokyo

Institute of Technology (TIT) identified 158 techno-parks in Japan in 1997. Tsukuba is the first example of techno-park movement in Japan. The first decision to create this center was made in 1963 and the Tsukuba techno-park was formally established in 1970. The research-oriented dynamic structure of Tsukuba University gave an advantage of developing relationships between the researchers. The research agencies in Tsukuba compose 30 percent of all Japanese national research agencies and 40 per cent of all personnel. They expend to 50 per cent of the total R&D budget. The rest of the Tsukuba techno-park area is suburban or development district, where there are three major research parks for private industries: Northern Research Park, Western Research Park, and Toukoudai Research Park. Kazusa Academia Park (KAP) was established by learning from the failures of Tsukuba techno-park. KAP in Chiba prefecture is designed to aggregate bio-industries from Tokyo and ignores local ones including the world-top soy-sauce industries. Another enterprise is Higashi Hiroshima Technology Park. The basis of project is Hiroshima University, which is founded in the center of Hiroshima. After Japan, techno-park application started in Korea, owing to the fact that Korea is the closest neighbor of Japan. The main objective of Korean techno-parks is often to promote the application of science by bridging the gap between research and development, and commercialization. Korea's unprecedented economic growth, from 1960 to 1995, is largely attributed to *chabol* (groups of large companies) with the assistance of favorable policy of the central government. As a result, Taedok techno-park was established in Pusan to generate solutions to two major issues: the centralization of enterprises and protection of independence against Japanese firms. In Taiwan, different strategies were followed in regional development and reindustrialization. As of 2001, Taiwan had four techno-parks, namely Hsinchu (1980), Tainan (1995), Chunan (1998), and Taichung (2001). HSIP companies owned only 2% of the total number of patents in Taiwan in 1994; this number grew to 10% by 1999. [30] The Tainan Science-based Industrial Park (TSIP), established in 1995, has become closely integrated with regional industries and local development. Thus, high-tech and innovative firms generally remain concentrated in specific locations, use shared facilities, and enjoy common economic benefits. These specific characteristics can be transformed into regional development. From this perspective, the techno-park can be an effective tool for integrating industry and regional development. Comparing the development of Hsinchu Science City in Taiwan with the planned development of Tsukuba Science City in Japan and Taedok Science Town in Korea reveals some unique experiences in Taiwan, in that the government-led projects have successfully stimulated the regional, and even national, emergence of innovation systems and economic development (World Bank, 2012).

Besides the European and the East Asian examples, there are also developed techno-parks on the Australian continent. One of the most famous techno-parks of Australia is that the Western Australia Technology Park (WATP), established in 1985 in the capital city of Western Australia. WATP is different from other techno-parks owing to the fact that it is a state-governed rather than university initiative. Moreover, this place is not a suitable location for a sustainable technology park due to the small population, low population densities and distance from major markets.

There is also great development in techno-park applications in Israel, Ireland, China, and Russia. Today, a total of 18 techno-parks are established in

Israel. The first techno-park of Israel is Institute of Weisman; the second one is Carmiel, which was established in 1984 by the Israel government, and is very close to Haifa city. The third is Etziona International Scientific Park established by the Herodian Association in 1991. The first techno-park became the pioneer of the pushing force for the industrial development of Israel. In 1980s, more than 3000 people were employed and more than 30 corporations were placed in the Rehovot Science Park. By the end of the 1990s Israel had the world's second most profound techno-park after Silicon Valley, and had formed one of the world's most successful high-technology clusters, which generated $15 billion in export revenues in 2000. Today, Private high-tech businesses are focused in four small and different clusters: Har Hotzfim and Malkah Technology Park in Jerusalem, the Rechovot/Rishon LeZion area (which includes the famous Weizmann Institute), Haifa Technology Park, Herztiliyah Pituach area. Ireland has been termed the "Celtic Tiger" due to its similarity to East Asian economic successes in the late 1990s. Ireland has one of the highest concentrations of information and communications technology (ICT) activity and employment among the OECD countries. It is the fifth largest exporter of computers in the world, they account for more than a third of all Irish exports and one third of PC is sold in Europe are made in Ireland. Plassey Technology Park is established near the Limerick city and this park is the oldest park and techno-pole of the country. It has been operating nearly for 30 years. The major aim of the techno-park is to increase the cooperation and collaboration between university and industry. The techno-parks drive the industry in Ireland and they are located in Dublin with the smaller regional clusters in Corck, Limerick/Shannon and Galway, the latter including Nortel and over 50 small and medium-sized companies. The new key opportunity sectors being targeted by Ireland are informatics, digital media, and e-business and health sciences. Moreover, especially business application products are a component of this activity. It has largely been driven by foreign direct investment (FDI), though recent evidence suggests that the indigenous software industry is now growing at a much faster rate than the multinational sector. It is also a major factor in high skill, high wage job creation since the early 1990s and comprises a key element of Ireland's national innovation system (World Bank Report, 2012).

After the Celtic Tiger, the Chinese Dragon takes its own place in the world. Japan and U.S.A. are the pioneers of the technology production race. On the other hand, European countries have become the "One Europe", and China is the world's most populous country. Thus, China has aimed to become the super power of the world. In the middle of the 1980s, the government of China decided to apply three major policies: aiming to increase scientific research, development of high technologies, and growth of the national economy. Shenzhen Science and Technology Park was established in 1985. Then, in 1988, the Torch program was started to commercialize the findings of high technology researches. Proceeding of this program placed an important role in the establishment of the high technology industrial areas. From that time to the present day, 40 techno-parks have been established in China. 27 of them are formally recognized as techno-parks. The Chinese government supports cooperation with foreign countries. Today, more than 1,700 corporations are established in Shenzhen Science and Technology Park and they have employed more than 130,000 workers (World Bank, 2012).

In Eastern Europe, developments have not been as fast as those in Western Europe. At the same time, the scope of this development also has been limited due to the fact that the economic, political, organizational, and cultural level obstacles have prohibited the entrepreneurship activities. Russia also understood the significance of the science parks after China. The concept of Science Park was introduced in 1988 following the publication of an article in a Russian scientific journal. Universities, scientific institutions and industrial enterprises constructed the first science park in Tomsk in 1990 jointly. The number of Russian science parks was fifty-two in 1996 and the number of small firms based in these structures numbered more than 1000. By the beginning of 1998 the number of university technology parks had risen to 62. Seven are considered to be the technology park leaders, comparable to Western science parks; fifteen are in the process of catching up while the others remain at a more elementary level. The St. Petersburg Techno-Park is the most famous one among Russian techno-parks. There are three major characteristics of Russian technology parks. Firstly, the number of founders ranges from three to twenty one. Fifty per cent have more than ten founders, mainly large enterprises, and universities. Secondly, 93% are individual companies, while the remaining 7% are subdivisions of universities. Thirdly, the average number of firms accommodated is 20. In March 2006, the Russian government approved a program to create more techno-parks, which will incorporate high-tech enterprises in such sectors as Nano-, bio-, information and other kinds of technology, as well as scientific research organizations, educational institutions providing staff for such enterprises, and other related ventures. The area of each technological park will be about 700,000 square meters, with 40% of this designated for residential buildings, 25-30% for industrial purposes and 30-35% for infrastructure. The state allocated approximately $1.3 billion for the project, around 15% of all construction costs. Private investment was expected to exceed $6 billion. Russia built eight industrial techno-parks by 2012 as part of a federally approved 2006 program, the chairman of the State Duma's subcommittee on technological development (World Bank, 2012).

Among all these techno-parks, Silicon Valley is widely considered the most effective in the world, the techno-park that all others, as well as local and national governments, take as an example. In the following title, the case of Silicon Valley is clearly discussed along with its value system.

Case of Silicon Valley

As Koepp mentions, the context of Silicon Valley is important to understand the economic changes and its geographical, political and cultural consequences as well. Silicon Valley represents the dominant ideology of the 21st century economic system, which is highly competitive and depends on advanced technology. According to Koepp, “the rags-to-riches success stories, revolutionizing back-through, gee-whiz gadgetry, explosive business growth, headline-grabbing corporate feats, and extraordinary economic wealth” explain the dynamics in Silicon Valley (2002, p.12). Additionally, Kodolak explains the success of the Silicon Valley as follows:

> Silicon Valley is more popular and a source of inspiration throughout the world. Silicon Valley became a role model or a ‘trendsetter’ for many newly established high-tech complexes. It influenced a large geography of technological change, and even the names of the complexes were imitations of Silicon Valley, which, denotes it shows how people are eager to claim their own

> version of Silicon Valley. The mountainous pinnacles of Austria now protrude a Silicon Alps. A swath of Silicon Tundra can be found in the frigid latitudes of Canada. An industrial oasis is known as Silicon Valley graces the arid landscape of Israel. A Silicon Fen stretches over the green lowlands of England. The dykes of the Netherlands project a Silicon Polder. The high-tech product workhorse of the world, Taiwan is known as Silicon Island. Areas lacking the identifiable geology for siliconization simply localize the Silicon Valley title: Bangalore is called the Silicon Valley of India; Singapore and Penang vie for acknowledgment as the Silicon Valley of East Asia. (2007, p. 1).

Castells (1999) provides a further description as well:

> If the first Industrial Revolution was British, the first Information Technology Revolution was American, with a Californian inclination. Silicon Valley was formed as a milieu of innovation with the generous funding given mostly by the Ministry of Defense and coming together of skilled scientists and engineers. (p. 53).

On the other hand, as Benner (2002) has explained that the story of Silicon Valley can be traced back to the works of Frederick Terman, who was the ambitious Dean of Engineering, at Stanford University. His personal support to two young students (William Hewlett and David Packard) created now a world-known company named Hewlett & Packard. During the Second World War, the company had the chance to grow and later continued to expand. The war-related aerospace and electronics enterprises contributed to the development of Santa Clara countryside, which was an agricultural valley just ten years before. From 50's till today, Silicon Valley have seen cutting-edge technological breakthroughs, and transformed them into new industries. Referring to Benner (2002, p. x), semi-conductors in the 1950's, integrated circuits in the 1960's, microprocessors in the 1970's, powerful personal computers in the 1980's, Internet in the 1990's, software development at the end of the century and nanotechnology in these days are the products of this relentless innovation. Prestigious universities such as Stanford, Carnegie Mellon, San Jose, Santa

Clara, National and DeVry are located in Silicon Valley and Berkeley, Davis and Santa Cruz campuses of University of California use its sources of research. Silicon Valley also hosts such pioneering software companies as Cisco Systems and Oracle, network companies like Sun Microsystems, and Internet portals like Google and Yahoo (Benner, 2002, p. 83). According to Florida and Keeney:

> The newness of Silicon Valley leads to development of new forms of organization, networking and employment patterns instead of clumsy structure of traditional industries. Hence, the origins of Silicon Valley reveal strong commitment to the principles of information economy. It displayed great success in the application of those abovementioned characteristics. Silicon Valley became the global center of innovation and production by constantly reinventing itself, extensive use of flexible labor, adaptation to the rapidly changing skill requirements, availability of technical expertise and nonstandard forms of employment. (1990, p. 68-69).

Furthermore, as Benner emphasizes that there are three elements that characterize the labor markets in Silicon Valley. First, there is a considerable increase in temporary employment, independent contracts and forms of nonstandard employment. As an example, the percentage of the nonstandard forms of employment is 44% of total employment in the Valley (2002, p. 48). As he states, even the permanent employment is shaped by short periods of time and rapidly changing skill demands. Second, job turnover and mobility is high among Silicon Valley professionals. Lastly, rapidly changing technologies and market conditions can easily decrease skills. Those characteristics led to a distinctive work culture at Silicon Valley. According to Kodolak, however, the culture of Silicon Valley, although filled with powerful institutions and organizations, nonetheless 'celebrates' individual accomplishment and places the burden of success and the failure on the individual. People believe themselves, as individuals, to be responsible for their fates and bear the social and emotional responsibility for life-long earning and strategic planning. This means that individuals constantly walk a fine line between needing to change and ‘re-invent’ themselves, and staying on task long enough to reap the rewards of sustained expertise. They must both be flexible enough to capitalize on new opportunities and yet sticking with a skill set and type of work long enough to accumulate expertise. In short, Silicon Valley is a model of innovation with its flexible labor market and dynamic structure in our age, which focuses on technological change. Such characteristics of the information age, such as the separation of scientific technical knowledge, high-tech companies, and highly qualified labor is distinctive in Silicon Valley (Kodolak, 2007, p. 2). Most studies show that the success of the Silicon Valley is related to their social network, which is taken as a value system. Below, the details regarding the social networks and value systems are viewed.

Social Network as Value Systems in Silicon Valley

Most researchers, like Penska, are looking to adapt the success of Silicon Valley to other techno-parks around the world. Penska (2010) clarifies in his studies that innovation is developed mainly “on the organizational level by research and development occurring through private sector firms, the university, government labs, and partnerships among all three” (p. 24). Therefore, the model of the industry-university-government partnership has become important. Additionally, on the individual level, most of the faculty members, scientists, researchers, and entrepreneurs collaborate and cooperate on an inter-and intra-institutional basis. For that reason, the R&D process is a kind of “interactive learning process that requires knowledge exchange, interaction, and co-operation among various actors in a production network or value chain" (Penska, 2010, p. 24). Consequently, innovation has become a medium for facilitating networks of these individuals and institutions. As Scott mentions, people have thought that the "spatial and locational attributes" help individuals and institutions that innovate and drive economic growth (1998, p. 3). For instance, according to Scott, the physical locations of institutions and individuals in "clusters" help them in terms of "networks." In that way, individuals share and improve their own knowledge and creativity, which improves and facilitates innovation (1998, p. 3). Geographically close institutions upgrade innovation and development as they are discussed in the different literature, such as "learning regions, creative fields, and national systems of innovation, regional innovation systems and new industrial spaces" (Scott, 1998, p. 4).

In this globalized world, Florida (2002) clearly explains that the growth of nations, regions, and cities are related to innovation in a specific economic geography. Cities can grow when they are producing new ideas with workers and firms crowding together in dense areas to learn ideas from one another" (p. 84). In other words, the new economic growth is related to "economic opportunities, relying on individuals, the human capital, who drive innovation. However, Florida (2002) points out the relationship among the entrepreneurs, scientists, and others who drive innovation (called the "creative class") in the specific geographical region. It provides the ambiance and opportunities for the people who create and innovate, leading to development, and self-reinforcing clustering (p. 15). Knowledge is distributed to empower economies and innovative progress. Most companies choose highly intellectual people, who have scholarships and are located close to universities, to increase their access to knowledge (Florida, 2002). Penska defines the social concepts of innovation systems as follows (2010):

> The institutional idea of innovation is deployed. Innovation is the process whereby exploration of knowledge, or research possibly leading to discovery or invention, is transformed by the application or exploitation of knowledge into commercial products, processes and services that have market value. The term "systemic innovation" denotes interactive linkage between generators, diffusers, and exploiters and commercializes of new knowledge. These are the research centers, publishers and patentees, entrepreneurs, investors and marketers operating in an open techno-economic network in a given space such as a region or nation. (p. 2).

This innovation is defined as a process, which does not occur in isolation, but in collaboration and interdependence with other organizations. While defining the value systems, it is important to take into account social system and socioeconomic places. In other words, it is possible to understand the social context where economic activity takes place. Most of the time, the activities can be changed from one geographic location to another within different social and institutional context. Important social conditions shape value systems in innovation-based communities, like organizational integration, financial commitment, and strategic control. The value of knowledge is related to public good. Innovation becomes understandable and justified if the learning regions, knowledge-based clusters and networks of innovators and entrepreneurs have part of the territorial development. As Penska emphasizes, helping institutions with the new policies is a new strategy with new initiatives, including "tech transfer policies to facilitate commercialization of discoveries from the laboratory to the marketplace, tax abatements and credits, free land and buildings, loan and grant programs, business services, legal protection, job training, and local infrastructure improvements, such as access roads and property remediation" (2010, p. 32). Hence, new value systems are created in the geographically clustered regions instead of focusing on the technical, economic, legal, educational, or political aspects of the region. As a result, these social conditions generate the value systems in Silicon Valley. The social networks work within all kinds of institutions; the university, government, and industry, where the flow of people, resources, and information are seen intensively among the sectors. That is the reason why these flows among the institutions make them unique in this global economy. The capability of developing social networks as their value systems helps use efficiently and effectively all their resources. In other words, not the quantity but the quality of the social networks is important in the region where all the small firms are connected to the larger firms, that are in turn connected to global partners and suppliers (Penska, 2010).

Furthermore, according to Castell, a "social network" can be defined as a set of nodes or actors, persons or organizations, linked by social relationships or ties of a specified type (p. 21). This tie or relationship between two actors has both strength and content, which can be information, advice, or friendship, shared interest or membership, and typically some level of trust. Trust is the most important factor. In a social network, for instance, connections are developed based on information from the good and bad aspects of peoples' reputation, which spread more easily in this specific region. The social networks are important for all kinds of small and large companies. Networks help the movement of labor force, the development of influence and power, and the actual creation of innovation. Consequently, while the region attracts highly intellectual and gifted people, so the intellectual level and knowledge have been creating a kind of synergy that improves multi-faceted teamwork capabilities: another form of "social capital" in the era of neoliberal policies (Castell, 2003, p. 21).

Hence, according to Penska, the ability of Silicon Valley to restructure and transform itself according to the changing conditions is because of extensive labor mobility in the highly intellectual population. The social networks related to the work force develop professional bridges between organizations and firms. Therefore, both sides benefit from better dual outcomes. Additionally most of the employees who have been hired by means of the professional social networks quit less often; they prefer to experience mobility *inside* the organization while developing loyalties. As a result, this unique culture and social network empowers the value systems in the region by improving trust - in a neoliberal context. In addition, the highly intellectual people of the region have the chance to work not only in the same industry, but also move from one industry and/or institutional sector to another, like from technical firms to venture capital firms, or to university research centers. In that way, they can build strong ties and connections throughout the entire industry (Penska, 2010)

These social networks can also mean power and influence. As Penska (2010) emphasizes, in the university techno-parks, people who work as financial consultants or lawyers can easily influence the structure and future development of the companies. They have multiple roles in these institutions, where they work with all their effort because they are scared of losing their reputation. For that reason, the cooperation and collaboration among these people is among the strongest in all of the working world. The last but not the least outcome of these social networks is the production and innovation. Most of the time, the social networks help transmit information and knowledge among different firms and individuals in order to upgrade innovation. There is no doubt that having the right product at the right time plays an important and crucial role for the future of a firm in these rapidly changing markets. Hence, the networks help people to mobilize capital, find relevant and reliable information quickly, and link them to the appropriate institutions in order to develop innovation by having high level of creativity. As Penska (2010) defines, this network regulates the practices within the firms, like collaborative manufacturing as a new logic of production, and "flexible specialization" (p. 21) to respond quickly and to meet the demands of this changing marketplace of the neoliberal economies. In the region, a complex division of labor in the small and medium-sized companies has developed, empowered by local political, financial, and educational institutions. It means that these social networks in the neoliberal dynamics encourage collective learning, entrepreneurship and leadership among the people. Informal communications, collaborative projects, research associations and universities, and common ties help individuals and institutions cope with the changes in the dynamics of the neoliberal markets while preventing stagnation. According to the World Bank Report (2012), in the quick access to resources and know-how that cannot be produced internally, the main institutional sectors of the university techno-parks, including the region's educational, industrial, financial, and legal activities, play a strategic role; therefore the social networks work in conjunction with neoliberal policies to regulate the activities in Silicon Valley. From a general standpoint of the techno-parks in the world, the techno-parks in Turkey are critically highlighted in this literature review in order to problematize some findings of this study. Hence, the following title is about techno-parks in Turkey.

Techno-parks in Turkey

The development of the techno-parks in Turkey has had the same historical background as other nations. As Polat (2007) mentions, The Turkish government and its agencies have made decisions in response to changes in the knowledge-based economy. Firstly, the Supreme Council for Science and Technology approved an Agenda in enhancing technological capacity at its meeting on 25 August 1997. At its meetings on 2 June 1998 and 20 December 1999, it made some further additions and amendments to this Agenda. A study group established a mechanism to evaluate the “off–set” proposals and prepare draft documents in order to make better use of offset agreements, signed within the framework of large scale projects for procurement and manufacturing of goods and services under license, in order to enhance the technological capacity of the country and increase its competitiveness with the other nations in the global economy. The Ministry of Defense, Higher Education Council, the Scientific and Technical Research Council of Turkey (TÜBITAK), Technology Development Foundation of Turkey (TTGV) and the Turkish Telecommunication Corporation (TURK TELEKOM) prepared a coordinated report and submitted this to the Prime Minister to develop the necessary funds to establish a National Innovation System. Launching a survey for the National Innovation System was developing Science and Technology Policy, which aimed to enhance the innovative capacity of Turkish Industry. The first step for a national policy on important science was to determine the appropriate area(s) and subject(s), and next to search for optimization of national funds and available manpower while considering the participation in international joint megaproject(s). According to Polat's studies, he "search for criteria studies" (2007, p. 25) in science was conducted by TÜBITAK, with the contribution of the Turkish Academy of Sciences (TÜBA), the Turkish Atomic Energy Agency (TAEK) and other related agencies and eminent scientists. In the additions and amendments of 1999, the Master Plan for the National Information Infrastructure was completed, and a draft regulation for establishment of the National Council of Information Technologies, which co–ordinated the implementation of the Master Plan, had been adopted. Considering the vital importance of implementing the Master Plan, the Supreme Council established the National Council of Information Technologies. As Polat (2007) clarifies, revision of the existing regulations on "R&D Assistance Program to the Industrial Companies by the Government" (p. 28) was to broaden assistance to cover all enterprises including those of service sectors and agriculture; and to encourage public and private firms to invest more in R&D activities and facilitate bureaucratic procedures. The selection of some critical technologies was done based on the economic, social and political targets of the country, in relation to the capacity of Turkish science and technology system. Efforts were done to gain capability in science, technology and production by facilitating a reversal of the Turkish brain drain. They designed a National Policy on molecular biology, genetic engineering and biotechnology with participation of TÜBA by TÜBITAK, and The Technology Development Foundation of Turkey (TTGV). As in the Polat's thesis mentioned, the new R&D structure on earthquake and natural disaster management coordinated to establish "the National Earthquake Council" (p. 28). Science and Technology policy changes over 1998 and 1999 had thus been both in response to new imperatives like earthquake needs and objectives, and evaluation of the previous policies and programs. Incentives and support for R&D were given. Starting from 1999, TTGV was implementing the Industrial Technology Project (ITP). This was a follow up to the Technology Development Project, which started in 1991. The project continued to support the upgrading of technological activities of Turkish private sector firms. The core activity of the Foundation was the co–financing of product and process innovation among private enterprises, with a special emphasis on Small and Medium Sized Enterprises (SMEs). It also promoted linkages between the national R&D institutions and industry. Direct support for R&D was given by working with Small and Medium Sized Enterprises (SMEs). Assistance Program for the Industrial Companies was conducted by TÜBITAK on behalf of Turkish Government. The Money and Credit Coordination Committee published a decree concerning this program in 4 October 1998 as an amendment to the First Decree of 1995 (Polat, 2007). Changes with respect to the R&D assistance Program are mentioned in the TUBITAK Report (2010) as follows:

> The amount of R&D assistance was increased from 50% to 60%; Support for personnel expenditures was increased to 60% for large companies and 75% for small- and medium-sized enterprises; Financial support for R&D procurement from domestic R&D establishments was increased from 10% to 30% of the research contract; R&D in environmentally sensitive technologies was given priority in addition to flexible manufacturing systems, advanced materials, genetic engineering/biotechnology, space and aeronautical engineering and technology; The project support was increased by 20% for projects on priority areas; The expenditures for registration of patents, utility models and industrial designs by the Turkish Patents (TPI) Institute were included in the support scheme in addition to the expenditures for patent applications to TPI;

> International Projects (EUREKA, COST, IST) was supported by 50% of the basic amount; Such support was increased to 60% by additional contributions; The total amount of R&D expenditures of universities and/or research agencies jointly participating in international projects with industrial firms should not exceed USD 100 000 per project; R&D expenditures of industrial firms established jointly by more than one industrial establishment, the Technology Development Foundation of Turkey and/or the Scientific and Technical Research Council of Turkey were supported by 60%: It was possible for industrial firms to submit joint R&D projects. (p. 2-3)

As Polat clarifies, the Supreme Council for Science and Technology at its meeting of 25 August 1997 made a decision on "the arrangements of medium and long-range public procurement policy" (2007, p. 31). The Supreme Council in the 1998 and 1999 meetings made amendments and additions on this issue. Under the coordination of the Ministry of Industry and Commerce, studies had been made to use public procurement policy to enhance the science and technology capacity of Turkey in 1999. The purpose was to design a general framework of a new public procurement policy based on research intensive and high–tech goods, and to determine the necessary improvements in legislation for this purpose. "The Decree on the Principles of Venture Capital Investment Partnerships" was published in the Official Gazette of 6 November 1998. But this was a general-purpose decree, which did not provide any specific arrangement or mechanism providing promotion for innovative initiatives. Studies had also been conducted under the co–ordination of the Treasury for new legislation, which ensured the establishment of new ventures based on future technologies. "The Report on the Measures to be Taken for Development of Venture Capital Investment Partnerships", by the Treasury, was sent to the relevant institutions in July 1999. The Master Plan for the National Information Infrastructure" was completed and submitted to the Supreme Council for

Science and Technology at its Fifth Meeting of December 20, 1999. The Council has adopted a draft regulation for establishment of The National Council of Information Technologies, which coordinated the implementation of the Master Plan. The Supreme Council, considering the vital importance of the implementation the Master Plan envisaged the establishment of The National Council of Information Technologies. The decree on R&D Assistance Program for the Industrial Companies by The Turkish Government" was published in 4 October 1998, providing an important support to universities and research institutions for their participation in international projects. According to this decree, the total amount of R&D expenditures of universities and/or research agencies jointly participating in international projects with the industrial firms could exceed USD 100,000 per project within the support framework (Polat, 2007).

Additionally, the Tinaz Titiz, who was the Minister of State, and Fikret Üçcan, who was the Counselor to the Minister of State, first cited the concept of techno-park in 1986 – 1987. The first examples were established in Ankara and Gebze, Kocaeli in 2001, Izmir in 2002, Istanbul and Eskisehir in 2003. Currently there are 43 techno-parks (see Table 2 and Table 3) in Turkey. 32 of these 43 techno-parks are in function. 5 of these 19 techno-parks are the members of the international techno-park institutions. These techno-parks are Ankara Cyberpark, Konya Technocity, Mersin Techno-park (Techno-scope), METU Technocity, and Gazi Magusa TGB. Techno-parks are an alternative to tax free zones, but it aims to directly benefit the province in which it is located, both socially and economically. They thus receive a substantive amount of support and incentives, which is intended to attract an inflow of investors to participate in this special investment zone. The details of some of the most significant support it receives are provided below. As Polat explains, “the Management Company is exempt from all tax, duties and fees concerning its activities conducted under the scope of the TDZ (Technology Development Zone)”. Moreover, in accordance with Article 8 of the TDZ Law No: 4691, the Management Company may receive “a government grant for the procurement of land and construction of the infrastructure in the event of financial difficulties” (Polat, 2007, p. 56-74). The offices at the zone are ready to rent and infrastructure facilities are also provided. According to the TDZ, the Management Company through the establishment, management and operation of the Techno-park is not subject to corporate income tax for 5 years following the start of their operations in a TDZ, but The Council of Minister can extend this for up to 10 years in some technology areas. Turkey continues to be an advocate of raising science and technology to new heights, and has recently been engaged in a significant science, technology and innovation (STI) impetus.

Table 2. Establishment Years of Techno-parks in Chronological Order (Ministry of Science, Industry, and Technology, 2012).

	Name of the Techno-parks	University	City	Year
1	ODTÜ Teknokent Teknoloji Geliştirme Bölgesi	METU	ANKARA	2001
2	TÜBİTAK Marmara Araştırma Merkezi Teknoparkı	TUBITAK-TTGV	KOCAELI	2001
3	Ankara Teknoloji Geliştirme Bölgesi	Bilkent University	ANKARA	2002
4	İzmir Teknoloji Geliştirme Bölgesi	Izmir Yüksek Tek.Ens.	IZMIR	2002
5	GOSB Teknopark Teknoloji Geliştirme Bölgesi	Sabancı University	KOCAELI	2002
6	Hacettepe Üniversitesi Teknoloji Geliştirme Bölgesi	Hacettepe University	ANKARA	2003
7	İTÜ Arı Teknokent Teknoloji Geliştirme Bölgesi	ITU	ISTANBUL	2003
8	Eskişehir Teknoloji Geliştirme Bölgesi	Eskisehir University	ESKISEHİR	2003
9	Selçuk Üniversitesi Teknoloji Geliştirme Bölgesi	Selcuk University	KONYA	2003
10	Kocaeli Üniversitesi Teknoloji Geliştirme Bölgesi	Kocaeli University	KOCAELI	2003
11	Batı Akdeniz Teknokenti Teknoloji Geliştirme Bölgesi	Batı Akdeniz University	ANTALYA	2004
12	Erciyes Üniversitesi Teknoloji Geliştirme Bölgesi	Erciyes University	KAYSERI	2004
13	Trabzon Teknoloji Geliştirme Bölgesi	Karadeniz Technical Univ.	TRABZON	2004
14	Çukurova Teknoloji Geliştirme Bölgesi	Cukurova University	ADANA	2004
15	Mersin Teknoloji Geliştirme Bölgesi	Mersin University	MERSIN	2005
16	Göller Bölgesi Teknoloji Geliştirme Bölgesi	Suleyman Demirel Univ.	ISPARTA	2005
17	Ulutek Teknoloji Geliştirme Bölgesi	Uludag University	BURSA	2005
18	Gaziantep Üniversitesi Teknoloji Geliştirme Bölgesi	Gaziantep University	GAZIANTEP	2006
19	Gazi Teknopark Teknoloji Geliştirme Bölgesi	Gazi University	ANKARA	2007
20	Trakya Üniversitesi Edirne Teknoloji Geliştirme Bölgesi	Trakya University	EDIRNE	2008
21	Fırat Teknoloji Geliştirme Bölgesi	Fırat University	ELAZIG	2007
22	Erzurum Ata Teknokent Teknoloji Geliştirme Bölgesi	Atatürk University	ERZURUM	2005
23	Pamukkale Üniversitesi Teknoloji Geliştirme Bölgesi	Pamukkale University	DENIZLI	2007
24	Yıldız Teknik Üniversitesi Teknoloji Geliştirme Bölgesi	Yıldız Teknik University	ISTANBUL	2003
25	Ankara Üniversitesi Teknoloji Geliştirme Bölgesi	Ankara University	ANKARA	2006
26	İstanbul Üniversitesi Teknoloji Geliştirme Bölgesi	Istanbul University	ISTANBUL	2003
27	Sakarya Üniversitesi Teknoloji Geliştirme Bölgesi	Sakarya University	SAKARYA	2008
28	Boğaziçi Üniversitesi Teknoloji Geliştirme Bölgesi	Boğaziçi University	ISTANBUL	2009
29	Cumhuriyet Teknoloji Geliştirme Bölgesi	Cumhuriyet University	SIVAS	2007
30	Dicle Üniversitesi Teknoloji Geliştirme Bölgesi	Dicle University	DIYARBAKI R	2007
31	Bolu Teknoloji Geliştirme Bölgesi	Izzet Baysal University	BOLU	2009
32	Düzce Teknopark Teknoloji Geliştirme Bölgesi	Duzce University	DUZCE	2010

Table 3. Establishment Years of Techno-parks under Construnction in Chronological Order (Ministry of Science, Industry, and Technology, 2012).

	Name of the Techno-parks	University	City	Year
1	Tokat Teknoloji Geliştirme Bölgesi	Gaziosmanpasa University	TOKAT	2008
2	ASO Teknopark Teknoloji Geliştirme Bölgesi	TOBB University	ANKARA	2008
3	Kütahya Dumlupınar Tasarım Teknoloji Geliştirme Bölgesi	Dumlupinar University	KUTAHYA	2009
4	Samsun Teknoloji Geliştirme Bölgesi	On Dokuz Mayis University	SAMSUN	2009
5	Malatya Teknoloji Geliştirme Bölgesi	Inonu University	MALATYA	2009
6	Istanbul Teknoloji Geliştirme Bölgesi	Istanbul Commerce Univ.	ISTANBUL	2009
7	Harran Üniversitesi Teknoloji Geliştirme Bölgesi	Harran University	URFA	2010
8	Çanakkale Teknoloji Geliştirme Bölgesi	18 Mart University	CANAKKAL E	2011
9	Muallimköy Teknoloji Geliştirme Bölgesi	Gebze Yuksek Teknoloji Enst.	KOCAELI	2011
10	Kahramanmaraş Teknoloji Geliştirme Bölgesi	Sutcu Imam University	KMARAS	2011
11	Namık Kemal Üniversitesi Teknoloji Geliştirme Bölgesi	Namık Kemal University	TEKIRDAG	2011
12	Yüzüncü Yıl Üniversitesi Teknoloji Geliştirme Bölgesi	Yuzuncu Yil University	VAN	2012
13	Çorum Teknoloji Geliştirme Bölgesi	Hitit Üniversitesi	ÇORUM	2012

Such advocacy is rooted in the advancement of a dynamic ideal based on continuous renewal and modernization under the guidance of science, technology, and knowledge. Therefore, as seen in Figure 2, the number of the techno-parks has increased dramatically in a decade, particularly after 2006 (TUBITAK, 2011).

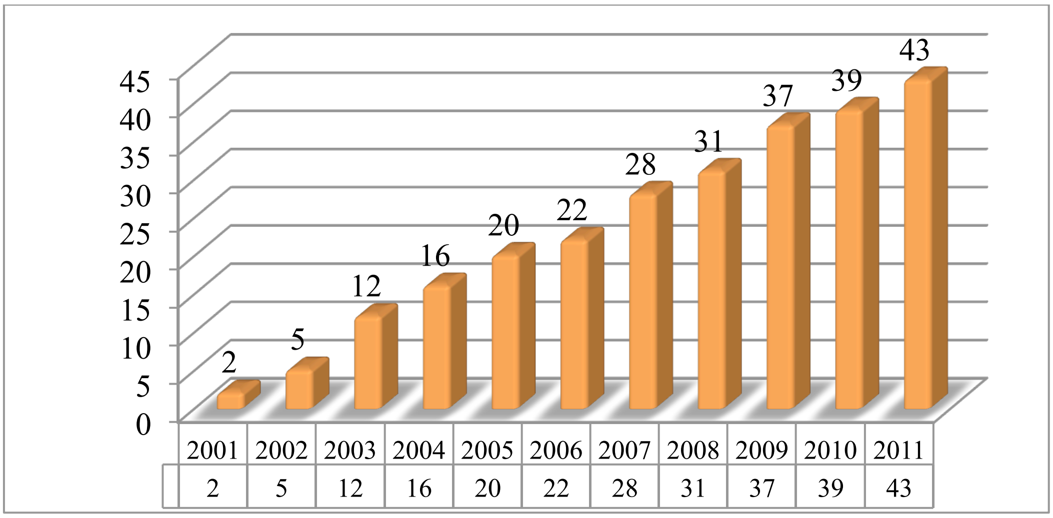


Figure 2. The Number of the Techno-parks between 2001 and 2011.

More importantly, 15 of them are in the most industrialized regions of Turkey, while 38 of them are established in different cities all over Turkey (TUBTAK, 2011). Additionally, in all regions, there is one techno-park, but the activities of these techno-parks are not like the others in Ankara, Istanbul, and Kocaeli.15 out of these 45 techno-parks are located in the most industrialized regions in Turkey. There is unbalanced development as it is seen in the Figure 3 and 4 (The Ministry of Science Technology and Industry, 2012).

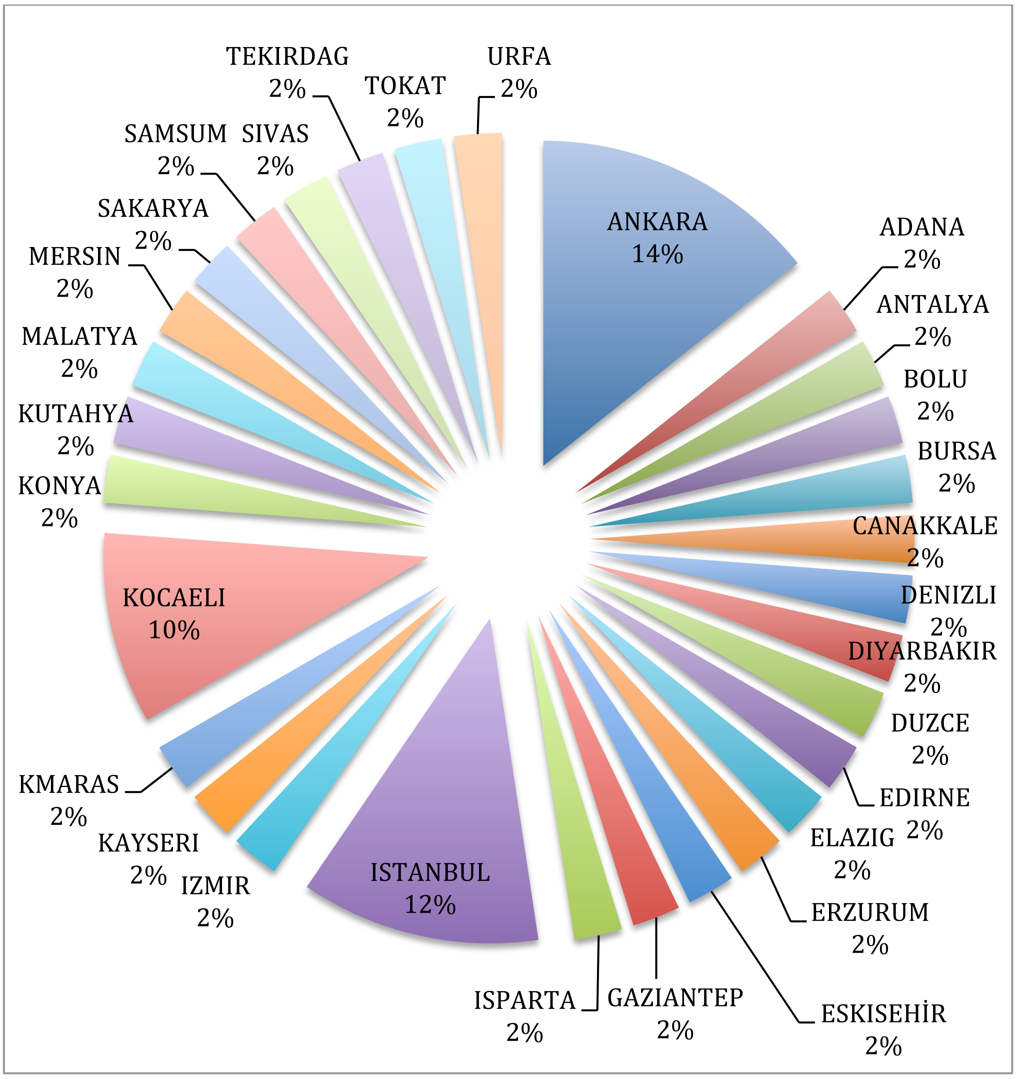


Figure 3. The Distribution of the Techno-parks in Percentages

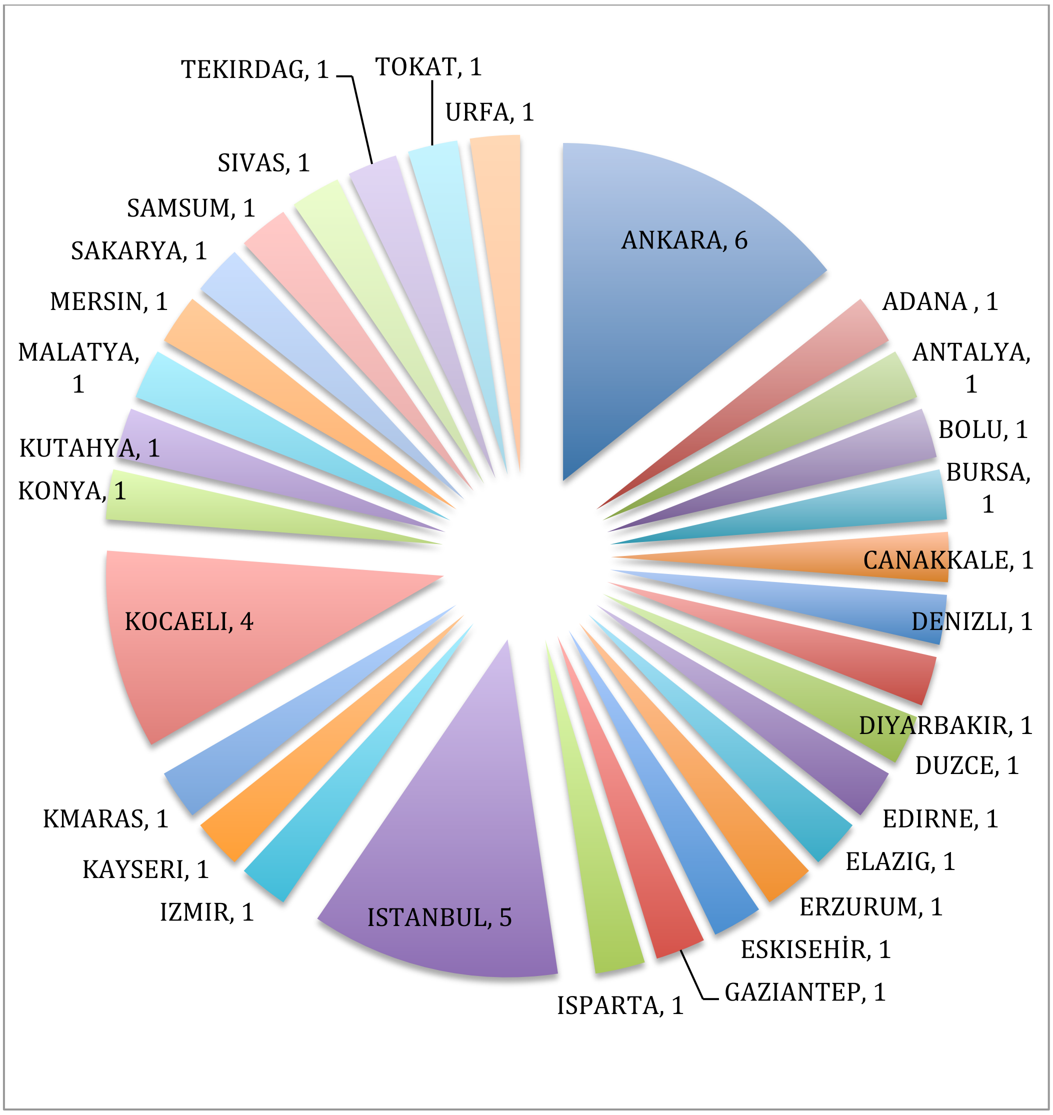


Figure 4. The Distribution of the Techno-parks in Numbers.

Science and technology create new opportunities for innovation “by supplying hitherto untapped sources of knowledge” as Polat mentions (2007, p. 56). According to Saritas and his friends, at the same time, innovators, entrepreneurs and traders in the techno-parks are able to connect to both consumers and sources of capital to fuel their growth - new ideas are developed in tandem with the rise of new needs on the part of real customers, and supported with financing and business services in order to ensure the commercial realization of these ideas

(2006). Additionally, most techno-parks are public rather that private; particularly those outside of the three main cities, Ankara, Istanbul, and Kocaeli. Three are only 5 private techno-parks, located in Bilkent University, TOBB University, Sabanci University, and Istanbul Commerce University. As it is seen in the Figure 5, the private techno-parks are less than the public, but it is expected to increase in the coming years as it is seen in the private universities.

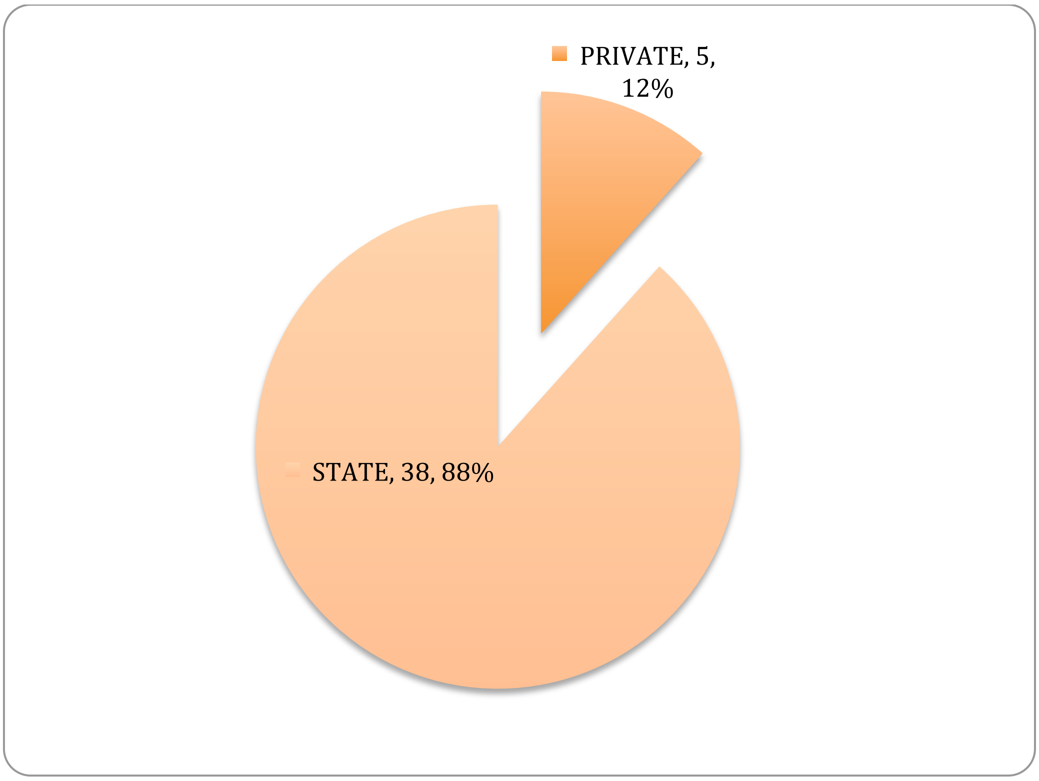


Figure 5. The Percentage of the Public and Private Techno-parks in Turkey.

There are also other reasons why the private techno-parks are so few in number. The first one is due to the cost of investments, and the second is related to the capacity of academic support, which is insufficient to support the companies in the techno-parks (The Ministry of Science Technology and Industry, 2012).

Another development in the techno-parks can be followed by checking the numbers of the companies and incubators, which are involved in different activities in the techno-parks. As seen in the Figure 6, the numbers of the companies which participate in different kind of the profit-oriented activities in the techno-parks have increased markedly in the last 10 years: from 0 to more than 1,800 corporations, particularly after 2006, when the number of the techno-parks increased sharply as well.

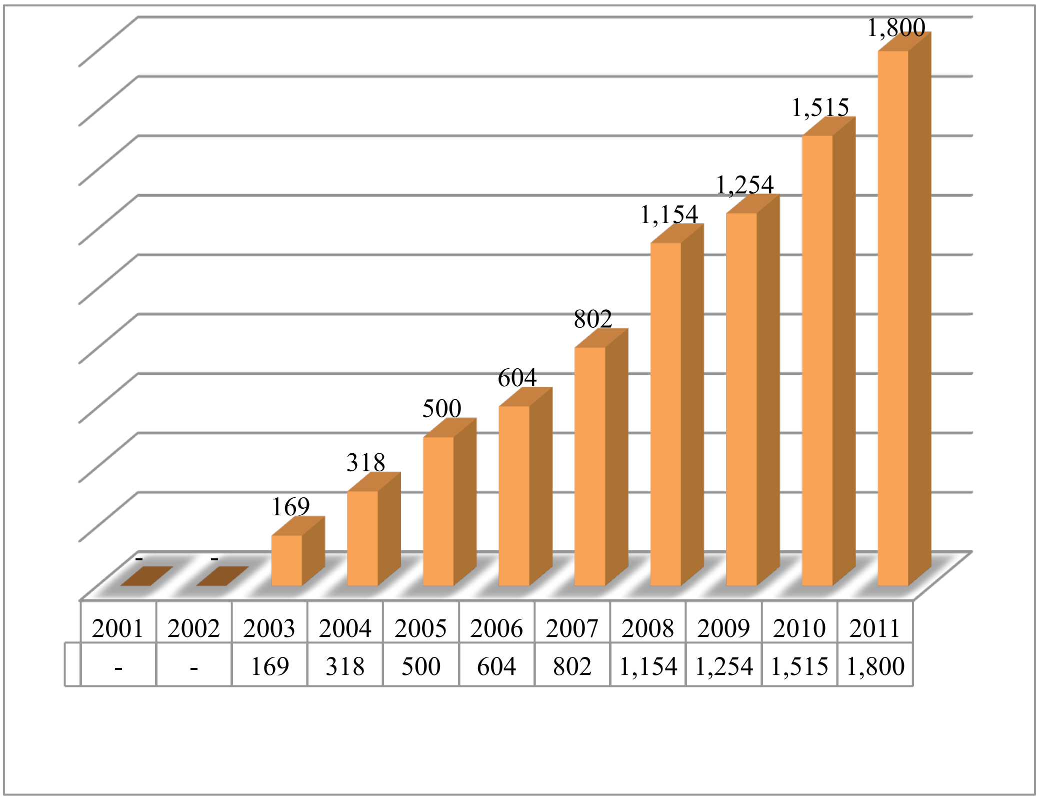


Figure 6. The Number of the Companies in the Techno-parks from 2001 to 2011.

Most universities have encouraged collaboration with the industry, and in the transition period most private universities preferred R&D centers rather than techno-parks in order to support their conservative and closed industries. During these periods, some institutions like KOSGEP played important and crucial role in the development of the techno-parks (The Ministry of Technology Science and Industry, 2012). Additionally, important institutions have been established and supported by the government, in order to increase the amount of technology-based industries in Turkey. The Turkish innovation system is shown below in

Figure 7.

Institutions related to the management of science, technology and innovation on a national level are founded, and it is here that related policies and tools for implementing polices are decided, and support and coordination is given. There are many institutions involved on this level, and the very centralized structure has also been described in previous literature (Saritas et al., 2006, TÜSIAD, 2003).

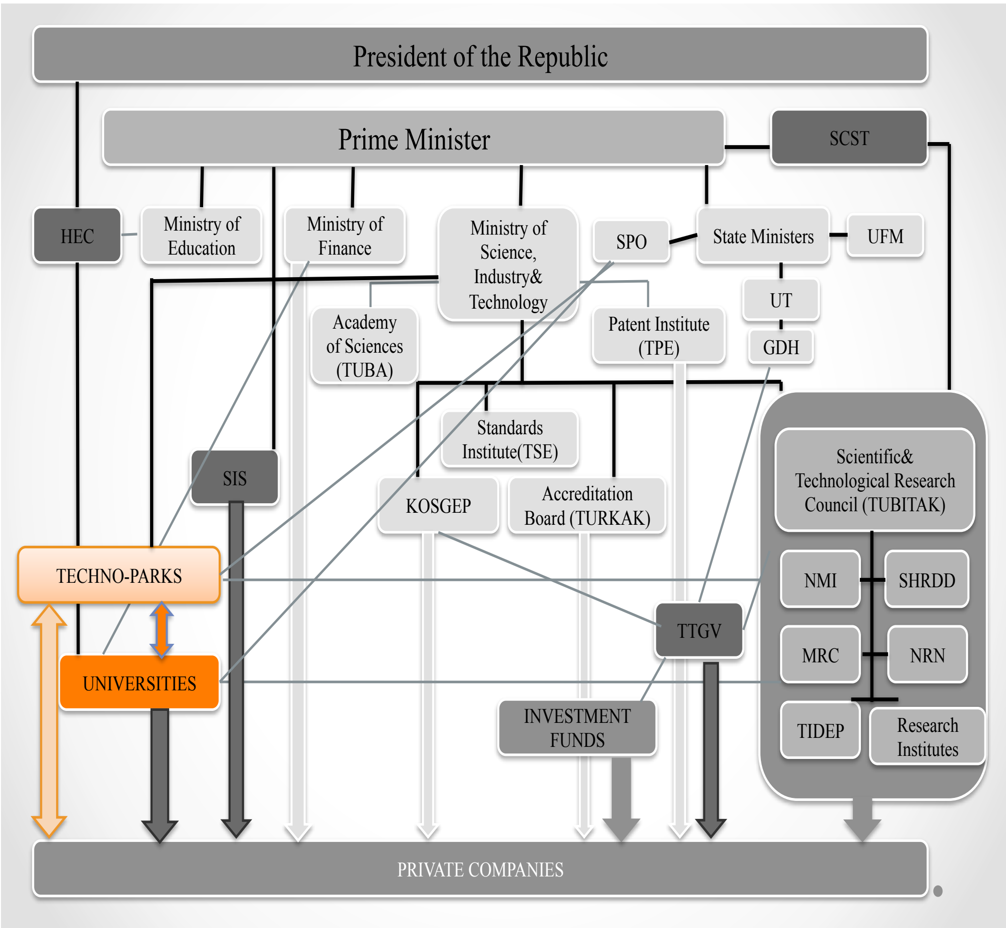


Figure 7. National Innovation System in Turkey.

Actors such as TURKAK, DIE and the Turkish Patent Institution carry out monitoring and assessment activities. Despite the high numbers of actors, this level lacks independent assessment institutions, which can increase functionality on a national level. The institutions are the more operative levels, providing hands-on support services for SMEs including finance, mentoring, R&D support programs and techno parks. These institutions have been criticized for not being fully effective in implementing initiatives and infrastructure. SMEs require thorough support policies, as part of the national innovation system (Saritas et al., 2006). From the development perspective, the literature review is conducted taking into account the changing dynamics in the world and in Turkey. The following part is about the science and technology policies related to the techno-parks as the Level 2 of the “Multi-Scalar Governance of Education” Analysis.

Science and Technology Policies related to Techno-parks

As Stine (2009) points out, science and technology policy is “concerned with the allocation of resources for scientific research and technical development” (p. 2). The government encourages science and technology as the roots of strategy for industrial development and in economic growth, including the use of science in connection with problems of the public sector. Due of the close relation of “basic research with higher education, this aspect of science and technology policy is difficult to separate from overall educational policy and from scientific and technical workforce policy” (Stine, 2009, p. 1). Additionally, scientific and technical knowledge guide and influence public policy decision making on many other issues, so science and technology policy does not always need to be a separate field of inquiry. Stine explains:

> Science and Technology (S&T) policy differs from other public policy issue areas, such as the rapidity of change in science and technology; novelty of many issues in science and technology; scale, complexity, and interdependence among technologies; irreversibility of many scientific and technological effects; public worries about real or imagined threats to human health and safety;

> and the challenges to deeply held social values. At the beginning of the 20th century, other issues became the focus of the nation's science and technology policy, including conservation, medicine, and public health; and a number of additional science organizations were established" (e.g., Food and Drug Administration). In addition, the first industrial research laboratories and large-scale mechanized industry were started. World War I brought about additional application of science and technology to weapon development. (2009, p. 2).

After World War II, the application of research and technology for both military and economic purposes became evident. As Stine clarifies, "no longer were philanthropists the primary sources of funding for research and development (R&D); instead it was the government" (2009, p. 3). A fundamental change was seen in the relation between the government and the scientific community, where areas such as weaponry, communications, and medical needs such as surgical innovations became important. "The capabilities of science and technology were widely recognized due to the use of chemicals, aircraft, mechanized weapons, radar, and other technological applications in World War II," as Stine has explained (2009, p. 3). Hence, the utility of science and technology to society was crystallized. The government undertook responsibility for renewing the nation's scientific talent. To respond to these needs, as Stine (2009) emphasizes that the governments "accepted new responsibilities for promoting the flow of new scientific knowledge and the development of scientific talent of our youth" (p. 4). These changes led to the establishment of the national science systems (Stine, 2009).

Today, however, the most important international organizations, the World Bank, the OECD, and the IMF, have been actively involved in science and technology policies of the nations. According to Stine (2009), science and engineering research and innovations are related to the needs of the society and the nation's economy, like in "energy, transportation, communication, agriculture, education, environment, health, defense, and jobs," so as a result many policymakers are interested in every aspect of science and technology policy (p. 4). Even though most industries use science and technology to some degree, the OECD identifies ten important industries, which have a strong linkage to science and technology. According to Stine (2009), the OECD organizes these industries into two categories:

> Knowledge-intensive service industries, which incorporate science, engineering, and technology in services or the delivery of services, and high-technology manufacturing industries, which spend a relatively high proportion of their revenues on R&D. According to the OECD, knowledge-intensive service industries include communications services, financial services, business services (including computer software development), education services, and health services. High-technology manufacturing industries include aerospace, pharmaceuticals, computers and office machinery, communications equipment, and scientific (medical, precision, and optical) instruments. (p. 5).

Additionally, Stine (2009) emphasizes that the policy issues for science are related to "how much governmental funding is sufficient to achieve national goals, and the degree to which the government benefits primarily from its investment in research as opposed to the world at large. Hence, according to Stine (2009) policymakers work on the innovation process, "both policy for technology and technology for policy, particularly the relationship between science, engineering, economics, education, and job creation" (p. 9). However, in the case of policy for technology, policies can be different due to the different innovation models needed by the system. The innovation policy is clearly explained by Stine (2009) as follows:

> The innovation policy, based on the linear model of innovation, leads some policymakers to believe that it is inappropriate to use governmental resources to invest in technological development. Rather, private resources should be used to invest in this portion

> of the innovation process, as private entities will receive the returns on investment. An alternative perspective is that research and innovation can be so interrelated that it is not possible to separate the two. (p. 6).

Therefore, officials in charge of innovation policy invest governmental resources to nurture and develop technological innovation appropriately, by selectively allocating government funds as shown in Figure 8.

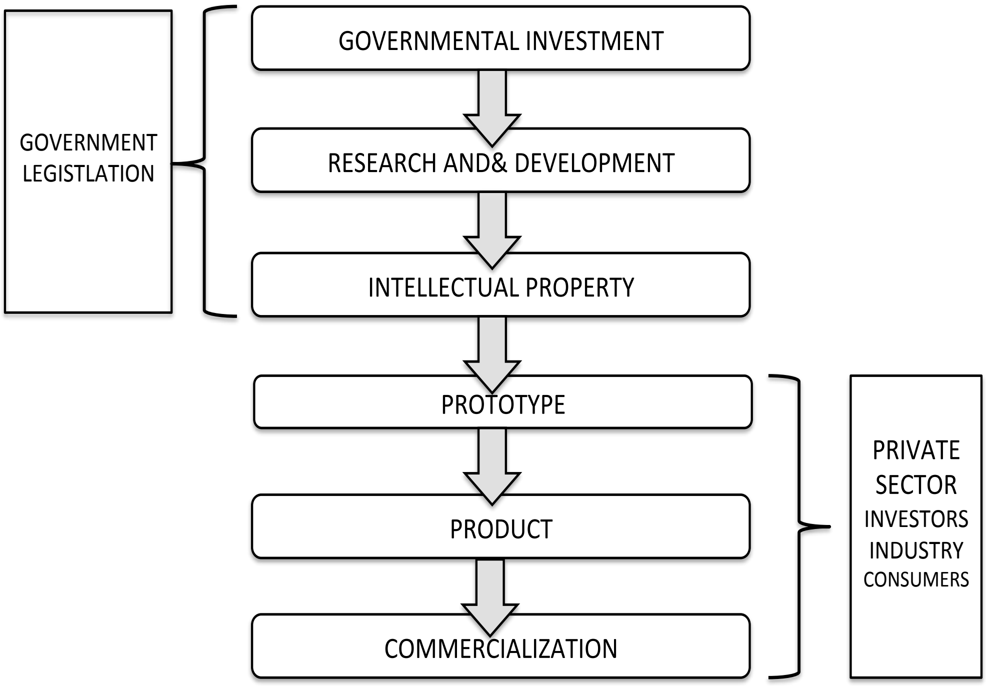


Figure 8. The Relationship of Governmental Investment to Innovation (Stine, 2009, p. 11).

As Stine (2009) puts it, the gap between the government and the private sector is called the "valley of death," because of the challenges of taking intellectual property and transferring that idea to private entities, which may or may not be interested in turning that intellectual property into technology. Hence, the linear model is insufficient as a basis for S&T policy decision making today, since linkage between science and technological innovation is far more complex. As a result, policymakers believe that in the knowledge-based economy, government investments in R&D play an important and crucial role. On the other hand, the nations obtain the returns on investment in R&D, helping to achieve the related societal and economic goals. The governmental investments empower the production of prototypes and create technological development. In a global economy, foreign firms are also attracted. However, there are some concerns of policymakers, as Stine (2009) points out:

> Policymakers express concerns that investing in R&D in a sector closely linked to industry — or, for that matter, at any stage of technology commercialization — may result in the government picking "winners and losers." For example, although some believe that investment in information technology R&D has resulted in benefits for the country and helps by setting industry standards, others believe that investment in information technology R&D is inappropriate because it is the government, not industry, who is determining the direction for research and determining technological "winners and losers." In terms of technology for policy, differing views regarding policy issues is not that dissimilar as those for policy for technology. (p. 7).

Furthermore, according to Stine, the "global proliferation of techno-parks reflects the recognition by national and regional governments that future economic growth and competitiveness lies in developing a robust knowledge economy" (2009, p. 2). One of the most ambitious goals of the policymakers is to increase national competitiveness by improving the structure, operation, and funding levels of the techno-parks. In other words, as Stine points out that the governments preserve their nations' strategic and economic security in order to vie against "the competitive advantage of [a] low-wage structure" (p. 3). Additionally, "the government must compete by optimizing its knowledge-based resources, specifically in science and technology, and by keeping the most fertile environment for new and revitalized industries and the well-paying jobs they bring" (Stine, 2009, p. 3). In trying to meet this challenge, politicians and officials organize national policies to advance science, technology, and innovation in order to make sure their nation keeps up with the rest of the world. Governments make a comparative review of policies and programs to stimulate knowledge-based growth, including investments in research and development and in new public-private partnerships. Besides all these efforts, as Stine points out they encourage collaboration, “to translate ideas born in the laboratory into competitive new products for the marketplace” (2009, p. 3). As a result, public-private partnership has become more widespread. In the following title, the role of public-private partnerships as university-industry-government partnerships is given in order to provide another layer of analysis on how and why the world of higher education is changing.

University-Industry-Government Partnerships in Techno-parks

As Wessner (2009) explains, in the new liberal economies, public-private partnerships are seen as a tool to address today’s innovation necessity. By stimulating cooperative research and development between industries, the government, and universities, these partnerships successfully introduce new technologies to the market. Partnership in research and development among industry, university, and government laboratories works if the system is properly designed, effectively led, and adequately funded. According to Wessner, governments see the growing importance of collaboration, which brings research to the market; therefore, the role of governmental is to support for innovative small companies in the techno-parks are a type of public-private partnership that “fosters knowledge flows—often between park firms and universities and among park firms—and contributes to regional economic growth and development” (2009, p. 5).

As Wessner (2009) emphasizes, these partnerships are both formal and informal, and try to increase “efficiency of innovation within park firms, universities, and national laboratories” (p. 5). Private investors capture the benefits of research at sufficient levels to justify investment in that research. Additionally, “public investments in facilities such as techno-parks can reduce the costs faced by individual firms and thus increase the willingness of universities and private firms to perform research” (Wessner, 2009, p. 5). More importantly, the benefits of the research outcomes are expected to spread to the other firms in the park and eventually to the local and national economy. After studying the Science, Technology, and Economic Policy Report, Wessner points out, “many countries around the world have adopted measures to lower costs for firms by providing commercial facilities that enhance the research process, lower its cost, and where appropriate speed its dissemination” (2009, p. 6).

Furthermore, the partnership is to improve the research and commercialization missions of universities and national laboratories. Consequently, techno-parks are seen as catalysts for the development of innovative clusters that support rapid economic growth” under neoliberal policies (Wessner, 2009, p. 3). Firms come together to profit from shared expertise and services and the development of mutual trust has encouraged interest in fostering industry clusters to enhance regional development in the techno-parks. As Wessner explains:

> Examining industrial clusters from the perspective of business strategy, the enduring competitive advantages in a global economy lie increasingly in local things—knowledge, relationships, and motivation—that distant rivals cannot match.

> The regions offer an important source of competitive advantage even as production and markets become increasingly global. Such clusters have often developed around a government-funded nucleus; one example is the high-technology industries that emerged and grew around the government laboratories and major universities in the Boston area. In other cases (e.g., Silicon Valley) multiple private industries interacting with a major university, and irrigated with substantial and sustained federal funding, created powerful developmental synergies. (2009, p. 9).

Even though there is a spontaneous emergence of these innovation clusters, a third approach related to the development of innovation clusters is about research parks. As Wessner emphasizes, the private industry and the governments strongly agree that the placing creative activity within the concentrated geographical area of a techno-park can help to create a "community of innovation" (p. 9) needed to transfer new ideas from universities and national laboratories to the marketplace. The government uses this strategy to revive economic growth in disadvantaged regions. In other words, techno-parks are often used as a tool to restore a region's vitality (Wessner, 2009). In other words, they work for the private sector. As discussed in the following title, the techno-parks are mainly work for the benefits of the private sector draining the higher education using working capital of the universities.

Working Capital in University-Industry-Government Partnership and Benefits of Techno-parks for the Private Sector

Certain firms have been operating in the techno-parks and the university or the research centers. These firms are the ones that directly benefit from the techno-parks. In addition, private firms in the city, in the region, and even in the entire country benefit from the techno-parks in various ways. The benefits of the techno-parks to the entrepreneurs, according to the OECD, are listed in the following subheadings. As Polat (2007) mentions:

> Techno-parks create synergy between firms and academic institutions, The exchange of knowledge, information and even technology between the partners is stimulated and improved; Firms can understand the links established between university and industry much better; Universities transfer the scientific knowledge and expertise to companies; Techno-parks provide an important resource network for firms, Proximity between firms and universities promote the natural exchange of ideas through both formal and informal networks. (p. 67).

Formal methods contain licensing and cooperative alliances, while informal methods contain mobility of scientists and engineers, social meetings, and discussions. More importantly, as Polat (2007) clarifies:

> Tax privilege is supplied to the entrepreneurs with respect to the techno-parks; The interaction among the firms is promoting; Image and prestige are also supplied in techno-parks to the entrepreneurs; Consulting services are supplied to the firms from techno-park and university; Techno-parks supply some services such as communication, photocopy, and other secretarial services for giving entrepreneurs a chance to use their time more effectively in their major task. (p. 67).

To accomplish a firm's survival and growth objectives, techno-parks provide shared office services and business assistance, including affordable rent and fostering connections with firms inside the incubator and in the local economy. According to Polat:

> Firms also take help in fields like finance, marketing, and management from the techno-parks; The techno-park reduces consumer research costs; Firms can generate new products and processes which are developed more consumer oriented; Even if techno-parks promote the introduction of radical innovations by firms in the market, this effect is contingent on entrepreneur specific factors such as work experience in the R&D department. (2007, p. 67).

Furthermore, according to the OECD, the universities, on the other hand, are becoming like agents of the private sector and are using the privileges provided for the techno-parks. Polat summarizes the situation as follows:

> Universities can gain extra financial funds at a time when their traditional sponsors, namely governments which are operating under financial difficulties; The enlargement and updating of universities' research agenda in areas related to companies' science and technology demands would create positive stimulus for linkages; Techno-parks are transferring universities' finding in science and technology to the society; Techno-parks' interaction with universities could positively contribute to their innovative ability and capacity. Thus, improve their competitive performance; Technological innovation stems from scientific research and science parks can provide the catalytic incubator environment for the transformation of pure research into production; Techno-parks give the academic environment a clear opportunity to start a business to commercialize research. It is reasonable to allege that without techno-parks, most of the academic owned businesses would not have been established in the first place. (2007, p. 67).

Additionally, according to Link (2009), there exists a negative correlation between the distance from the techno-park to the university and the probability that the academic curriculum will shift from basic towards applied research. As Polat clarifies, according to the OECD, the benefits of the techno-parks to region are listed in the following subheadings:

> Governments and other organizations which are dealing with industrial and technical development have introduced regionally targeted measures to provide an appropriate physical environment to encourage economic development in deprived and depressed localities; Techno-parks cause to an increase of employment opportunities in the region where they are established; Techno-parks increase the income level of citizens who live around the techno-park; Reindustrialization takes place in regions where the techno-parks are established; Regional development occurs also in zones where the techno-parks are constructed; Education level of region is increased. (2007, p. 68).

The benefits of the techno-parks to the country, which are defined by the OECD, are listed as:

> Closer interaction between universities and industries may not merely create mutual benefits but also contribute to improving the countries' industrial competitiveness; Development of higher institute links is assumed to encourage innovation and production in country; Decrease the unemployment rate of the country; Increase the image and prestige of the country in the world; Science and technology level of the country is gone up also among other countries of the world; Specialized labor force also increases as a result of techno-park application; Country becomes open to international markets. (Polat, 2007, p. 69).

Therefore, as the OECD Report indicates, the general purpose of the government program that supports techno-parks is to gather high-tech enterprises, including scientific institutes and high schools, into one location for the accelerated and rapid development of the high-tech sector within a short time. A techno-park is a formal type of legal organization with a head management company. The main business activity of the management company is to create comfortable conditions for the techno-park's members/participants. Such an organization is similar to what exists in the U.S. (business owners' organizations). The difference between techno-parks and other forms of innovative organizations is a techno-park's initial infrastructure, and that the government subsidizes all initial investments. According to Polat, who has taken from Monck and his friends' studies in 2006, the conditions of the techno-parks in the neoliberal policies can be summarize as follows:

> Greater private sector participation to techno-parks; Making formal linkages with other successful techno-parks; Low cost of office space; Offered management services; Low cost of utility services; Provided administration and financial services; Leadership of the incubator; Support from the local university and research institutes; Support from government and public sector organizations; Financial support including angel, venture, and other sources of capital; Market conditions and marketing capability; Entrepreneurial atmosphere; Networks with local business and support services; Global networks for information sharing; Quality of business plans; Management capacity; Location of incubator; Availability and quality of technical

> experts; Strong entrepreneurship and leadership; Marketing capability; Clusters of universities, which affect the performance of techno-parks; Growth; Successful transfer of university researches to industry; Placement of university graduates; Macro-economic and political conditions; Demand of technology in the region; Number of patents and other rights, which are developed in the techno-park; Products commercialized and started to be produced; Technology transfers in the techno-park; Research publications produced by activities in techno-parks; New products and technologies sold in local and international markets; Added value which is generated in techno-parks; Generation of beautiful work space with the help of the staff, and supply the cultural works and communication possibilities; Partnerships which are done with foreign firms; Number of joint projects which are done with universities and research institutions; Number of scientific studies which are commercialized due to activities which take place in techno-parks; Interactions between techno-park firms and firms which are in different techno-parks; Shared vision; Necessity of collaborative process; Complementary roles of industries and universities, Need for presence of leading companies, preferably both large companies and "niche market" companies; Effective commercialization strategies; Prestige and image; Closeness to the airport and communication possibilities. (2007, p. 69).

As a result, the techno-parks have been established in order to adapt to the neoliberal policies, while the system, the structure, and the practices at the universities are increasingly changing. Hence, the government is the mediator, channeling the financial sources and regulating these activities in order to secure the nations' position in the competitive global markets. In the following title, as the Level 3, the Politics of education from the "Multi-Scalar Governance of Education" Analysis, the government's role and support are overviewed taking into account the arrangement and mechanism supported by the government in the development of the techno-park in order to comprehend critically the transformation of higher education.

Government's Support for Techno-parks by Making New Arrangements and Mechanisms

Governments are one of the most vital participants in the creation of the techno-parks, using them as part of their strategy for economic and regional development. As Wessner (2009) agrees, "the government's large science and technology industrial parks" show the power of the strong growth and international competitive through significant national and regional investments in science-based economic development. In the Science, Technology, and Economic Policy Report in 2009, however, "aggressive intervention by national and local governments to create and grow large-scale research parks is a hallmark of policies" (p. 2). Taking into account the studies of Wessner, the example of China is given as an example to understand the strategies of the governments:

> While China provides a remarkable example of state support for research parks as a tool to promote national targets in technological progress, other nations are also providing significant support for their research parks as a part of their nation's growth and development strategies. The governments have regularly reinvented and transformed itself though strategic and farsighted investments. Moving from labor-intensive production in the 1960s and 1970s, to skill-intensive production in the 1980s, to technology-intensive manufacturing in the 1990s. (2009, p. 10).

On the other hand, as Lawton Smith mentions that while universities have historically been involved with industry in a variety of ways (for instance, in areas such as agriculture, military activity, ship building, mining), it was not until the 1980s that an entrepreneurial role for universities became increasingly part of mainstream policy and practice (2007, p. 98). By means of new arrangements and policies, the knowledge produced and developed by the universities has increasingly become commercialized. In the following title, how the commercialization of technology has been encouraged in the higher education is explained with the examples of incubators and techno-parks, which have dramatic effects on the transformation of the higher education.

Incubators and Techno-parks: Commercialization of Technology

Taking note of early developments in the United States of America, particularly as a consequence of Bayh-Dole Act in 1980, governments in a range of countries, including the United Kingdom, Australia, Sweden, Germany, Italy and Japan, have all introduced policy measures to encourage technological commercialization, as Nedeva (2008) explains. Robertson and Kitagawa point out that the activities that many universities now engage in, and which constitute "third stream" or "third sector," include patents, such as pharmaceutical products, the trademarking of business ideas, aiding "spin-off" firms that might involve investments from the university and the business sector, and so on (2011, p. 3). These activities, however, are often viewed by academic staff as peripheral to the central task of teaching and research (Robertson & Kitagawa, 2011, p. 3). As a result, over the past decade there has been a shift in government policy, from one focused upon research excellence and its dissemination amongst the academic community, to one, which now includes a range of knowledge-transfer activities with the wider business community, and other stakeholders. In the 2006 policy framework, as Wright and his friend mentions as follows:

> Universities were represented as ...the most important mechanism we have for generating and preserving, disseminating and

> transforming knowledge into wider social and economic benefits. It is within this context that governments have been interested in supporting and realizing high-tech innovation through university spin-off companies and hi- technology incubators. (Wright et al., 2006, p. 9).

For that reason, as Roberson and Kitagawa (2011) emphasize, the emergence of technology-based incubators originates from an assumption by the government that the promotion of such activity will foster the development of a knowledge-based economy. They are intended to offer a training ground for nascent entrepreneurs to be found within and outside of the university community. Incubators also serve as a mechanism for commercializing science and technology-oriented applications. As boundary spanners, they are intended to link technology, capital and know-how to entrepreneurial talent for the purposes of accelerating the development of new companies, and thus hasten technology's commercialization. University spin-offs are believed to have several key benefits: in generating revenue for the institution; making the university more attractive to current and potential faculty members; and benefiting the community and the nation (Robertson & Kitagawa, 2011). Universities claim that they can offer access to specialist, in-house facilities/expertise for spin-offs, although this may not always occur in practice. For their part, university technology incubators aim to support networking opportunities by bringing in venture-capital investors from the wider business community (local, national and sometimes global), to negotiate relationships between the university and local government, to foster a business culture in a local area, and offer legal and daily business assistance. They attract local people and provide a space to develop new businesses as a result of interactions with researchers and research ideas generated in the universities, acting as what some have called a "knowledge hub" for the local/regional innovation system (Robertson & Kitagawa, 2011, p. 2-9). On the other hand, as Peng mentions though, it is difficult to provide a quantitative measure of how much university incubators can aid spin-off companies on the business side, such incubators are nevertheless considered as key to providing a "community and nucleus" for start-up companies (2006, p. 4).

Additionally, as Robertson and Kitagawa (2011) emphasize that in the world, there has been considerable and growing interest from policy-makers in promoting spin-off companies from universities. These developments, conceived of as a central component of innovation policy, are strongly promoted and justified, especially for "less favored" regions. External partners, such as local businesses and also by staff and students who want to create and nurture start-up companies, can access such support infrastructure. The economic boom of the late 1990s, energized and enabled by funding schemes for new innovation support mechanisms, resulted in an upsurge in spin-off activity. However, there had been too many spin-offs of low quality, and that university infrastructures were not equipped to support these ventures. There was also a concern that spin-offs were being given "... undue prominence in consideration of university performance in research commercialization" (p. 1-9).

As a result, as Wessner (2009) emphasizes that the "entrepreneurship" is an important tool in neoliberal policies so that the success of the techno-parks is to improve the entrepreneurship for the economic growth. Therefore, public-private partnerships, like the Small Business Innovation Research (SBIR) programs, are accepted "to maximize the state's investments in research parks while amplifying the impact of the government's investment in research" (p. 11). The partnership provides competition-based activities for small but highly technological firms, which have a technical background but are not commercially proven ideas. Hence, the view of the government is that new ideas need to be proven. This way, the knowledge of the entrepreneurs finds opportunities in the techno-parks, which can increase innovation and the commercial potential of the goods and services. This means that new ideas with commercial potential often do not attract sufficient private investment. According to Wessner, the governments provide "this seed capital and, moreover, act as a signal to private venture capital markets, helping entrepreneurs secure the funds needed to bring new ideas to market" (2009, p. 9). In order to understand the structure, it is better to understand science and technology policy facets, as Wessner gives them:

> Science for policy, technology for policy, policy for science, and policy for technology. These facets cannot be easily separated, but can help provide a framework to better understand the policy decisions that policymakers are addressing in a given situation. This, in turn, can reflect how policymakers consider the policy advice they are given by the scientific and technical community. Science for policy and technology for policy are when scientists, engineers, and health professionals provide analysis, knowledge, and data to inform policymakers with the goal of enhancing their ability to make wise decisions. This scientific and technical guidance is available for almost any public policy arena. Policymakers are the ones who decide what steps should be taken to manage these risks. They can base their decisions on the guidance provided to them by the science, engineering, and health communities. In contrast, policy for science and policy for technology are when policymakers take actions that influence the S&T community or the actions in which they engage such as research or S&T- business related activities. (e.g., patent law) (Wessner, 2009, p. 14).

Additionally, Wessner (2009) argues how the policymakers make decisions related to the investments in research, such as "whether or not to establish programs and Organizations that set priorities for this research, and what technologies agencies should investigate further as possible mechanisms" (p. 11) as it is seen in Table 4.

Table 4. The Relationship between Science and Technology and Policymaking (Wessner, 2009, p. 14).

	Policy Influencing Science and Technology	Science and Technology Informing Policy
Science	Policy for Science e.g., Should the U.S. federal government support embryonic stem cell research?	Science for Policy e.g., Should the United States take action on climate change?
Technology	Policy for Technology e.g., Should the emerging field of nanotechnology be supported and regulated?	Technology for Policy e.g., Should policy actions be taken to enhance the new implementation of new vehicle technologies that might reduce the nation's fossil fuel consumption?

Additionally, as Wessner (2009) points out, governments, with the help of the international organizations, like the OECD, develop metrics to measure the performance of techno-parks and economic development in general, as a "work in progress" strategy (p. 12). The limitation arises from the diversity of techno-parks and their missions, and even in their different goals, facilities, funding, and management structures, including their economic, political, and social environments surroundings. The actual level of organization, management structure, legal status, and size also varies significantly among research parks. As Wessner (2009) emphasizes even though the common major purpose is economic development, there are other goals, like "technology transfer, land development, and enhancement of the research opportunities and capacities of affiliated universities" (p. 12). Hence, the governments follow some critical criteria of non-governmental institutions to improve the success of their policies in techno-parks:

> [1.] *Meeting the goals of legislation*. One plausible way to measure the success of research parks is to assess their performance against stated goals, as written into legislation and found in documents and interviews. *Return on public investments.* Direct expenditures by government on land acquisition and infrastructure development, financial inducements, and the opportunity cost of the land for research parks versus other types of uses can be compared against changes in the tax rolls and other measures of economic growth.
> [2.] *Enhanced firm performance*. This can be measured in terms of the change in income and corporate taxes collected by local, state, and federal governments as the result of the growth of successful businesses inside and outside the park, as well as in terms of net gains in jobs. *Enhanced university performance*. As noted above, spillovers to the economy usually take the form of the creation of codified knowledge, which can be measured in terms of patents and publications. Spillovers can also be examined in other ways. Tenants often form research joint ventures with other firms in the park, and this can be tracked. Tenant companies may also provide benefits to the host university by sponsoring laboratories and professorships, hiring students, or associating themselves with co-patenting activity.
> [3.] *Value of the park to tenants*. Another kind of measure is the value of the park to tenant companies that benefit from the richness of the flow of knowledge between them and universities. For example, firms may seek the cachet of working in a successful park, which can benefit the host university, tenant firms, and the local community. (Wessner, 2009, p. 15-17).

Additionally, as Luger and Goldstein (2006), in both developed and developing nations, techno-parks are now a worldwide phenomenon. Hence, national governments have forced to make significant investments in techno-parks in order to facilitate the commercialization of new technologies, to attract leading high-technology companies from around the world, to benefit from and contribute to university research and "market ready" (p. 2) students, and to create centers of regional and national economic development. By fostering a more robust interface between universities and laboratories and entrepreneurs and small and large businesses, techno-parks are seen as an effective policy tool to realize large and highly visible returns on a nation's R&D investments. As Luger and Goldstein (2006) have reported, many nations adopt different strategies to launch and support the development of techno-parks as given in the *Science, Technology, and Economic Policy Report*:

> Research parks are no longer a developed world phenomenon. Parks can be found in more than 60 countries at all stages of development. Most research parks outside the United States are planned as part of a national strategy for industrial competitiveness. Many parks employ cluster-based recruitment and marketing methods, including tax incentives, training programs, and other industry-targeted services. Technological development at many research parks is increasingly integrated with university research, with faculty working with private firms and firms renting laboratories and incubator space in universities. Beyond research universities, community colleges and regional technical schools are increasingly participating in research parks. (Luger & Goldstein, 2006, p. 5-7).

As a result, differing policies of the governments focus on increasing different technologies, which in turn increase the nation's competitiveness in the market. Therefore, new spaces different than the universities, called "techno-parks" have been purposely developed. While new techno-parks are being established in the university campuses, the spaces are purposely re-thought and re-developed with the help of the government's funding and subsidiaries according to the needs of the private industry and the university. In the following title, the economic, spatial redevelopment is analyzed as the Level 4, the Outcome of the "Multi-Scalar Governance of Education" Analysis to comprehend further how the techno-parks affect universities.

Globalization changes the spaces and the positions of the people and institutions. Instead of the territory, the use of atmosphere has become strategic for the satellite communications. Additionally, the perspective of big winners gains power. Hence, as Snitow and Koffman emphasize that while the new economy is becoming global, speed and change customize the choices. Even though the techno-parks are opening new dimensions in science, technology and innovation, they are the center of "a world of low wages and insecurity-just down the street" (2002, p. 1). At the beginning, those places had been established as "the frictionless world," and they are far away from this approach with wealthy business people and the media. However, these spaces have suddenly become as the symbol of a global economy based on computers and the Internet. After WWII and the Cold War, as Snitow and Koffman (2006), the military forced a change in these places, like what happened in the Silicon Valley where the first "high tech boom" (p. 1) occurred. First, farms changed to massive fields of concrete belonging to private industry and the military, like the U.S. Naval Air Station at Moffett Field and at the Lockheed aerospace complex. The demographic structure had been changed in terms of workers. Most farm workers had started to work in factories with higher wages and job security. As Snitow and Koffman explain:

> Stanford University developed outstanding science and engineering programs closely linked to local defense industries and government contracts. Stanford researchers discovered not only new technologies, but also new ways to profit from their discoveries. Hewlett-Packard, Cisco, and others all emerged from this hothouse of scholarship, business, and government money. As the Cold War drew to a close, a new high tech boom was sparked by advances in semiconductors, personal

computers, and the Internet. (2002, p. 1-2).

Today, however, risk takers are attracted each year by the best techno-parks in the world, like Silicon Valley, where they hope to find high-paying and stimulating jobs. They are highly intellectual engineers, managers, experts, researchers, entrepreneurs and factory workers. Instead of long-term jobs, flexible and fast-paced work life become popular under the name of temporary and contract employment. As is seen in Silicon Valley and other techno-parks, Snitow and Koffman point out that "this high tech industry is the most anti-union industrial areas in the world" (2002, p. 3). More importantly, as they discover:

> Very few high tech workers have been able to join unions, and industry leaders say they intend to keep it that way. In the 21st Century, many cities hope to replicate Silicon Valley, but few people know of the valley's many contrasts. There are sudden millionaires and also "permanent" temporary workers, casual outdoor lifestyles and toxic waste dumps, gated mansions down the street from overcrowded apartments, Internet networks and extremely low levels of civic, social, and philanthropic involvement. In, a computer training center in East Palo Alto, a low income community just a few miles from high tech's wealthiest neighborhoods. We meet her as she raises money for Plugged In at the Sand Hill Challenge, a charity soap box derby race put on by venture capitalists, the big investors in high tech start-up companies. (Snitow & Koffman, 2002, p. 1-2).

Therefore, the techno-parks are becoming gentrified. Escalating rents and high tech development are driving residents out, defining a major effect about the "digital divide" (2002, p. 1-2) just as bulldozers come to demolish the old neighborhoods, as Snitow and Koffman emphasize. One of the main characteristics of the techno-parks is a temporary worker. Additionally, as they clarify this is the world of "flexible work" in the "new economy" (p. 2). Each individual acts in the economy, like "an independent contractor and the CEO of [his or her] own life"(p. 2). However, individuals have had no job security and no health or pension benefits. They are employed or fired related to the interest of the employer. They had no rights while at work. However, people in the workforce joined unions and demanded greater control of their working conditions and wages. Laws protected working people, who had a job with lifetime health benefits and could retire with a pension. Since the 1980s, temporary work and contract work have become important in the workforce. After the establishments of the techno-parks, temporary work and contract work become usual, particularly in era of global corporate competition. In that way, techno-parks open new opportunities for outsourcing, while diminishing union membership. Additionally, the governments support and regulate the conditions of work in the techno-parks. The space has created inequalities where young people come into the workforce in the highly technological sectors and start out in temporary jobs. In the techno-parks, many never hold permanent jobs. According to Snitow and Koffman:

> Temporary agencies are now the largest private employers in the world. In 2000, Manpower, for instance, operated in 59 countries with over 2 million employees. When full time permanent workers are laid off nowadays, companies often replace them with temporary workers. Every kind of work and every industry are affected. In the 1990's, the number of temps working in manufacturing tripled. Many more work in meatpacking, fast food, box store, and day labor jobs that often are not classified as temporary, but which also lack job security and benefits. Even many college and university teachers are now temps, traveling academic itinerants who call themselves “Road Scholars.” The trend is international. (2002, p. 3-4).

More importantly, legal protections for permanent workers have been decreasing since the 1990s, and nine out of ten new jobs were either temporary or part time. However, according to Snitow and Koffman (2006) many economists have appreciated “the idea of flexibility and the idea that each person is responsible for his or her own destiny (p. 3). Even though the members of the Industry

Association say, “temporary work often leads to permanent employment, lowers unemployment by more rapidly matching workers and jobs, and provides social and work skills for young people and people coming off welfare” (p. 5), the benefits of these temporary work conditions in the techno-parks belong to the private sector. As Snitow and Koffman clarify, these jobs help companies adjust to rising or falling demand with short-term hires and low-cost layoffs (2006, p. 5). Companies try to find places in the techno-parks to find and use the regulations related to temporary jobs to increase profits by lowering pay and benefits. Today, temporary workers become more than full time employees who earn less now than 30 years ago. Snitow and Koffman (2006) agree that the techno-parks generate the norm, “replacing stable, high-wage jobs, de-skilling work, eliminating health benefits, and silencing workers who want to complain about health and safety or who want to organize unions” (p. 6). The new economy generates gains for the private sector and losses for the workers under the name of the “flexibility” for the high tech work structure. Additionally, unstable communities and unstable families are becoming profound in the flexible work conditions. The techno-parks reorganize labor, government, corporations, schools, and community groups by transforming work conditions, job security and fairness at work. Indeed, they create economic and spatial inequalities (Snitow & Koffman, 2002, p. 3-4).

Furthermore, the techno-parks and their regions are becoming the most expensive suburbs, like in the area of Stanford University, the Hewlett Packard Corporation, and many of Silicon Valley’s leading high tech financiers, home to venture capitalists who make millions of dollars during high tech booms. The techno-parks result in the majority of the population being wealthy. However, there are also low-income communities with no financial resources. The techno-parks create unbalanced developments in the regions. According to them, the structure of the techno-parks generates disparities between communities, which is called "the digital divide" (2002, p. 3-4). More importantly, Snitow and Koffman explain this situation as follows:

> The divide exists when low-income people and minorities don't have access to computers and the Internet, which are necessary tools for participation in the new economy. Silicon Valley's wealthy elite supports education and computer training for low-income people in East Palo Alto. High tech leaders that giving East Palo access to computers is a good investment in future workers and consumers and that it gives low income people an opportunity to make it in high tech. At the height of the high tech boom in the late 1990's, the issue of the "digital divide" became a catchall phrase used by the media, government, and corporations to refer to virtually all-social problems. In Silicon Valley, there was a growing faith that high tech education could level the playing field, provide opportunity, and "raise all ships" on a wave of prosperity. In Silicon Valley, overcoming the digital divide became synonymous with overcoming the problems of racism, poverty, and under-funded public schools. But when the high tech boom collapsed, all the social and economic problems remained. (Snitow & Koffman, 2002, p. 6-7).

It is an important aspect of the technology-based spaces, which develop intensively differences because of the technology divide. According to Snitow and Koffman, this transformations force "core social divides: the grave disparities in economic opportunity, education, health, safety, housing, employment, and even transportation" (2006, p. 7). In the studies, there are important findings related to technology, which creates social problems and reproduce existing social and racial divides. Additionally, in the communities and in the school, the use of technology has increased significantly, providing students different opportunities, whereas those who do not have lose their chances to succeed. This is also seen at the universities, where they have better science and technology laboratories and opportunities. Most of the students who graduate from the best universities where there are techno-parks have located enjoy significantly better employment chances (Snitow & Koffman, 2002, p. 7-8). More importantly, these places produce toxics, safety, and health problems:

> Over 1,000 materials, including chlorinated solvents, brominated flame retardants, PVC, heavy metals, plastics and gases, are used to make electronic products and their components—semiconductor chips, circuit boards, display panels, and disk drives. A Cathode Ray Tube (CRT) monitor can contains between four and eight pounds of lead alone. Big screen tube TVs contain even more than that. Flat panel TVs and monitors contain less lead, but many use mercury lamps. About 40% of the heavy metals in landfills, including lead, mercury and cadmium, comes from electronic equipment discards. Indium is being used increasingly in semiconductor industry. Nano materials are being used in many products including some electronics, although the health and safety impacts of Nano materials have barely been studied. These chemicals or materials can cause harm to workers and communities at any stage of the product lifecycle. (Electronics Coalition, 2012, p. 1).

Health and safety problems of the highly technological production are unknown. Computer parts are being recycled and melted down to recover some of the valuable metals that went into their production. According to Snitow and Koffman's studies, these stories contrast with the public image of the computer industry as a place where skilled employees work on "campuses," where manufacturing takes place in "clean rooms," and where the workers dress in protective body suits from head to toe (2002, p. 3). What few people realize is that the suits and respirators are worn to protect the products, not the workers. The electronics industry is one of the most chemically intensive, toxic industries in human history. More than 700 chemicals are used in the production of a computer workstation. Many of those chemicals, such as arsenic and cadmium, are extremely toxic. Others have never even been tested for health effects. No one knows the health effect on workers of being exposed many of these chemicals at the same time, but we do know that high tech workers have had unusually high levels of cancer, miscarriages, and children born with birth defects. Critics say the industry is a massive experiment using human beings as guinea pigs. The other end of a computer's life cycle is the scrapheap. By the late 1990's, 12,000,000 computers, amounting to over 300,000 tons of toxic electronic junk, became obsolete each year. Much of this scrap languishes in people's garages, attics or basements because there is no coordinated and safe way to dispose of it. Some of it is shipped to China, Pakistan, and India where it is burned, releasing into the air vast amounts of highly toxic chemicals such as dioxins and benzene. Most consumers just throw their old computers in the garbage. Out of sight and out of mind, these old computers have become an environmental nightmare. Almost half the weight of a computer monitor is lead, which causes mental retardation and other health problems in children. When the monitors are dumped, the poisonous lead can seep into the water table. Most manufacturers have been unwilling to set up efficient take back programs or to pay for safe recycling. The results of these production and disposal problems can be seen clearly in techno-parks, like in Silicon Valley itself. The Valley has more Superfund toxic contamination sites than any other area in the country. Most of the contaminated sites are located in low-income communities where high percentages of immigrants and people of color live, giving rise to charges of "environmental racism." (Snitow & Koffman, 2002, p. 8)

As Apple points out, most people are fascinated and lives are changed by computers, "not as a technology, but as a tool for email, instant messaging, games, and inevitably far down the list, for work, homework, and research"

(2010, p. 9). However, few people spend time thinking about "where computers come from or what the Internet means for how our society is organized" (p. 9). The high tech industry has changed a generation and business philosophy. According to Apple, the technology has totally transformed the world where "economic laws no longer apply, that national boundaries are meaningless, that all wealth is created by entrepreneurs, that unions are a thing of the past, that each individual is the "CEO of his or her own life" (Apple, 2010, p. 9). These changes have also affected education. Apple has explained this situation as follows:

> Education processes re/produce (new) social orders and social identities arising from, and constitutive of, a new spatiality of knowledge/power. A new 'hegemonic bloc' has been built. A tense and sometimes contradictory alliance of neoliberals, neoconservatives, authoritarian populist religious conservatives, and the new managerialists of the professional-managerial middle class is increasingly dominant is all too many spheres of social and cultural life. In the process, it has had profound effects on what counts as important knowledge, "appropriate" teaching, good learning, indeed on what education is for and how we assess its benefits. Indeed, the global sweep of these things is quite striking. (2010; p. 6-7).

These are not simply procedural transformations. These differences are absolutely essential in understanding the politics of education and the transformations education is currently undergoing. Additionally, as Apple strongly criticizes, there are few people who are doing some of the most important "hidden labor" that keeps the university functioning than there were before. In the universities, as Apple mentions, that their jobs have often "been outsourced, pay lowered, benefits cut, and [require] much more work to be done as they must compensate for other workers who have lost their jobs" (2010, p. 7). According to Apple, these works are done by poorly paid working class, immigrant, and diasporic people. As Apple mentions:

> There is an unfortunate tendency among even many progressive academics—their failure to recognize both their continuing debt to such people and the realities of the relationship among "empire," diasporic populations, and the hidden labor that enables academics to do their teaching. More significant transformations have been affecting higher education, transformations that are increasingly visible not only here in the United States but elsewhere as well. Given the severity of the economic crisis as it works its way through the higher education sector, we can expect that these effects will deepen and worsen globally. (Apple, 2010, p. 8).

Even these ideological and economic movements are not enough to explain and illustrate the whole picture sufficiently because there are other challenges in the higher education. According to Apple (2010), one of these challenges is the element of conservative modernization as authoritarian populist religious conservatives. As Apple (2010) clarifies critically that the initiatives of neoliberalism focus on audits, economically useful knowledge, entrepreneurialism, and an "ethic" of consumer choice that positions students and parents as "customers" (p. 11). On the other hand, politics of populist religious impulses and identities with their own re-articulation demand and change the realities of universities as well as the techno-parks. Many people who work in these institutions have been transformed before since they are directly working with the latest initiatives of the governments.

As Kodolak (2007) mentions, the relationship between academy and industry, however, is the core of the discussion in the universities, particularly the elite ones, where techno-parks are developed to improve this partnership. The accumulation of scientific knowledge at the universities together with reaching and using new technologies attracts the attention of private industries. Therefore, the universities open new spaces - generally called techno-parks – in order to attract the private industry. In other words, the inequalities are significantly increased between elite universities and the other ones who have enjoyed such a wide range of opportunities. According to Massey (1992), this situation is explained as follows:

> Techno-parks at the universities are the 'nerve centers' of the new 'scientific management.' They do not promote science, but its application in technology. In other words, technological application of scientific knowledge constitutes the basis of the innovations in techno-poles. In that sense, an advertisement prepared for the Cambridge Science Park is a good example to show the linkage: Three centuries ago Newton was researching in his rooms in Trinity. Many notable scientists have worked in Cambridge since. The fountain of scientific ideas flows here as strongly as ever. Achieving the commercial potential of those ideas and applying the vast range of local scientific expertise to helping high technology industry-is the aim of the Cambridge Science Park. (p. 56- 89).

However, the relationship and interaction between universities and industry in the techno-parks can be seen in many different ways. As Kodolak points out:

> 72% of the parks host university research groups and teams. Most of the science parks are concentrated in dense university areas. 60% of the science parks have more than 5 universities or higher education institutions within a 50 Km radius. Moreover, 21% have over 20 universities around them. The application of university research corresponds to the needs of industry in particular ways. Primarily, techno-parks present opportunities for new firms established inside the university, which are called "academic start-ups." These firms are born inside the university and carry their research outside the laboratory and bring it onto the market. The other one is defined as 'tapping in' which means making use of university resources, technology and knowledge by the new establishments with no previous contact with the university or existing establishments relocating in the area. (2007, p. 42).

Techno-parks are new places where small firms are encouraged in order to use high technology cooperating with researchers in related departments. In this way, techno-parks have forced the university administration to serve technologically oriented companies in these knowledge-based economies. As a result, as Robertson mentions that techno-parks are the results of neoliberalism, which focuses on the governments' and the private sectors' individualistic choices in market relations, developing new forms of inequality based on differential access to resources in realizing choices (cultural, economic, social and organizational) (2011, p. 277-297). Even though the techno-parks are deeply increasing inequality, most nations have started to compete in the knowledge-based economies mainly dominated by the technological development. Hence, the following title explains the spatial redevelopment due to the techno-parks where created unexpected social injustices and inequalities.

Techno-parks and Spatial Redevelopment

As Seo (2006) mentions that mostly techno-parks support a specific business model, through which technology transfer, incubation, innovation and finally industrialization process take place. The different R&D activities are developed in science park arenas and in industry sectors to empower the research based industrialization. Some science parks are focused on basic research (e.g., Cambridge Science Park), while others are on applied research (e.g., Singapore Science Park). Other techno-parks commercialize their strong manufacturing capabilities. As Seo (2006) explains, new firms are often located within or around these regions and forming clusters. Techno-parks create "substantial agglomerative effects" (p. 3) for the regional economy. According to him, there are two main approach related to science parks: "the economic geography perspective and the institutional perspective" (p. 3). According to Seo (2006), the techno-parks and their surrounding region are related as an "entity consisting of specialized firms with an evolving structure of inter-firm linkages and agglomerative effects" (p. 3). The roles and contributions of science parks help regional development and regional innovation systems.

Additionally as Seo (2006) clarifies, from the second half of twentieth century, the economic values of scientific works, which have been produced in academic settings, have become markedly increased. There have been several concerns about these linkages with the business community. The numbers of university research settings and the working areas provided for this aim have been increased, while creating also some serious obstacles. The concept of the regional industrial complexes has become known as *techno-poles*. Several universities engage in activities with these complexes, for regional and national development. The projects of technology development and innovation start to transform these ideas for marketable products. The most basic idea is creating technological products for the market. Therefore, the engagement with the industry is planned to increase technology production by enlarging the number of techno-parks, where academic support for innovation already occurs. On the other hand, from the institutional standpoint, Seo emphasizes:

> Techno-parks support its stockholders with specific policy-based or mechanism-based ways. This view emphasizes issues such as the functioning of incubators, the degree of spin-offs, and whether science parks grant competitive advantages to their tenant firms as well as positive turn over effects to firms located in their complex. The affinity towards endorsing science parks as an expert one to held technology-based firms have focused chiefly on the direct and tangible contributions of science parks and the institutions within them. The assistance includes new job openings, quality of employment which eventually devoting techno-parks to go for investing on R&D to raise venture capital, as well as to increase the role of universities towards contemporary ideas on research with the science parks. Thus, it attempted to foster techno-parks as an important means for regional technology innovation and economic development. (2006, p. 7).

As a result, techno-parks are considered to be important spaces for the regional and economic development, but they are increasingly decentralized from the universities using their resources. Therefore, it is important to examine the effects of this shift toward decentralized, planned, and de-spatized centers in techno-parks.

Decentralized, Planned, and Despatilized Centers

As Robertson (2009) explains, space is important to understand the changes in the policies related to 'de-centralization' in "education markets" (p. 3). Hence, studying changes of space related to education, particularly those spaces related to the higher education, has opened new dimensions in comprehending a powerful neoliberal discourse. Today, as Robertson mentions, education activity has moved from previously fixed and institutionalized centers and is reworked with "new spaces of knowledge production with new geometries of social relations" (2009, p. 3). The centers of power in the national state have been redefined in the selective functions, in the different nodes and in the scalar architecture of the global order. Hence, as Robertson emphasizes, these scales have been redefined new sets of logics – "around efficiency, choice, local partnership, self-management, responsibility" (2009, p. 3). More importantly, institutionalized social relations make it possible for new non-state actors to participate, particularly in the activities for-profit by reconstituting education spaces. Even though decentralization has seen as a movement of power in a downward direction—to the local organization/community, the movement is not only in this direction. Robertson (2009) clarifies this situation as follows:

> Decentralization takes at face value the spatial imaginary of the representation of space. The idea of scale—as opposed to

> decentralization enables us to see quite what is at stake - the social production of scale and the reconstitution of social relations in a shifting spatial geometry of power and social relations. Using the concept of scale enables us to trace movements in multiple directions, as new nodes of power and rule are constructed or invigorated, struggled over and legitimated. In turn we are able to see the emergence of a new functional and scalar division of the labor of education space. Positionality matters in this case, as the social relations arising from market-based relations are dependent upon who and what is included in the spatial organization of choice. So, too, do networks, which work as means of protection against exclusions as well as mechanisms to ensure inclusion—like clubs? Spatialising state projects, such as 'decentralization' and 'markets' raise significant issues for the spatiality of the sociology of education – anchored as it has been in a deep methodological nationalism and statism. This is despite the fact that the sites, scales, strategies and subjectivities for re/constituting and governing of education have been highly dependent upon re/projecting and re/working education spatial and social relations. (p. 3).

Additionally, the innovation hubs are forms of enterprise zones, described by Susan Robertson (2009) as the mine and foundry of the informational economy. Some of these zones are purely private sector real-estate efforts, but most are the products of cooperation between the public and private sectors. These hubs are characterized by the partnership of research institutions and companies with the common goal of generating the basic materials of the informational economy. According to Balkan, the Association of University Related Research Parks clearly relates the university and the techno-park by giving the characteristics of these settings:

> (1) Existing or prospective land and buildings intended primarily for private and public research and development facilities, high-technology and science-based companies, and support services; (2) a contractual and/or formal ownership or operational relationship with one or more universities or other institutions of higher education, and science research; (3) a role in promoting research and development by the university in partnership with industry, assisting in the growth of new ventures, and promoting economic development; and (4) a role in aiding the transfer of technology and business skills between the university and industry tenants. (2006, p. 96).

While becoming decentralized, techno-parks are also becoming the planned centers to promote high-technology industry and to generate the basic materials of the informational economy. The term planned denotes a designing activity, in the perspective of both organizational and physical. As Balkan emphasizes, "if the physical dimension is taken in hand, then the fields of architectural and urban scaled design efforts are to be considered" (2006, p. 18). New aspects in creating the spaces for innovative activities need, "architecture of knowledge" with its reflection in the physical setting such as; "setting the motivational space for innovation, the social quality of spaces for the spatial performance" (Balkan, 2006, p. 18). From the aspect of economy, the main goal of these settings, named techno-parks, is generating knowledge to sell as a new trend so that new concepts of organizational structure are needed. Additionally, this structure basically requires large budgets to fund the teams of experts involved in techno-parks' construction. Balkan states the major purpose of these teams is "to design the complex into commercially applicable format" (2006, p. 18).

Furthermore, Toker (2003) has analyzed how the spatial organization of workspaces in university research centers influence encounters among researchers. Hence, the innovation process is itself considered as an outcome. There are directs effects of spatial organization on innovation process outcomes, as Toker mentions:

> ... Among various information resources used for information consumption, face-to-face technical consultations are the most important information resources. Research in design disciplines has shown that spatial organization of workspaces can affect human encounters. The configurational properties of the space play a central role in our working, home, social and cultural lives. The social aspect of architecture engages people with their environment and each other, contributing to the quality of communities, organizations and individuals. This contribution is

> based on the networks that are related to those of whom are the users that are housed in architectural settings. This issue of architecture is essentially grounded on design by imitation through a social network, which serves to realize the ideas of social qualities contained by the space. (2003, p. 23).

While designing spaces for society, the social aspect of architecture within the techno-park settings has directly affected the social order that is derived partly by the use of computer-based production systems. The recent revolution of information technology has a great influence on the architectural formation seen in techno-parks, which are technology-producing spaces. Hence, these centers are not only decentralized and planned, but also despatilized. The context of physical space organization is also shaped under the influence of global networking transformations according to the technological improvements. The information and technology-based revolution has transformed the organization of spaces deeply (Balkan, 2006). Furthermore, as Morgan points out:

> Globalization and digitalization have been presented as ineluctable forces which signal the 'death of geography,' The argument that 'geography matters' is pursued in three ways: first, by questioning the 'distance-destroying' capacity of information and communication technologies where social depth is conflated with spatial reach; second, by arguing that physical proximity may be essential for some forms of knowledge exchange; and third, by charting the growth of territorial innovation systems. Current accounts of economic globalization, and particularly of large globally operating corporations as its principal actors, are still preoccupied with two propositions: one of them is the idea that these 'global players' are able to assume much of the power and sources of power traditionally ascribed to the nation-state; the other, connected one is the idea that their transnationalized structures and practices are able to turn the world into one unified, global space, making them fully independent of place, location, and space. This proposition gives clues to define the virtual space configuration of innovation producing settlements. (2004, p. 4).

Therefore, as Morgan (2004) declares that globalization generates "a new concept of working environment, a flexible work arrangement [where] the spatial configurations for some categories of knowledge workers has gained ‘a momentum within virtual mediums’ of new communication tools” (p. 45). Adapting to a knowledge-based economy, which plays important and crucial role in knowledge creation and transfer, this change in spatial configuration is defined with the term despatialization. This situation is explained by Balkan more specifically as follows:

> Despatialization –consequential to working with improved communication tools, such as Internet, intranet, videophone, etc.– modifies the elements of the relations of “person-person, person-artifact, person-place, space-place-activity, and space-artifacts25 within spaces of knowledge processing spaces. Social networks interrelate and interact, thus, radiate their social space that they form. The physical borders are fine if they do not compress these relations within functional norms. However, these spaces within borders may create positive, relaxing and motivational spaces when the public interaction is enhanced. (2006, p. 19).

Hence, the main purpose has become to construct solid buildings with interior common spaces that “pass over the borders and through the walls,” conducive to generating a social network which penetrate within the interior and exterior knowledge- processing community. Additionally, as Balkan clarifies:

> A community is an amalgamation of living things that share an environment. The individual living beings can be plant or animal; any species; any size. What characterizes a community is sharing interaction in many ways. In human communities, intent, belief, resources, preferences, needs and a multitude of other conditions may be present and common, affecting the degree of adhesion within the mixture, but the definitive driver of community is that all individual subjects in the mix have something in common. This is even true in biological communities. (2006, p. 20).

In order to understand the evolution of technology, it is important to analyze network communities; the interactions between social practice and technical mechanisms, since boundaries between designers and users are blurred and evolution here is responsive to user experience. Tom Allen (1977), in studying communication and innovation in engineering, emphasizes the production of new knowledge and mentions, “problem solving and significant advances in knowledge depend much more on interaction between people that are not part of the same research group, profession or field, than on communication within work groups” (p. 67). According to Toker, the most significant advances in engineering knowledge appear “to have a random component, which often depends on chance meetings between people that work in different fields and who are not the members of the same team, but work in the same building” (2003, p. 134). Hence, the creation of common or social spaces in the techno-park settings is considered an important necessity for techno-park developers. Moreover, as Toker (2003) points out, “the physical setting of the organizational space takes its designed morphology related to its human environment” (p. 134). Because this environment is profoundly interrelated to each other as social improvements, the technological developments are changing according to the space of the human environment. The space is widely affected by the people, who have different experiences in terms of functionality. Hence, as Toker clarifies, “the spatial quality of the social space is strongly related with the user profile and the morphological features of the architecture” (2003, p. 136). This situation is explained as “space is the machine” (p. 61) by Dal Fiore and Martinotti (2005). In other words, the space configuration of a certain function affects the operation mechanism and its communal or social networking, or vice versa as Filippo Dal Fiore and Guido Martinotti emphasize:

> Continuously evolving ecologies of communities and networks populate the world, both directly-experienced and Internet-mediated, contributing to originate different opportunities in which a special social dimension (i.e. socio-cognitive space), in which meaningful social innovations take place ... as the organizational community versus the occupational community

(a sort of operating adhocracy). (Filippo & Martinotti, 2005, p. 62).

Furthermore, Balkan explains that communities and networks are different as it is seen in the Figure 9. They represent the “two extremes of an epistemic continuum of the different possible relationships between an individual/organization/system/agent (i.e. its individuality) and the environment in which these actors operate (i.e. its sociality)” (2006, 60-67).

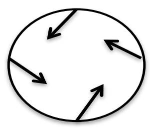
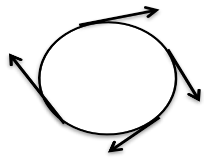
		
Communities		Networks
Tension towards homogenization/conservation	VS	Tension towards differentiation/generation
Confirming/explicative communication		Creative communication, new paths of sense
Space of belonging		Space of comparing

Figure 9. Differentiating communities from networks.

As Balkan (2006) mentions, even though communities and networks are both strongly interrelated, their controlling/organizing mechanisms are different in terms of the virtual or spatial network hierarchy. Combining the network with the communal structure of a community is a way to maximize the effectiveness of the production process. This aim finds its base in the physical intersection set: common spaces. Therefore, the design of these spaces in technology production nodes (i.e techno-parks) becomes extremely important. However, decentralized, planned and spatialized places have increasingly created economic and spatial changes and inequalities, particularly in the systems of the universities.

However, education is a process that needs interpersonal (not merely interactive) relationships between people— between teacher and student and student-to-student. It is an individual and collective self-knowledge. According to Kapoor, that "education is a process of becoming for all parties, based upon mutual recognition and validation and centering upon the formation and evolution of identity" (p. 2). The educational experience is illustrated by this relationship between people. In that way, the quality of education can be enriched. Therefore, according to Noble (2001), commodification (or commoditization) decreases the quality of education since "a commodity is something created, grown, produced, or manufactured for exchange on the market" (p. 59). Even though in education "some things" are bought and sold, the system is not for that purpose. This situation is defined by Karl Polanyi (2006) as "fictitious commodities" (p. 3). According to Noble, even though most educational services are "divided into units of credit and exchanged for tuition, they are fictitious commodities" (p. 2). They are not purposely done for commodification. However, the commodification of higher education is systematically planned as Kapoor (2002) clarifies:

> To transform educational process into commodity form, for the purpose of commercial transaction. The assembled "courses" are exchanged for a profit on the market, which determines their value, by their "owners," who may or may not have any relationship to the original creators and participants in the educational process. At the expense of the original integrity of the educational process, instruction has here been transformed into a set of deliverable commodities, and the end of education has become not self-knowledge but the making of money. In the wake of this transformation, teachers become commodity producers and deliverers, subject to the familiar regime of commodity production in any other industry, and students

> become consumers of yet more commodities. The relationship between teacher and student is thus reestablished, in an alienated mode, through the medium of the market, and the buying and selling of commodities takes on the appearance of education. But it is, in reality, only a shadow of education, an assemblage of pieces without the whole. (p. 2).

Under this new system, as other highly skilled workers in every industry, academic faculty meet with the realities related to commodity production. As Kapoor (2002) claims, "speed-up, routinize, greater work discipline and managerial supervision, reduced autonomy, job insecurity, employer appropriation of the fruits of their labor" (p. 2). More importantly, under the managerial pressures, they have to deal with diminishing labor costs to increase profit. Kapoor, using David Noble studies explains this situation:

> The commoditization of instruction leads invariably to the "proletarianization" or, more politely, the "deprofessionalization" of the professoriate. As investors shift their focus from health care to education, the deprofessionalization experienced by physicians is being extended to professors. But there is a paradox at the core of this transformation. Quality education is labor-intensive; it depends upon a low teacher–student ratio, and significant interaction between the two parties—the one utterly unambiguous result of a century of educational research. Any effort to offer quality in education must therefore presuppose a substantial and sustained investment in educational labor, whatever the medium of instruction. (Kapoor, 2002, p. 2).

However, the requirements of commodity production decrease the quality of education, as well as its pedagogical aspects. In distance education, intimate and individualized instruction is possible rather than in the crowded, large lecture halls. But the main purpose of distance education is to increase profit by decreasing their instructional costs to a minimum so that they undermine the pedagogical aspect. As a result, as Kapoor emphasizes (2002), they not only degrade the labor force but "degrade" the "product" as well. Almost all the higher education institutions have invested in distance education to increase revenues. Additionally, university administrators have realized that the technology of online education is affordable and relatively disarming for their managerial advantage. At the same time, faculty resistance can be decreased and "the deprofessionalization of the professoriate has increased and gained coherence and confidence" (p. 3). As Kapoor expands on this situation:

> As more colleges and universities have moved squarely into the realm of commercial online education, alone or in collaboration with private-sector partners, the distinction between nonprofit and for-profit institutions has been blurred to the vanishing point. Not so very long ago, the post-secondary establishment railed against their for-profit online counterparts (in particular the University of Phoenix and Jones International), in defense of their own monopoly of higher education. The major trade associations like the American Council on Education and the American Association of Universities indignantly opposed formal accreditation of the pariah 'for-profits' and lobbied virtuously against any relaxation of federal requirements for student aid that might support their 'virtual' rivals. Today, these same organizations are striving to keep up with the Joneses. Joining forces with their erstwhile adversaries, they now rail against any and all state regulations that might cramp their own for-profit propensities, especially by limiting their part-time and distance-education offerings. In essence, universities are disconcertingly departing from academic tradition. Not only are they setting up their distinctly for-profit subsidiaries, like Columbia's Fathom or New York University's NYU Online. They are fast becoming de facto unabashed "for-profits" themselves, and doing so with abandon. (2002, p. 3-4).

Hence, according to Noble (2001), the academic system becomes a commercial enterprise, especially after the "dotcom collapse" (p. 56). However, the costs of the online development are unstable and uncertain, and highly competitive. On the other hand, as Kapoor articulates throughout the history of industrial capitalism, the military has helped the private enterprise support technical innovation and develop a market for new services and products, particularly in "uniformity, standardization, modularization, capital-intensively, system compatibility, interchangeability, measurability, and accountability—in short, a model of education as a machine, with standardized products and prescribed processes" (2002, p. 4). In the case of distance education as well, the military has affected higher education to reinforce and "[extended] extra-academic commercial tendencies toward training and deprofessionalization" (Kapoor, 2002, p. 3). The military has dramatically commercialized distance education in higher education. The changes in online education make administrators restructure their institutions and labor relations for their managerial advantage although they are not aware the deprofessionalization of their faculty. Additionally, according to Noble, "the administrations have failed to understand that the point of retaining professional ownership and control over the content of courses is not the enrichment of the professoriate but the preservation of quality higher education" (2001, p. 62).

However, some elite universities take distance education as a shadow and extension of their formal education. The Massachusetts Institute of Technology (MIT) put their course materials on websites for free Internet distribution. The case of MIT is different because of its position in the market and its power in funding; however, most universities cannot afford to do this as it may risk their position in competitiveness. Such universities use the benefits of long-distance learning, which improves their career-making connections together with the high quality of education that comes from direct contact with skilled faculty members. The effects would be different on the elite universities as well as on the socially disadvantaged universities. As Kapoor (2002) explains, the future of higher education has been changing in terms of faculty organizations, particularly with "a new intellectual property regime" in academia (p. 3). On the other hand, "technology-driven" administration develops a threat in "faculty autonomy, intellectual property, and job security" (Kapoor, 2002, p. 4). The commercialization of academia and the commodification of instruction are the latest manifestation, which develops particular problems for public higher education. The decisions related to intellectual property have changed the culture of academia. This is critically explained by Kapoor, using Nobel's 2001 studies:

> Decades after academia divested itself of classified research on behalf of the national security state on the grounds that such practice was in conflict with the free and open exchange of ideas to which university culture is dedicated, the academy has adopted practices on behalf of private corporations that have the very same corrosive consequences. There are concerns about the conversion of intellectual activity into commodity form for commercial sale, by means of patents, copyright, and licenses on these; about the resulting incremental enclosure of the "knowledge commons," through an array of proprietary arrangements, into a patchwork of private monopolies; about how universities have been adopting the corporate model of operation and outlook as they lock themselves into the corporate embrace, at the sacrifice of the core values of the academy; about the erosion of university culture as campuses have become a closed world of secret deals, non-disclosure agreements, prepublication reviews—the ensemble of practices that define the intellectual property regime; and about the campus atmosphere of silence, intimidation, and self-censorship that attends these arrangements and signals the demise of free speech and academic freedom. (Kapoor, 2002; p. 1).

These strategic changes in higher education have developed a distinct minority in the universities, while faculty, students, and the taxpaying public support institutions of higher education. Hence, according to Kapoor (2002), the educational ideals have been denied so that "the ideological, rhetorical, and political initiative and moral high ground in the debates about higher education to reinvigorate a non-commercial conception of higher education and reconsecrate the intrinsic rather than mere utility value of universities" (p. 4). As a result, Bekemeyer claims that even though there are critical approaches as "education is meant to serve in a democratic society," the participants cannot do anything in the transformation of "this precious and unique social space as a realm of freedom, of open access, debate, inquiry, and learning place, where the habits and highest ideals of democracy are a way of life" (2011, p. 1). In other words, the purpose of higher education has been increasingly changing, while creating inequalities and destroying social justice by means of consumerism, academic capitalism and commodification of higher education. This situation is even worse than ever before after the development of the techno-parks. These economic and spatial changes are analyzed systemically in in order to show the effects of the newly re-ordered techno-parks on increasing economic inequalities and social injustices. Consequently, the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis are overviewed in the literature before making the further studies of this study. In the following chapter, the methodology of this study is discussed in order to examine and problematize the transformation of the higher education by means of the techno-parks taking into consideration the key changes explained in the literature review. The following chapter is about the methodology of this study. Taking into account the literature review, the methodology of this study is explained.

CHAPTER III

METHODOLOGY

This study critically examines the changing form and scope of higher education by examining techno-parks in Turkey. This transformation of the higher education by means of the techno-parks, which have been changing the dynamics of the higher education, is studied by using the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis (Dale & Robertson, 2008, p. 2) as explained in the literature review. Hence, in this study, the transformation of the higher education and techno-parks are critically understood, explained, and problematized in the context of Turkey using these four levels of the "Education Questions" which are the "Educational Practices, Educational Politics, Politics of Education, and their Outcomes." (Dale & Robertson, 2008, p. 9). These four levels help to study the social issues step by step in order to critically understand, examine, and explain.

However, while collecting the data for each level mentioned above, a phenomenological research analysis is preferred because this issue has increased in complexity and become known as a social phenomenon. For this reason, two approaches of the phenomenological research analysis are used in order to gather and analyze data for each level of the "Education Questions" (Dale & Robertson, 2008). In order to comprehend this social phenomenon, the findings of the research analysis are divided in two parts. In the first part, the hermeneutics research approach of the phenomenological research analysis is preferred to analyze the three levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. These three levels of the "Education

Questions" are the "Educational Practices, Educational Politics, and the Politics of Education" (Dale & Robertson, 2008, p. 9). In this part, the data collected by reading the related texts or experiences, the intention and meaning behind the surface of the techno-parks and the higher education world's transformation is understood, explained, and problematized.

In the second part, however, the empirical approach of the phenomenological research analysis is used to gain comprehensive descriptions of this transformation by means of the techno-park. The four levels of the "Education Questions" in the Multi-Scalar Governance of Education" Analysis, which are "Educational Practices, Educational Politics, the Politics of Education, and the Outcomes" (Dale & Robertson, 2008, p. 9), are explained by conducting both single and focus group interviews. The descriptions gathered from these interviews provide the essence of the people's experiences relating to the insight and dynamics of techno-parks. The thirty-five participants are gathered from four different techno-parks in Turkey. They are managers, academics, directors of the techno-parks, and student interns. Twelve of these participants participated in the focus group interviews. Consequently, after gathering data from these interviews and focus group, the phenomenon of higher education's transformation using techno parks is better understood, explained, and problematized. The study aims to understand this transformation in better detail by studying the conceptualization and implications of techno-parks, critically analyzing them with these two different research approaches.

In the following titles, the methodology of this study is given. At the beginning, the details regarding the research methodology are explained in order to clarify why and how the four levels of the "Education Questions" in the

“Multi-Scalar Governance of Education” Analysis are preferred and used. The research questions are developed with these four levels in mind, in order to better understand, explain and problematize this transformation with a higher framework. Then, the data collection strategy, using phenomenological research analysis, is given. In this title, the two approaches of the phenomenological research are explained since the research analysis has two parts. In the first part, the data collection, which is reading the related texts, is clarified; then, in the second part, the data is collected with focus groups and interviews. The research setting is also explained along with the details of the participants. In the data collection procedure of the second part, the procedures related to the interviews, the focus group interviews and the coding system of the data collection are discussed. Then, the data analyses and ethical assurances are clarified. This way, the methodology of this study is used to understand, explain, and problematize higher education’s transformation using techno-parks. As a first title, the research methodology is discussed below.

Research Methodology

In this study, since the relationship between higher education and techno-parks in Turkey is highly complicated, “Multi-Scalar Governance of Education” Analysis” (Dale & Robertson, 2008) is used as a research methodology in order to critically examine the dynamics of this relationship step by step. The “Multi-Scalar Governance of Education” Analysis has developed in four different levels in order to study the educational issue as a guideline in this globalization era. It helps to prepare the research questions systematically. While using “Multi-

Scalar Governance of Education" Analysis in this study, higher education's transformation by means of techno-parks is considered a phenomenon, so "the phenomenological research analysis" (Moustakas, 1994) is used in order to collect the data for each level of the "Education Questions" in this study. In the following paragraphs, why and how the "Multi-Scalar Governance of Education" Analysis is preferred and used is explained, while discussing the needs of the new research methodologies (Dale & Robertson, 2008). By using these four levels of the "Education Questions" in the "Multi-Scalar Governance Education" Analysis, the transformation of the higher education in Turkey is more systematically and critically understood, explained, and problematized.

In Level 1, the "Educational Practices" (Dale & Robertson, 2008), the practices and processes related to education issues are taken explicitly into account by asking of these higher education transformations: "what, where, how and why, when, where, by/from whom, under what circumstances and broader conditions, and with what results?" (p. 9). Additionally, how, by whom, and for what purposes these transformations occurred are specifically examined in order to evaluate the practices and the processes in the techno-parks. Hence, the first research question, "How do techno-parks develop in Turkey?" is problematized using this Level 1 of the "Education Questions" in the analysis. The related sub questions of this study are given in the Appendix B in Turkish and in the Appendix C in English.

In Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9), the transformation of the higher education by means of the techno-parks is problematized. Therefore, the questions regarding the "social, economic, political and educational purposes" (p. 9) of these relationships are systematically analyzed, while taking into account "funding, provision, ownership and regulation of educational governance" (Dale & Robertson, 2008, p. 9). "The sectorial and cultural path and dependencies are overviewed critically, to problematize [the] decided, administrated and managed educational politics" (p. 9) of Turkish techno-parks which play a key role in this transformation. Consequently, the research question, "What are the science and technology policies and national strategies that shape and organize the techno-parks?" is developed by asking the sub questions (see the Appendix B in Turkish and the Appendix C in English).

In Level 3, the "Politics of Education" (Dale & Robertson, 2008, p. 9) of higher education and the techno-parks is systematically and critically studied. Hence, as explained by Dale and Robertson (2008) "what functional, scalar, and sectorial divisions of labor of educational governance are in place" (p. 9) is asked, in order to understand "the core problems of capitalism, which are accumulation, social order and legitimation, in the context of the "mandate, capacity, and governance of education" (p. 9). While analyzing these issues, "how and at what scale are contradictions between the solutions addressed" is taken into account. Additionally, regarding the transformation of the higher education by means of the techno-parks, "the boundaries of the education sector" (p. 9) is critically examined in order to understand "how the education sector overlaps with and relates to the other sectors" (Dale & Robertson, 2008, p. 9). As a result, this research study asks: "In what ways are the techno-parks integrated into the university-industry-government partnership, as a type of capital accumulation process while also changing the fundamental principle of education?" Furthermore, under Level 3, the educational sector is studied from the perspective of the citizenship and gender regimes. For that reason, study asks: "How do key managers and clients at the techno-parks, academics, and student interns work together within and beyond the university-industry-government partnership?" Moreover, by asking "how, at what scale, and in what sector do configurations in education contribute to the extra economic embedding/ stabilization of [capital] accumulation?" (Dale & Robertson, 2008, p. 9), the effects of the techno-parks are analyzed. In that way, "the nature of …intra-sectoral and inter-sectoral relations" are overviewed by taking into consideration "contradictions, cooperation, and mutual indifference"(Dale & Robertson, 2008, p. 9) in the context of these higher education transformations. In light of this evidence, another research question of this study is developed: "What are the arrangements and mechanisms of the techno-parks that promote the university-industry-government partnership?" Consequently, the "Politics of the Education" as the third level of the analysis critically examines the issue in order to understand, explain, and problematize the transformation of the higher education by means of the techno-parks.

In Level 4, the "Outcomes" (Dale & Robertson, 2008, p. 9), as the last "Education Question" in the "Multi-Scalar Governance of Education" Analysis, systematically and critically examines the transformation of the higher education by means of the techno-parks. Therefore, as Dale and Robertson (2008) clarify, "What are the individual, private, public, collective and community outcomes of 'Education' are at each scalar level" (p. 9) is asked in order to understand, explain and problematize "the consequences for equity, individual and collective capability, democracy and social justice" (p. 9). As a result, the five different research questions of this study are developed to understand deeply the outcomes of the transformation of the higher education by means of the techno-parks. The first question of Level 4 is, “What kinds of economic, educational, cultural, and spatial inequality are created by means of the techno-parks?” The second question focuses on the potential outcomes of this transformation of higher education by asking: “Do techno-parks create any segregation?” The third question of this level is “What are the roles of techno-parks in urban redevelopment?” The forth question of this level is: “Do techno-parks create economic, educational, political, and cultural transformations?” and the last questions asks: “In what ways do techno-parks create economic, educational, political, and cultural transformation, while changing the purpose of higher education?” In that way, the five research questions of this study help understand, explain, and problematize the consequences of the transformation of the higher education by means of the techno-parks in Turkey for equity, individual and collective capability, democracy and social justice. By using four different levels of the “Education Question” in the “Multi-Scalar Governance of Education” Analysis, the transformation of the higher education is analyzed critically by asking ten research questions. The following title focuses on the research questions of this study, which are developed using the four levels of “Education Questions” framework, under the “Multi-Scalar Governance of Education” Analysis.

Research Questions

The research questions of this study problematize the role of techno-parks in the transformation of Turkish higher education. In this study, there are ten research questions, which are developed using the four levels of “Education Questions” in the “Multi-

Scalar Governance of Education" Analysis explained by Dale and Robertson (2008). In each research question, the level of the "Education Question" is given related to the "Multi-Scalar Governance of Education" Analysis. In that way, the use of techno-parks in Turkey as a strategy for transforming higher education is conceptualized and problematized by answering the following research questions:

1. How do techno-parks develop in Turkey? (Level 1, Educational Practice)
2. What are the science and technology policies and national strategies that shape and organize the techno-parks? (Level 2, Education Politics)
3. In what ways are the techno-parks integrated into the university-industry-government partnership, as a function of the capital accumulation process while also changing the fundamental principles of education? (Level 3, The Politics of Education)
4. How do key managers and clients at the techno-parks, academics, and student interns at the universities work together within and beyond the university-industry-government partnership? (Level 3, The Politics of Education)
5. How are the arrangements and mechanisms of the techno-parks that promote the university-industry-government partnership? (Level 3, The Politics of Education)
6. What kinds of economic, educational, cultural, and spatial inequality are created by means of the techno-parks? (Level 4, Outcomes)
7. Do techno-parks create any segregation? (Level 4, Outcomes)
8. What are the roles of techno-parks in urban redevelopment? (Level 4, Outcomes)
9. Do techno-parks create economic, educational, political, and cultural transformations? (Level 4, Outcomes)

10. In what ways do techno-parks create economic, educational, political, and cultural transformations, while changing the purpose of higher education? (Level 4, Outcomes)

In the following titles, the data collection and analysis following these research questions is explained.

Data Collection

While using this "Multi-Scalar Governance of Education" Analysis, the research questions are developed step by step in order to understand, explain, and problematize the social phenomenon. In this study, the data collection and analysis becomes importance as well. Therefore, a phenomenological research analysis is used, while collecting the data for each research question developed according to the four levels of the "Education Questions" (Dale and Robertson, 2008).

As Mayntz explains, there is also a methodological problem in the "explanatory correlational analysis, because dealing with empirical research in macro-phenomena," such as regime transformations, the welfare state crisis, or neoliberalism and transformation of higher education is strategically difficult (2003, p.12). Like Mayntz, Fuat Ercan (2010) has mentioned that social phenomena could be analyzed differently than ever before because the knowledge and information about the changes can be under the control of the hegemonic power. Therefore, a holistic understanding and approach are needed to comprehend not only the outside dynamics, but also the internal, deep dynamics of the social phenomena, like capitalism and neoliberalism;

particularly in developing markets, like Turkey (p. 182-183). In today's social sciences, other sociologists and philosophers, like Ercan, disagree with the dominant traditions of correlational (or multivariate) analysis in quantitative research. This argument is supported by Dale and Robertson (2007), who are critical of the explanatory power of correlational analysis. In other words, such topics' aims are very difficult to describe and produce general theoretical statements with well-known small-N problems. In order to deal with this problem, a phenomenological research analysis is used in the data collection and data analysis.

As a methodological approach, qualitative research is grounded in the premise that "meaning is socially constructed by individuals in interaction with their world" (Merriam, 2002, p. 13). Hence, a phenomenological research analysis has methodological traditions to understand a social or human problem, taking into consideration social phenomena (Mayntz, 2003) and to understand religious, cultural, political and ethical changes within the institution, like schools, universities, industry, and state. The structure of the social phenomena within the phenomenological research analysis takes into consideration critical and non-critical information as well in order to understand, explain, and problematize the dynamic changes of the structure in the time process.

The most important aspect of the phenomenological research analysis is first to understand the social phenomenon using both critical and non-critical information. Then, it is important to explain the social phenomenon, and finally, it is vital to problematize the social phenomenon (Mayntz, 2003, p.14). This situation is explained by Ercan as well in the Figure 10.

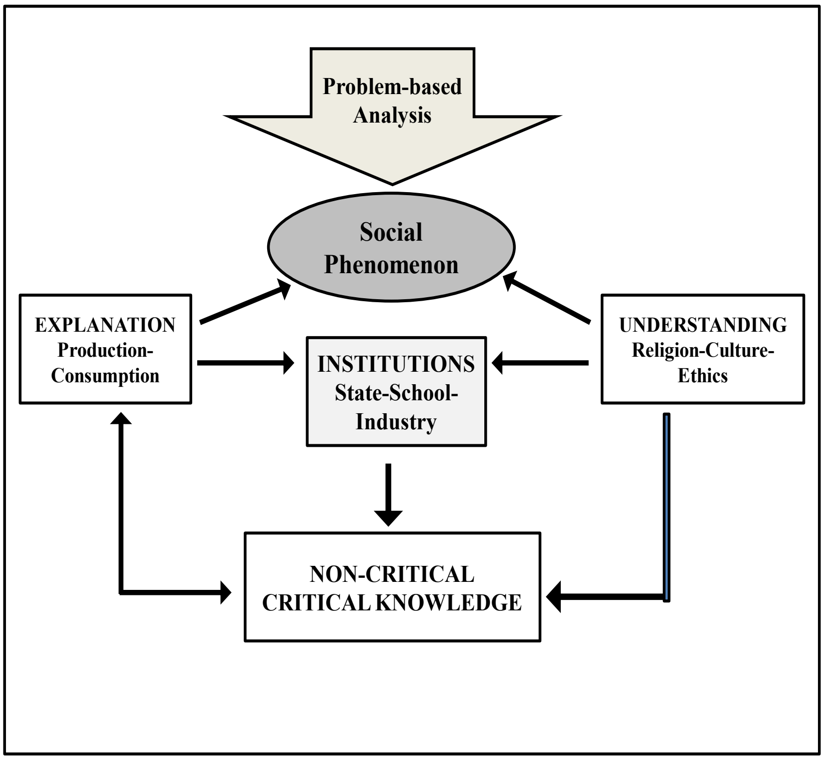


Figure 10. Phenomenological Research Analysis for a Social Problem (Ercan, 2010, p.183).

As Moustakas (1994) explains, a phenomenon could be studied by means of concepts. Phenomenology tries to diminish a prejudgment or presupposition by looking and analyzing the concepts openly in their natural environment. It is difficult to describe the concepts, so understanding meanings and essences is possible by understanding intuition and self-reflection. Moreover, Moustakas (1994) clarifies that “meaning is created when the object as it appears in our consciousness, mingles with the object in nature: what appears in consciousness is an absolute reality while what appears to the world is a product of learning” (p. 27). In other words, “the act of consciousness and the object of consciousness are intentionally related” (Moustakas, 1994, p. 27). On the other hand, the relation between phenomenology and human science is complex. Therefore, in the phenomenology research, descriptions of experiences are given, instead of explanations or analysis of the experiences in which the researcher is also involved in the research (Moustakas, 1994).

According to Moustakas (1994), in the phenomenological research analysis, there are five human science research approaches that utilize qualitative methodologies: ethnography, grounded theory, hermeneutics, empirical phenomenological research, and heuristic research. As Moustakas explains:

> *Ethnography* means the direct observation of the activities of a certain group as well as communication and interaction with the group members. The result of ethnographic research is a cultural description.
> In the *grounded theory* approach data is collected and the hypotheses and concepts based on data analysis are worked out during the study.
> *Hermeneutics* involves the art of reading text or experiences in such a way that the intention and meaning behind the appearances are understood. The point of view is known as well as the cultural and social forces that may influence it. *Empirical phenomenological research* returns to experience in order to obtain comprehensive descriptions. These descriptions then provide the basis for a reflective structural analysis to portray the essences of the experience. First the original data is comprised of 'naive' descriptions obtained through open-ended questions and dialogue. Then the researcher describes the structure of the experience based on reflection and interpretation of the research participant's story. The aim is to determine what the experience means for the people who have had the experience. From there general meanings are derived
> *Heuristic research* begins with a personal question or challenge, but one that has a social or universal significance. It is aimed at discovery through self-inquiry and dialogue. The life experience of the heuristic researcher and the research participants is not a text to be interpreted but a full story that is vividly portrayed and further elucidated through art and personal documentations. From these individual depictions and portraits from research participants, a composite depiction is developed. This represents the entire group of co- researchers. The primary researcher then develops a creative synthesis from this material. (Moustakas, 1994, p. 2-3).

All these models have certain common qualities as Moustakas has clearly clarified:

> They recognize the value of qualitative designs and methodologies. Studies of human experiences are not approachable through quantitative approaches,
> They focus on the wholeness of experience rather than solely on its objects or parts,
> They search for meanings and essences of experience rather than measurements and explanations,
> They obtain descriptions of experience through first-person accounts in informal and formal conversations and interviews,
> They regard the data of experience as imperative in understanding human behavior and as evidence for scientific investigations,
> They formulate questions and problems that reflect interest, involvement, and personal commitment of the researcher; and
> The view experience and behavior as an integrated and inseparable relationship of subject and object and of parts and whole. (1994, p. 2).

In this research, the two approaches of the phenomenological research analysis, which are the hermeneutics and the empirical phenomenological research approaches, are used in order to collect and analyze the data. In that way, the research questions, which are developed under the four levels of "Education Questions" in the "Multi-Scalar Governance of Education" Analysis, are critically answered in order to understand, examine, and problematize the transformation of the higher education by means of the techno-parks. Therefore, this study is divided in two different parts in collecting and analyzing the data. In the first part, the hermeneutics approach is used by analyzing critically the reading text. In the second part, the empirical phenomenological research approach is used in order to collect and analyze the data, while examining critically the essence of the subjects' experiences.

In the first part of the data collection and analysis, the hermeneutics approach is chosen to understand, examine, and problematize the transformation of the higher education in Turkey by means of the techno-parks by reading and analyzing critically the related text. As Moustakas (1994) explains, the text is read “in such a way that the intention and meaning behind the appearances are understood” (1994, p. 2). Here, Moustakas claims, “The starting points of studies are to be found in art and in philological-historical insights. The autonomy of viewing art from the vantage point of the history of style has been shaken by hermeneutical reflection (...) including shake up of fixed presuppositions” (1994, p. 2). Hence, in the first part, the data are collected and analyzed by reading the text related to the higher education and techno-parks in Turkey, in order to answer the first five questions of this study. Since the first five research questions are developed according to Level 1, Level 2, and Level 3 of the “Education Questions” in the “Multi-Scalar Governance of Education” Analysis, the transformation of the higher education by means of the techno-parks in Turkey is critically understood, explained, and problematized.

However, in the second part, the empirical phenomenological research is done in order to collect and analyze the data. As Moustakas suggests comprehensive descriptions are preferred by using “reflective structural analysis of the essences of the experience” (1994, p. 2). In other words, the original data is first gathered from ‘naive’ descriptions by asking open-ended questions and dialogue. In the second step, the researcher describes the experiences based on reflection and interpretation of the research participant’s story. The aim of the study is to determine what the experience means for the people who have had the experience (Moustakas, 1994, p. 2). Therefore, the research begins with a personal question or challenge, which has social or universal significance. According to phenomenological research analysis, as Moustakas clarifies “the life experience of the researcher and the research participants is not a text to be interpreted, but a full story that is vividly portrayed and further elucidated through art and personal documentations" (1994, p. 3). In that way, it is possible to develop a creative synthesis. Hence, in the second part of this study, the ten research questions, which are developed to answer the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis, are critically answered. The main goal of this part is to understand, explain, and problematize the transformation of the higher education by means of the techno-parks in Turkey by using reflective structural analysis of the experiences of the people in the techno-parks. Consequently, the data collection and analysis are conducted by examining the reading text in the first part and by examining the experiences in the second part. Therefore, before discussing the data collection procedure of this study, the research setting and the participants are given in order to clarify how the second part of the data collection and analysis are done.

Research Setting

As a research setting in this study, four techno-parks were chosen from the 45 in Turkey in order to conduct the interviews and focus group interviews. Two of these techno-parks are in Istanbul, while the other two are in Ankara and Kocaeli. In Table 5, the locations of the techno-parks are given.

Table 5. The Locations of the Techno-parks.

Given Name	City
TECHNOPARK A	Kocaeli
TECHNOPARK B	Istanbul
TECHNOPARK C	Istanbul
TECHNOPARK D	Ankara

The researcher obtained consent for participation from the techno-parks and from the individuals that participated in this study (see Appendix A). The details of the participants who participated in this research are given in the following paragraphs.

Participants

The sample size for this research study is purposive, consisting only of those persons who are working and have knowledge about the dynamics of the selected techno-parks. The researcher visited eight techno-parks and chose four techno-parks under the basis of backgrounds and experiences. It is difficult to reach some techno-parks because of the geographical distance, or they were not interested in this study. The names of the techno-parks are not given because of the confidentiality asked from the participants.

The participants are selected through snowball sampling, which is a type of non-probability sampling technique based on the judgment of the researcher instead of choosing the other two methods of sampling in qualitative research called purposive and quota sampling, As Heckathorn (1997) mentions, snowball sampling is particularly useful when the population is hidden and/or hard-to-reach (p. 174), as it is in this case. The aim of the researcher is to represent the techno-park in a well-rounded way, so the participants are divided in four groups to represent the population in the techno-parks. In this method, it is possible to use the participants' social network as well. These groups are: administrators and managers; clients and firms, including incubators; academics; and student interns. They are also divided as male and female in order to balance gender participation. The number of the each group is again chosen using snowball sampling as it is given in Table 6. Of course, there are some limitations in finding proper participants. For instance, there is no female administrator in the examined techno-parks.

Table 6. Sampling Details of the Interviews.

	MANAGERS		FIRMS		ACADEMICS		INTERNS		TOTAL
	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	
TECHNOPARK A	1	1	-	1	-	1	1	1	6
TECHNOPARK B	1	1	-	1	-	1	1	1	6
TECHNOPARK C	-	2	-	2	1	2	1	1	9
TECHNOPARK D	1	2	2	2	1	2	2	2	14
TOTAL	3	6	2	6	2	6	5	5	35

In the Techno-park A and B, six participants were found from four different sampling categories. In the Techno-park C, nine participants were chosen from out of twenty-six people, due to the fact that most did not want to be part of this study. The five participants out of nine also participated in the focus group interviews. In the Techno-park D, fourteen participants were interviewed for this study: four managers, five clients of the techno-park, three academics, and four student interns. Seven among them took place in the focus group. Because of these differences among participants, the researcher was able to make a comparative analysis regarding the different experiences of the participants related to the techno-parks.

In the focus group interviews, on the other hand, the twelve participants of the Techno-park C and D participated in order to answer the last five research questions. The details of the participants in the focus group interviews are given in Table 7. The researcher wanted to discern whether the insights and opinions of the participants were different or similar. The questions of the semi-structured interviews are provided in the Appendix D in Turkish and Appendix E in English.

Table 7. Sampling Details of the Focus Group.

	MANAGERS		FIRMS		ACADEMICS		INTERNS		TOTAL
	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	
TECHNOPARK C	-	1	-	1	-	1	1	1	5
TECHNOPARK D	1	-	1	2	-	1	2	1	7
TOTAL	1	1	2	2	0	2	3	2	12

The focus group for the Techno-park C consisted of five participants drawn from the previous nine participants who provided data on an individual basis. In the Techno-park D, the focus group participants are seven individuals taken from fourteen participants. The combined total for the focus group responses from Techno-park C and D is 30.7% of the total participants from the four techno-parks. In the following title, the data collection procedures of this study are explained clearly in order to illustrate the structure and procedures of the research.

Data Collection Procedures

The data of this study is collected and analyzed in order to answer ten questions of the research question, which are developed under the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. In data collection and analysis, the five research questions are answered by using the hermeneutics approach. Then, the empirical phenomenological research is used to collect and analyze the data in order to answer the ten research questions of this study.

As Moustakas (1994) states, the methods of phenomenological research analysis begin with analyzing the reading text in order to understand the meaning behind the information. Then, "formulating the research question, illustrating the topic and research question and selecting the participants" are critical (Moustakas, 1994, p. 104). From this standpoint, the ten research questions are developed by using the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. Furthermore, they are answered by reading the related the text and by collecting the experiences.

Additionally, in the phenomenological research analysis, the concepts have not only social meaning, but also personal significance. More importantly, ethical principles in research are taken into consideration, where the participants are well informed and respected in their privacy. In other words, data is validated by the participants (Moustakas, 1994). In data collection, long and informal interviews are done by asking interactively open-ended comments and questions. Consequently, organization and analysis of data are performed by taking into consideration every relevant statement (Moustakas 1994, p. 105). Hence, in this study, the data collection and analysis done by reading the related text is validated by the participants who have experiences in the techno-parks.

By using the two approaches of the phenomenological research analysis, the hermeneutics approach and the empirical phenomenological research approach, the data are collected and analyzed. In that way, the development of techno-parks and the transformation of higher education are understood, explained, and problematized in this study. Therefore, the data collection and analyses of the ten research questions have conducted in two different parts as given in Table 8.

Table 8. The Structure of the Data Collection and Analyses

HERMENEUTICS APPROACH	EMPIRICAL PHENOMENOLOGICAL RESEARCH APPROACH	EMPIRICAL PHENOMENOLOGICAL RESEARCH APPROACH
TEXT ANALYSIS	INTERVIEWS	FOCUS GROUP INTERVIEWS
1st Research Question LEVEL 1	1st Research Question LEVEL 1	6th Research Question LEVEL 4
2nd Research Question LEVEL 2	2nd Research Question LEVEL 2	7th Research Question LEVEL 4
3rd Research Question LEVEL 3	3rd Research Question LEVEL 3	8th Research Question LEVEL 4
4th Research Question LEVEL 3	4th Research Question LEVEL 3	9th Research Question LEVEL 4
5th Research Question LEVEL 3	5th Research Question LEVEL 3	10th Research Question LEVEL 4

In the first part of this research, the hermeneutics approach is used to answer the first five research questions, which belong to the first three levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. By analyzing critically the information related to the techno-parks - taking into consideration the reports, the books, the documents, the dissertations, the interviews, and other written resources on the web related to the techno-parks in Turkey, the transformation of the higher education by means of the techno-parks is deeply and systematically understood, explained, and problematized.

For the second part of the research, on the other hand, the empirical phenomenological research is used. The researcher studying the literature has prepared the forty-two questions for the participants' interviews and twenty questions for the focus group meetings (Appendices B and C). In that way, the ten research questions, developed with four levels of "Education Questions" in the "Multi-Scalar Governance of Education" Analysis, are critically answered. The second part of this study is divided in two different groups, in order to answer the ten research questions for four levels of "Education Question." In the first group, the interviews are conducted for the first five questions of the ten research questions, which critically analyze and explained the first three levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. In this group, the thirty five participants from the four techno-parks have participated in and answered the five research questions which are asked through the interview questions given in the Appendix B in Turkish and Appendix C in English. Consequently, how the first three "Education Questions" "Educational Practices, Education Politics, and the Politics of Education" (Dale & Robertson, 2008, p. 9) are related to the transformation of the higher education in Turkey by means of the techno-parks is explained.

In the second group, however, the focus group interviews are conducted in order to answer the last five research questions, which clarify Level 4 of the "Education Questions" as the "Outcomes" (Dale & Robertson, 2008, p. 9). The last five research questions are answered through the focus group interview questions given in the Appendix D in Turkish and Appendix E in English. In that way, the outcomes and the consequences of the techno-parks in the transformation of the higher education are critically understood, explained, and problematized by asking the participants in the focus group. In the following paragraphs, the data collection processes through the interviews and the focus group interviews are explained as the data collection strategy of the empirical phenomenological research.In the following titles, as the data collection methodology, interviews and focus group interviews are explained.

Interviews

In the second part of this study, the interviews have been organized in order to answer the first five research questions of this study. In that way, the data collected by the participants at the interviews have been used to answer the first three levels of the "Education Questions: Educational Practices, Education Politics, and the Politics of Education" (Dale & Robertson, 2008, p. 9). In order to conduct the second part of the study, the researcher has started each interview with a brief introduction and background of the researcher and purpose of the study. Responses from the interviews were recorded on an audio tape recorder with permission of the respondent. The researcher minimized personal bias by keenly observing the respondent's body language and interest in the interview process. The researcher is also aware of her gestures and language to minimize distraction. A guiding principle for the researcher is a constant effort to develop understanding and correct meaning. Holstein and Gubrium (1995) state "that understanding how the meaning-making process unfolds in the interview is as critical as apprehending what is substantively asked and conveyed" (p. 4).

In this study, the researcher tries to minimize bias by using open-ended research questions given in the Appendix B in Turkish and Appendix C in English for thirty-five participants. Moreover, the interview method is not used exclusively for this study, but it is crosschecked when possible with other means of securing information, such as reviewing documents, archival records, and focus group meetings. Also, effort is made to minimize distortions through data obtained from different sources, namely administrators, managers, firms, incubator clients, and student interns, including archival data and focus group interviews. The interview data obtained from the tape-recorded responses from the interviews are transcribed CDs to obtain maximum accuracy prior to the analysis of the data. During the interviews, the forty-two semi-structured research questions given in the Appendix B in Turkish and Appendix C in Engşlish, including questions related to the demographic information. In general, each interview session takes approximately a minimum of three hours to a maximum of six hours. In the following title, the details regarding the focus group interviews are explained.

Focus Groups Interviews

In the second part of this study, the second group has been organized in order to answer the last five research questions of this study. In that way, the data collected by the participants at the focus group interviews have been used to answer the final "Education Question" Level 4, the "Outcomes" (Dale & Robertson, 2008, p. 9). In that way, it is possible to analyze the outcomes and the consequences of the Turkish higher education's sector transformation. The twelve participants of the two techno-parks are participated in the focus group interviews. The details of the participants are given in Table 3.

As far as focus groups interviews are concerned, Hoepfl (1997) contends, "credibility depends less on sample size than on the richness of the information gathered and on the analytical abilities of the researcher" (p. 12). The data obtained from these two focus group interviews provide parallel-forms reliability in assessing consistency of results. Previously obtained data through individual interviews compared with data from the focus groups improve reliability for this research study. All the data gathered from the interviews and the focus group interviews have been coded in order to conduct the research analysis. The following tittle is about the coding system of the data collected from the single and focus group interviews.

Coding System

During the interviews and the focus group interviews, the data collected and preserved according a coding system, which was developed by the researcher. An alphanumeric system is used to code all the various participants used in this research to preserve anonymity of the data sources and to prevent coding bias. The four techno-parks are designated as Techno-park A, Techno-park B, Techno-park C, and Techno-park D. There are four groups of participants for the techno-parks, which are from managers, firms and clients, academics, and students and interns. All the participants are coded according to their gender as well. For instance, the two administrators or managers of the Techno-park A are coded as AA1 and AA2, the participants from the firms and client are coded as AB1. On the other hand, the academics of this techno-park are defined as AC1 and AC2. Finally, the student and interns are coded as AD1 and AD2. All the participants of the four techno-parks are coded in this system according to the participants in the sampling as it is seen in Table 6. This coding system gives the chance to analyze the data of the techno-parks by taking into account the similarities and the differences between males and females, and among participants who have different background and experiences. In other words, it is possible to compare and contrast the data of the managers with other participants-clients, firms, academics, interns, and students- within the group and between each other. Table 9 explains the details of the coding.

Table 9. Coding Details of the Interviewees in the Interviews.

	MANAGERS		FIRMS		ACADEMICS		INTERNS	
	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE
TECHNOPARK A	AA1	AA2		AB1		AC1	AD1	AD2
TECHNOPARK B	BA1	BA2		BB1		BC1	BD1	BD2
TECHNOPARK C		CA1 CA2		CB1 CB2	CC1	CC2 CC3	CD1	CD2
TECHNOPARK D	DA1	DA2 DA3	DB1 DB2	DB4 DB5	DC1	DC2 DC3	DD1 DD2	DD3 DD4

The same kind of coding is done for the focus groups as well. This is given in Table 10 The participant has the same code in the interview in order to keep the records carefully organized.

Table 10. Coding Details of the Interviewees in the Focus Group.

	MANAGERS		FIRMS		ACADEMICS		INTERNS	
	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE
TECHNOPARK C		CA1		CB1		CC3	CD1	CD2
TECHNOPARK D	DA1		DB1	DB4 DB5		DC3	DD1 DD2	DD3

After the interview of each participant in the focus group, the data was taken into consideration with the notes taken during the interview and coded all together in the word document in the CDs.

Data Analyses

In this part, the data analyses are explained by using the phenomenological research analysis according the system given in the "Multi-Scalar Governance of Education" Analysis (Dale & Robertson, 2008, p. 9). In other words, the research question which are articulated according to the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. Then, a phenomenological research analysis is used to collect and to analyze the data for each research question. In describing phenomenological analysis, the Colorado State University Writing Guide (2008) states:

> Phenomenological research analysis is a research tool used to determine the presence of certain words or concepts within texts or sets of texts. Researchers quantify and analyze the presence, meanings and relations of such words and concepts, then make inferences about the messages within the texts, the writer, the audience, and even the culture and time of which these are a part. (p. 1).

Hence, in this study, the data is collected according to the four levels of the "Education Questions" in order to understand, explain, and problematize the "Educational Practice, Education Politics, the Politics of Education, and the Outcomes" of the transformation of the higher education by means of the techno-parks in Turkey.

The data are collected and the responses are tape recorded, with the participants' approval, based on the assurance of confidentiality. The tapes are then transcribed for data aggregation and analysis. During the one-on-one interviews, the researcher has asked follow-up questions to obtain clarification.

In the first part, the method of data analysis is done by analyzing all the related documents and putting them in the context of the phenomenological research analysis called hermeneutics. The documents are separated theme by theme in order to put and analyze by using Atlas.ti 7 software program since systematically collecting, selecting, and analyzing the data is much better than the other qualitative data analysis software programs. In that way, the phenomenon of this transformation is systematically studied by using related text, particularly those that belong to the government's white papers. By studying the text related to the techno-parks and higher education in Turkey, the intention and meaning behind the appearances are understood, explained, and problematized. In that way, the study answers the first three levels of the "Education Questions" - "Educational Practices, Education Politics, and the Politics of Education" – as they relate to the Turkish higher education system.

In the second part, as the method of data analysis, the empirical phenomenological approach of the phenomenological research analysis is used. The experiences of the people at techno-parks and universities are gathered and analyzed, in order to obtain comprehensive descriptions related to this sectorial transformation. These descriptions then provide the basis for a "reflective structural analysis" (Moustaka, 1994, p. 2). In other words, the personal experiences of the participants that are explained and not explained before are taken into account. Hence, it is possible to illustrate, understand, explain, and problematize the essences of the participants' experiences. At the beginning, as Moustakas (1994) mentions, the original data is gathered from 'naive' descriptions through open-ended questions, given the Appendices B and C, and dialogue.

The transcript of the interviews is taken, and the data is re-examined. The open coded interview notes are then compared to the actual text of the interviews, and codes are established on the raw data. Coding is then performed on the complete transcribed interview material. Coding in this study does not lead to new codes, but does provide for the creation of subcategories within the codes established through open coding. This coding system gives a chance to re-examine the interview data. To analyze the data and to evaluate the dissertation research questions related to the first and the second part, the researcher has organized the data in tables. In addition, to provide clarity and insight, the data analysis is supported by narrative from the interviews conducted with techno-parks administrators, business client firms, academics, student interns, and focus groups. Reliability is based on the consistency and accuracy of results obtained from the total representative population and data obtained through interviews and focus groups interviews. Validity is obtained through measuring what the research has intended to measure; Moustakas has explained, “Reliability and validity are conceptualized as trustworthiness, rigor and quality in qualitative paradigm” (Moustakas, 1994, p. 5-9). Then, by using the tables, the researcher describes the experiences in a specific structure, which is explained in the phenomenological research. In this structure, according to the data gathered from the participants of the interviews and the focus group interviews, the reflection and interpretation of each participant’s story is collected under the subjects related to the research questions of this study. Each research question that has developed according to the “Education Questions” has a specific theme. In that way, it is possible to understand and to determine what the experience means for the people who have had the experience.

Consequently, the general meanings are derived from the data for the transformation of the higher education by means of the techno-parks in Turkey.

After the finishing the structure for each theme, which is taken from the four levels of the "Education Questions", the data is analyzed with the ATLAS.ti 7 software program. As Friese (2012) explains, the main goal of ATLAS.ti is to help "uncover and systematically analyze complex phenomena hidden in text and multimedia data" (p. 1). This software program helps preserve, code, and interpret findings in the primary data material. Then, it evaluates this data according to the levels of importance. More importantly, it shows complex relations between the different data sources (Friese, 2012, p. 1).

As a result, by using the phenomenological research analysis, the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis (Dale & Robertson, 2008) are answered. Hence, the research questions of this study help understand, explain, and problematize the transformation of higher education by means of techno-parks in Turkey. In the Chapter IV, the details of this data analysis are given in order to clarify the phenomenon of the techno-parks and the transformation of the higher education. Finally, in the last title of this chapter, the ethical assurances of this study are explained.

Ethical Assurances

In this study, according the phenomenological research analysis, the human research criteria are carefully used. At the beginning of the research, permission is from the Research Ethics Committee of Bogazici University (Appendix A) taken with the INAREK Registration Number 2012/22. Then, consent is asked from the participants. By ensuring confidentiality, the researcher and the participants agree to place and time commitments. Additionally, permission is asked from the participants in order to record their conversations. In this study, the participants asked for their names to not be published, so heir names and the names of the techno-parks are not mentioned. As Moustakas (2008) mentions, “Setting aside prejudgments and opening the research interview with an unbiased, receptive presence” (p. 5). The research questions of this study did not result in any undue emotional or physical stress. The tone and pace of the interviews were pleasant rather than challenging. All the participants are asked to sign a release before the interview began. This way, it is possible to ensure that they understood they were participating by choice. Additionally, they could end the interview at any time, if they so desired. Before finishing this study, the researcher has showed the transcript of the interviews, which are used in this study. After the consent of each participant’s interviews is taken, the data is mentioned in the study. In the following chapter, the findings and results of this study are given.

CHAPTER IV

FINDINGS

This study sets out the critical effects of the development of the techno-parks in Turkey on the higher education while creating inequalities and social injustices. The findings of this study have gathered by using the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis, which are clearly explained by Roger Dale and Susan Robertson (2008, p. 2). According to the four levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis, the research questions related to the "Educational Practices, Educational Politics, the Politics of Education, and their Outcomes" (Dale & Robertson, 2008, p. 9) are critically understood, explained, and problematized in the context techno-parks and the higher education of Turkey.

While conducting this study, the phenomenological research analysis is preferred due to the fact that the issue, as a social phenomenon, has become complicated. These two approaches of the phenomenological research analysis help gather and analyze the data according to the four levels of the "Education Question" so that the findings of the research analysis are divided in two parts.

In the first part, the hermeneutics research approach of the phenomenological research analysis is preferred to analyze the three levels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis. By understanding, explaining, and problematizing the related reading texts, these three levels of the "Education Questions" which are "Educational Practices, Educational Politics, and the Politics of Education" (Dale & Robertson, 2008, p.

9) are answered in the context of the transformation of the higher education by means of the techno-parks. While reading the related texts or experiences, the intention and meaning behind the appearances are understood, explained, and problematized related to the transformation of the higher education and the roles of the techno-parks on this transformation.

In the second part, however, the empirical phenomenological approach of the phenomenological research analysis is used to have comprehensive descriptions related to the transformation of the higher education by means of the techno-park. The four evels of the "Education Questions" in the "Multi-Scalar Governance of Education" Analysis which are the "Educational Practices, Educational Politics, the Politics of Education, and the Outcomes" (Dale & Robertson, 2008, p. 9) are explained by conducting the interviews and the focus group interviews. The descriptions that gathered from the interviews and the focus group interviews provide the essences of the experiences of the people related to the real insight and dynamics of the techno-parks. The thirty-five participants are participated from four different techno-parks in turkey. These participants are managers, academics, directors of the techno-parks and the student interns. Twelve of these participants are participated in the focus group interviews. Consequently, after gathering the data from the interviews and the focus group interviews, the phenomenon of the transformation of the higher education by means of the techno-park has been understood, explained, and problematized. The details of the research questions related to the four levels and the approaches of the phenomenological research for each research question are given in Table 11.

Table 11. The Research Questions related to the Levels and the Approaches of the Phenomenological Research for each Research Question

HERMENEUTICS APPROACH	EMPIRICAL PHENOMENOLOGICAL RESEARCH APPROACH	EMPIRICAL PHENOMENOLOGICAL RESEARCH APPROACH
TEXT ANALYSIS	INTERVIEWS	FOCUS GROUP INTERVIEWS
1st Research Question LEVEL 1	1st Research Question LEVEL 1	6th Research Question LEVEL 4
2nd Research Question LEVEL 2	2nd Research Question LEVEL 2	7th Research Question LEVEL 4
3rd Research Question LEVEL 3	3rd Research Question LEVEL 3	8th Research Question LEVEL 4
4th Research Question LEVEL 3	4th Research Question LEVEL 3	9th Research Question LEVEL 4
5th Research Question LEVEL 3	5th Research Question LEVEL 3	10th Research Question LEVEL 4

In the following title, under the name of the first part, the three levels of the "Education Questions" which are "Educational Practices, Educational Politics, and the Politics of Education" (Dale & Robertson, 2008, p. 9) are given in order to understand, explain, and problematize the techno-parks in Turkey through the research questions.

First Part

Educational Practices, Educational Politics, and the Politics of Education of the Techno-parks in Turkey

In the first part, while conceptualizing and problematizing the transformation of higher education, the hermeneutic research approach of the phenomenological research analysis is used to understand the intention and meaning behind the appearances by gathering data from the reports, the books, the documents, the dissertations, the interviews, and other written resources on the web. The three levels of the "Educational Questions" which are "Educational Practices, Educational Politics, and the Politics of Education" are answered in the context of the transformation of the higher education by means of the techno-parks in Turkey.

In Level 1, the "Educational Practices" (Dale & Robertson, 2008), the practices and processes related to education issues are taken explicitly into account by overviewing the related text of these higher education transformations: "what, where, how and why, when, where, by/from whom, under what circumstances and broader conditions, and with what results?" (p. 9). Additionally, how, by whom, and for what purposes these transformations occurred are specifically examined in the documents in order to evaluate the practices and the processes in the techno-parks. Hence, the first research question, "How do techno-parks develop in Turkey?" is problematized using the Level 1 of the analysis.

In Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9), the transformation of the higher education by means of the techno-parks is problematized from the political context. Therefore, the questions regarding the "social, economic, political and educational purposes" (p. 9) of these relationships are systematically analyzed in the documents, while taking into account "funding, provision, ownership and regulation of educational governance" (Dale & Robertson, 2008, p. 9). "The sectorial and cultural path and dependencies are overviewed critically, to problematize [the] decided, administrated and managed educational politics" (p. 9) of Turkish techno-parks which play a key role in this transformation. Consequently, the research question, "What are the science and technology policies and national strategies that shape and organize the techno-parks?" is developed by critically articulating in the related text

In Level 3, the "Politics of Education" (Dale & Robertson, 2008, p. 9) of higher education and the techno-parks is systematically and critically studied in the related documents. Hence, as explained by Dale and Robertson (2008) "what functional, scalar, and sectorial divisions of labor of educational governance are in place" (p. 9) is overviewed in the documents in order to understand "the core problems of capitalism, which are accumulation, social order and legitimation, in the context of the "mandate, capacity, and governance of education" (p. 9). While analyzing these issues, "how and at what scale are contradictions between the solutions addressed" is taken into account. Additionally, regarding the transformation of the higher education by means of the techno-parks, "the boundaries of the education sector" (p. 9) is critically examined in the related text in order to understand "how the education sector overlaps with and relates to the other sectors" (Dale & Robertson, 2008, p. 9). As a result, this research study asks: "In what ways are the techno-parks integrated into the university-industry-government partnership, as a type of capital accumulation process while also changing the fundamental principle of education?" Furthermore, under Level 3, the educational sector is studied from the perspective of the citizenship and gender regimes. For that reason, this study overviews the documents to ask the question: "How do key managers and clients at the techno-parks, academics, and student interns work together within and beyond the university-industry-government partnership?" Moreover, by asking "how, at what scale, and in what sector do configurations in education contribute to the extra economic embedding/ stabilization of [capital] accumulation?" (Dale & Robertson, 2008,

p. 9), the effects of the techno-parks are analyzed in the documents. In that way, "the nature of …intra-sectoral and inter-sectoral relations" are overviewed by taking into consideration "contradictions, cooperation, and mutual indifference"(Dale & Robertson, 2008, p. 9) in the context of these higher education transformations. In light of this evidence, another research question of this study is developed: "What are the arrangements and mechanisms of the techno-parks that promote the university-industry-government partnership?" Consequently, the "Politics of the Education" as Level 3 of the analysis critically examines the related text in order to understand, explain, and problematize the transformation of the higher education by means of the techno-parks.

Development of the Techno-parks

In general, as Napier and his friends mention that innovation is taken into consideration as long-term competitiveness in the region for "economic growth, political stability, and private sector performance" (2004, p. 9). Additionally, in the structural changes of Turkish government, as Napier and his friends (2004) point out that the future prosperity and welfare depend "on the ability of its citizens, companies and institutions to be able to generate, access, and utilize knowledge and information" (p. 9). Therefore, the policies of the government are related to increasing the competencies and the opportunities in the globalized and knowledge-based economy by ensuring well-being of its people. However, Turkey has risk of falling behind, like other countries and competitors in Europe, Middle East, Asia, and Latin America. The government has challenged and organized the innovation policy to achieve its goals by empowering private sectors. Therefore, in this transformation, as Napier and his friend clarify that the public sector has reorganized to take different responsibilities in order to support the private sector and to empower them for long-term competitiveness (Napier, Serger & Hansson, 2004). In order to increase innovation, the government has given active role to the private sector and has developed innovative Small and Medium sized Enterprises (SMEs). In the following paragraphs, how the government has promoted innovation by developing innovative SMEs and by giving active role to the private sector is explained in order to understand the background of the development of the techno-parks by overviewing critically the related literature.

Promoting Innovation by Developing Innovative SMEs and Giving Active Role to the Private Sector

They are taken as drivers of the competitiveness and growth for all the countries in the world because they bring significant opportunities. A strong entrepreneurial culture has tried to be established in Turkey as in other European countries so that the government strengthens Small and Medium sized Enterprises (SMEs) of the private sector, which plays important and crucial role in employment. As a result, the critical development in terms of innovation and internationally competitiveness is expected from the SMEs. In other words, as Napier and his friends explain that the policies have been arranged for the growth and prosperity of SMEs because they are taken into account as "fuelling the economic growth, providing flexibility, engaging in bridge-building between Turkey and the European Union, and promoting employment" (Napier, Serger &

Hansson 2004, p. 65). Furthermore, the support and the structure for innovation are not seen sufficient in Turkey, especially for those start-up companies. The number of the new businesses is significantly low in the suburban areas. Therefore, the government has developed different incentives, like the Incentives 2012 announced on 6th of April 2012 to increase the investments in these regions. Even though informal sector activities are high, the complexity of the entrepreneurial activities is very limited because of inadequate access to finance and to international markets. As Napier, Serger and Hansson mention:

> Today, the environment of the SMEs has strategically developed by the government by giving different incentives particularly related to the structure for innovation policy. The main agenda is about "the national ICT infrastructure by developing local/regional action plans for innovation, fostering better conditions for SME growth and entrepreneurial activity, strengthening the supply chain of financial sources and investors, facilitating foreign direct investment and strengthening absorptive capacity of the domestic economy from spillover effects, continuing to strengthen economic and political stability and rule of law, and promoting increased awareness of and participation in EU Programs on terms that balance opportunities for cross-border knowledge flows and restructuring with the costs of growing administrative burdens. (2004, p. 76).

Consequently, challenges are mentioned to increase innovation for the competitiveness in the global economies by strengthening economic growth, which is defined under the national strategy and action plan to improve innovation capacities. All in all, the improvement in the innovation is seen in the development of SMEs. Additionally, according to Napier and his friends the private sector plays important and crucial role as:

> The private sector (chambers of commerce, employer and trade associations, financial organizations, companies and family trusts) in Turkey has pushed the government while they think that that offer a wealth of entrepreneurial drive, financial resources and strong leaders throughout the country. The government policy is that these assets should

> be levered, together with public policy action, to strengthen business conditions and growth prospects for SMEs. In turn, stronger enterprises and closer constructive and transparent public-private sector collaboration aid innovation prospects and create a more appealing environment for foreign direct investment. (2004, p. 76).

Therefore, in Turkey, the private sector is defined as the most-developed regional and local networks. Yet, the SMEs are not organized well to build their own network, so the public sector encourage them to come together and to work efficiently in order to prioritize certain industries and in order empower the national innovation system. On the other hand, in the last decade, as Napier and his friends (2006) point out that the world economy has changed and defined as "the new economy," the "learning society," the "information society" and the "knowledge-based economy" (p. 12) in which:

> Some of the expectations created in the process fell flat to the ground at the turn of the millennium, as the business cycle turned, equity valuations – not only of the high-tech sector but much more broadly – came tumbling down around the world, as flows of foreign direct investment dried up, and multilateral trade negotiations turned sour. (Napier et al., 2004, p. 12).

Furthermore, according to Napier and his friends (2004), the productivity was significantly worse in the 1990s than in the 1980s in Turkey and in the world. Additionally, different improvements have seen in different industries together with new service sectors. In the knowledge economy, measuring economic growth and welfare becomes difficult, particularly in economic performance, competitiveness of nations, and prosperity of millions of people. The most dramatic change is seen in the use of information. In other words, the availability of codified data becomes more affordable and accessible than ever before due to the new technologies. As a result, as Napier and his friends have clarified "international trade is increasingly tilted towards products with high skill- and technology-content. Similar observations are easily made at industrial- and firm-level; areas intensive in technology and skill are on the increase" (2004, p. 13). Furthermore, many different opportunities have created for the countries, especially for Turkey, as well as for all the institutions, particularly for the private industry because of the rise of the knowledge-based economy in which new information and communication technologies (ICT) are uses to strengthen the worldwide connections and collaborations. The most critical aspect of new technologies is that new highly improved skills are needed which force to make changes organizationally. As Napier and his friends (2004) explain that new means of communication, the Internet, create different opportunities "to be able to innovate, develop and implement new commercially viable ideas. As new determinants for economic growth are appearing, increased focus is put on the role of innovation" (2004, p. 13). For that reason, science and technology create new and important opportunities for innovation, which is used as sources of knowledge. In that way, sources of capital make possible to fuel the growth of the private sector, which strengthens the public sector as well, while financing these ideas ensures the commercial realization (Napier et al., 2004).

As shown in Figure 11, both macro and microeconomic conditions have affected the supply and demand of innovation in Turkey. As Napier and his friends emphasize "intellectual property rights, the financial market structure, human capital and investments are some of the factors determining the pace of innovation worldwide, and countries must be equipped with sufficiently-developed conditions on all levels if they want to capture the benefits arising from the knowledge-based economy" (2004, p. 14). In the past decade, promoting innovation becomes a national strategy for all the countries, like

Turkey, by “fostering an innovation culture, establishing a framework conducive to innovation, and gearing research more closely to innovation” (Napier et al., 2004, p. 14).

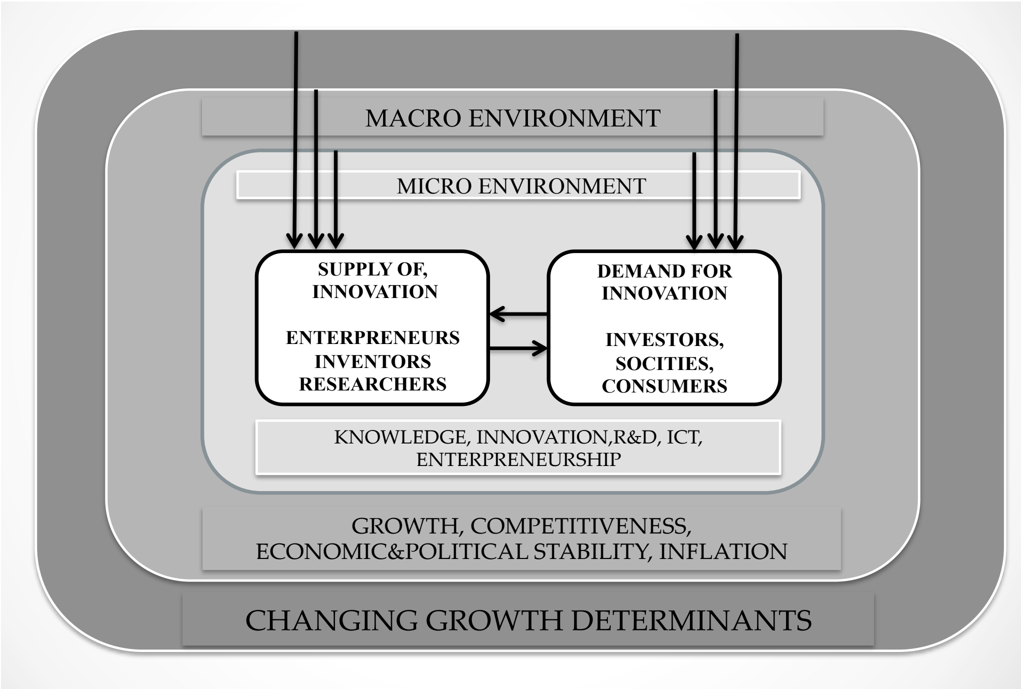


Figure 11. Knowledge-based Economy Changing Growth Determinants.

Napier and his friends explain that by focusing on science and technology, it is possible “to foster scientific excellence, competitiveness and innovation through the promotion of better cooperation and coordination between relevant actors at all levels” as it is seen in Turkey (2004, p. 14). Therefore, innovation and knowledge increase competitiveness and growth among countries, which have pressures about developing innovative knowledge. According to them, Turkey has same kind of pressures particularly after the financial crisis in 2001 when a massive economic stabilization program was put by the government. Additionally, the government was struggling with political corruption and lack of transparency (Napier et al., 2004). Consequently, developing techno-parks has become the main agenda of the Turkish government in order to improve and maintain political and economic stability, which have been expected by increasing the power in the knowledge-based economy. Additionally, Turkey does not have natural resources to compete in the global market. Hence, the political approach in Turkey is related to increasing the competitive advantage in the knowledge-based economy by stimulating investment and encouraging innovation. The efforts of the government are to balance "the political and economic macro environment in order to develop confidence and encourage investment" (Napier et al., 2004, p. 15). As the president of the Union of Chambers of Commodity Exchanges of Turkey (TOBB) has mentioned:

> The current level of productivity increases will not, by itself, be sufficient to ensure continued growth. Turkey is in need of investments to realize technological renovation in Turkish industry. It is the private sector's responsibility to be aware of the necessity for doing business in a different environment from the past and the government's responsibility to remove obstacles standing in the way of the entrepreneur. (TOBB 2004, p. 1-3).

In the mean time, investment and commercialization of technology are not well organized because of high fixed costs and risks in the global markets. More importantly, decisions of the government are related to economic and political stability to increase markedly as Napier and his friend explain, "the investments in education or in long-term high-risk R&D, both of which take years, sometimes decades, to pay off" (2004, p. 15). Additionally, Turkey has bipolar nature of the economy together with informality and corruption. The current situation makes difficult to promote innovation so that the government has developed the techno-parks to create new dimensions and incentives for the private sector. In the following title, the effects of the bipolar nature of the Turkish economy together with informality and corruption are critically explained to analyze the reasons behind the development of the techno-parks in Turkey.

Bipolar Nature of the Turkish Economy, Informality and Corruption

In Turkey, there are regional disparities, which create challenges for policymakers. Therefore, the main goal of the political decisions in 2012 under the name of “the Incentives 2012” is to decrease the differences by giving extra incentives for investments in these regions until 2023. The three major metropolitan areas, which are Ankara, Istanbul and Izmir, have income because of well-developed infrastructure to access to knowledge. On the other hand, the east side of Turkey has low income because of the weak infrastructure in communications, educational facilities, and business services. The Marmara region has accounts for approximately one third of Turkey’s total GDP (Hurriyet Daily News, 2012, p. 1). Therefore, the last incentives in 2012 are developed to decrease these differences by encouraging entrepreneurs and investors so the universities together with the techno-parks have been arranged to increase the quality of investments by increasing knowledge transfer to the industry.

The main goals of the incentives in 2012 are to “reduce dependency on imported intermediate goods and the country’s current account deficit, as well as at contributing to the structural reformation of the country’s industrial sector and balancing out the differences between regions”. According to the first draft of the report, the incentive scheme is divided in six provinces regarding the social-economic development, In that way, the last developed regions would be supported first and intensively. More importantly, the government’s strategy is to pay “the employee insurance costs on the minimum wage for 10 years for investments made in sixth-category provinces” (Hurriyet Daily News, 2012). In this strategy, living standards of population are aimed to increase by developing the education and infrastructure, but more importantly by increasing entrepreneurs and investors in order to have the highest return on investment. In other words, as Napier and his friends emphasize, “Entrepreneurs and investors help the most developed regions become more developed, while policymakers struggle to spread the wealth. The fact that the Turkish economy is so delineated also poses a problem for attracting foreign investment” (2004, p. 18). However, to attract foreign investment, there are also political, religious and human rights considerations. Besides the economic and political factors, according to Napier and his friends (2004), the transparency and equality are other aspects in establishing “faith in investments” which is taken into account as a major problem in Turkey. “Informality and corruption constitute significant barriers to economic development and innovation” (p. 19) in the country in which highly intellectual and well-organized individuals and companies do not want to take the risk, whereas in traditional sectors and firms have taken the advantage. Therefore, according to the World Bank Report, companies in traditional sectors are demotivated to “modernize or innovate, and unfulfilled potential in labor productivity and economic growth. According to World Bank estimates in 2011, “Turkey’s informal economy accounts for 32 % of Gross National Income” (World Bank Report, 2011). According to Napier and his friends (2004), there are several types of informality as:

> Tax-related evasion of value-added tax (VAT and income taxes by not reporting all business activities; Labor market related evasion of social security obligations and minimum wage payments by not reporting all employment or full

> employment working hours; and Product market-related evasion of minimum product quality requirements, property rights, and/or hygiene standards that would increase the cost of goods or services. (Napier et al., 2004; McKinsey Global Institute 2003, p. 20).

According to Napier and his friends (2004), the significant degree of 'informality' has caused distrust towards the country's public institutions. Therefore, the first goal of the government is to increase the foreign investments by increasing incentives, including selling land to foreigners after 2012 by establishing new clean places called techno-parks. In this way, the government tries to have sufficient conditions by decreasing informality and corruption and by increasing extra incentives to "ensure Turkey's future economic prosperity and its transition to the knowledge-based society" (Hurriyet Daily News, 2012). Consequently, most of the techno-parks at the universities, which look clean in terms of informality and corruption, have opened to develop innovation and competitiveness while increasing foreign investment. In that way, the government goals related to the competitiveness and innovation are possible. In the following title, the goals of the Turkish government are analyzed to problematize the reasons behind the development of the techno-parks in Turkey under the name of innovation and competitiveness, which is to decrease the current account deficit and to have better financial indications.

Turkey's Goals in Innovation and Competitiveness: Better Indicators and Low Current Account Deficit

The government of Turkey has taken the decisions in order to have macroeconomic stability and favorable legal framework conditions alone to ensure the development of a dynamic, and internationally competitive business sector. The last incentives in 2012 are related to the "rapidly growing importance of knowledge for welfare and competitiveness of the "firms" and the "country's ability to innovate" (Hurriyet Daily News, 2012). Additionally, according to the report of the European Commission (2003), the government has to try to improve "institutional and organizational conditions, access to knowledge, capital and labor markets, managerial capabilities and other human capital issues, incentive structures and attitudes" (p. 2-3) in order to increase the enterprise development in general, and of SMEs development in particular. All these decisions are arranged according to the strategies that are mentioned by the European Commission as follows:

> Competition through innovation appears to be as important as price competition as a reaction by enterprises to market pressures. In many business sectors, an enterprise that allows itself to lag behind in the race to generate new or improved goods and services, and better ways to produce or run them, is putting its future on the line...While research is a major contributor to innovation, if there is no entrepreneurial action, there is no value creation. It is the enterprise that organizes the creation of value. With the shortening of product cycles, enterprises face the need for more capital-intensive investment and must put more emphasis on the ability to react quickly. For enterprises, innovation is a crucial means to create competitive advantage and superior customer value. (2003, p. 6).

Consequently, the strategic planning decided by the Turkish government is explained by Porter and Scott (2003) as follows:

> Develop economically – and given equal access to global markets, the rapid pace of technological change, the trend towards shorter product life cycles, and, more generally, the growing importance of knowledge – the ability to innovate becomes an increasingly critical determinant of international competitiveness. In advanced nations today, competitive advantage ... must come from the ability to create and then commercialize new products and processes, shifting the technology frontier as fast as their rivals can catch up. (p. 1).

Hence, according to Napier and his friends, the ability to innovate is accepted as "a crucial prerequisite of enterprise development and entrepreneurship, and concepts such as 'innovation policy' and 'innovation systems' are increasingly attracting the attention of policymakers worldwide" (2004, p. 21). The same kind of developments is seen in Turkey, particularly with the enlargement of the technology-based developments in the universities through establishing new techno-parks. Additionally, the European Commission defines innovation, which can be developed in the highly developed conditions of the universities as follows:

> The renewal and enlargement of the range of products and services and the associated markets; the establishment of new methods of production, supply and distribution; the introduction of changes in management, work organization, and the working conditions and skills of the workforce. (European Commission, 2006, p. 5).

Additionally, in the traditional perspectives innovation is closely related to science and technology. However, according to the European Commission Report, today innovation is taken as follows:

> Commercialization of science and technology as well as the development and implementation of new ideas more generally, as in the form of organizational change or inventing new ways of doing things. Rather than being a one-dimensional, linear process leading from certain input factors, innovation is the result of efforts by multiple actors, and is enhanced by their constructive interactions. The concept of innovation has evolved from a linear model having R&D as the starting point, to the systemic model in which innovation arises from complex interactions between individuals, organizations and their operating environment. (2003, p. 6).

Hence, as Napier and his friends explain that the innovation system, in general, is taken into consideration as the responsibility of the governments, which have to make reforms to increase the potential for innovation by increasing the role of different actors, markets and institutions (2004). As it is seen in the Figure 12 "taxation and incentive structures, ICT access and penetration, R&D investment and commercialization, networks and clustering, business environment, technology upgrading, foreign direct investment, education, attitudes and social capital, etc." are the major activities to increase investments (Napier et al., 2004, p. 26). All these activities cannot be done without the help of the highly intellectual people who can be found in the best universities in the world. Consequently, new working conditions and places have been created in order to increase innovation and competitiveness. Below, the innovation system model is explained by Napier and his friends in order to understand the changing system of the innovation.

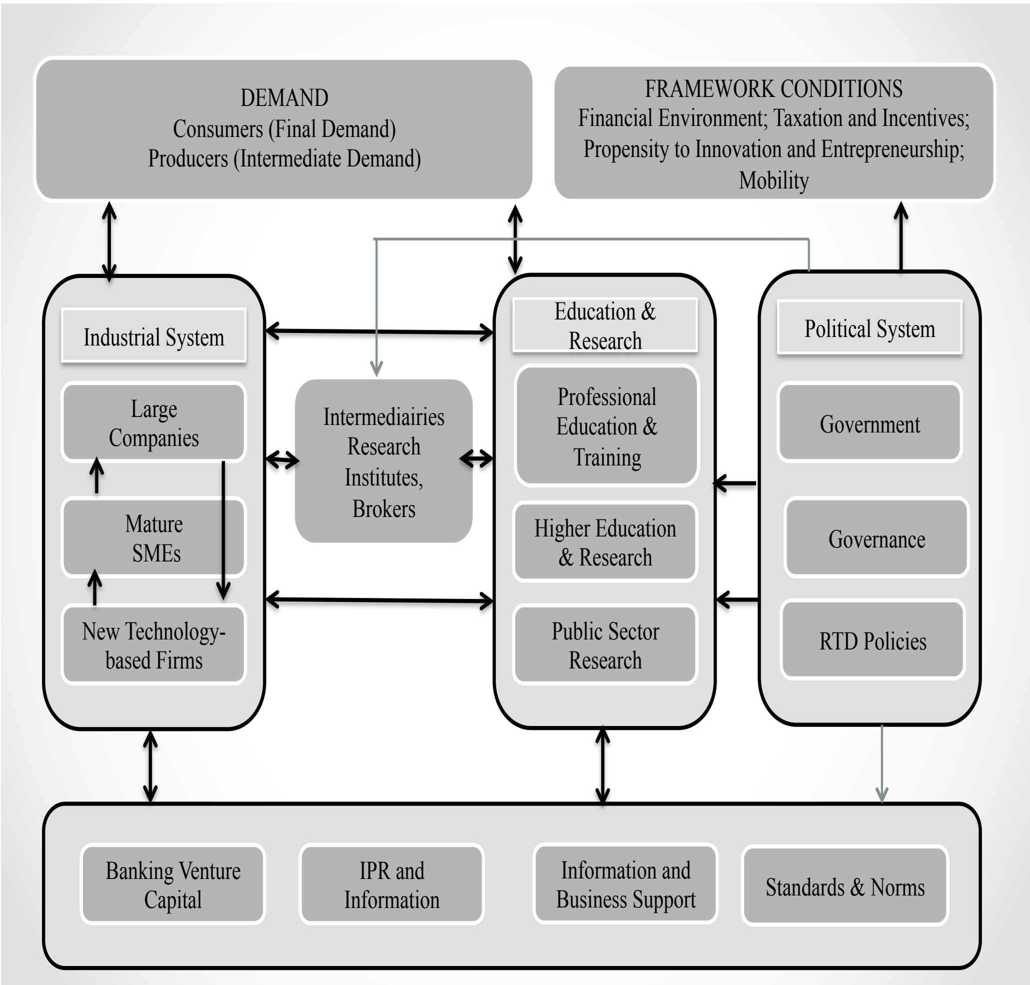


Figure 12. Innovation System Model.

As it is seen above, the importance of competitiveness and innovative capacity plays important and crucial role in long-term prosperity of a country where education and research are the core activities. The same kind of the new innovation system model has been encouraged by the Turkish government since 2000. However, in Turkey, the indicators, which are used to measure innovative capacity, does not show high capacity. According to Napier and his friends (2004), the indicators are defined as follows:

> Investment in R&D, patents, levels of Internet access and penetration, science and technology graduates, etc. There are many caveats when it comes to assessing both how much a country invests in innovation, or innovation inputs, and what returns it gets on this investment ('what it gets out of it'), or innovation outputs. (p. 26).

In Turkey, there are weaknesses of the existing indicators, particularly given the current lack of other aids for policy formulation because of wide regional and other forms of diversity. Therefore, the government takes radical decisions to decrease the differences among the regions by establishing new universities and even the techno-parks at these new universities. Additionally, the different decisions, which affect innovation and compatibility, have been taken by the government as political decisions, such as upgrading of years in schooling, relevant skills in the work force, organizational change, entrepreneurship, incremental innovation, women position, and decreasing unemployment rates. However, today, the indicators required are not available or not at satisfactory level, or under the world standards in Turkey. Hence, according to the Ministry of Economy, international organizations have been involved in changing and improving the standards (Ministry of Economy, 2012). Additionally, the most significant aspect is becoming more strategic about what knowledge is needed from a policy perspective. Consequently, the last incentives system in 2012 is declared after the studies have been conducted from more than 750 institutions and organizations in July 2011. According to the new incentive strategy the four main pillars are “general investment incentive regime; regional investment incentive regime; incentives for large-scale investments; and incentives for strategic investments” (Ministry of Economy, 2012). All these incentives are explained as follows by the Ministry of Economy:

> Value Added Tax (VAT) exceptions; Exemptions from customs duties; Tax cuts; Social security premium contribution for employers; Support for interest payments on loans; Land provisions; Support for income tax withholding; and VAT refunds. On the other hand, the new scheme gives priority to investments in industries such as defense, automotive, aerospace and aviation, rail and sea transport, pharmaceuticals, education, tourism and mining in the scope of “strategic investments”. Strategic investments will receive incentives at the level granted to the fifth province group, regardless of the province the strategic investment is made in, while a minimum investment of 50 million TL is required to qualify for the incentives. Turkey is also expecting to attract a higher level of FDI thanks to the “Incentives for large-scale investments“. In the new scheme, minimum investment requirements for production of chemicals, production of motor vehicles, investments on seaports and port services, investments on electronic industry and production of pharmaceutical products has decreased remarkably. (2012, p. 1).

In all these incentives, the universities play important and crucial roles as changing agents. More importantly, according to Napier and his friends (2004), innovation indicators are weak in Turkey related to organizational, process and services innovation, or innovation in the public sector. While innovation policy today recognizes the importance of effective linkages and networks, “innovation surveys throw little light onto how these networks are created, function and develop over time” (Napier et al., 2004, p. 26). In order to empower the innovation indicators, the universities by means of their techno-parks have encouraged by the government.

In the light of this evidence, according to Ercan and his friend (2011), since the government has been developing “effective innovation policies” (p. 17) which are also defined as neoliberal policies, another significant problem is seen in Turkish universities. These policies are accepted and deeply integrated to the institutions of Turkey, particularly those in higher education in order to increase the capacity in innovation, growth, and international competitiveness, which destroys the main purpose of the higher education (Ercan & Kurt Korkusuz, 2011). This situation is supported by the World Bank Report (2011) as follows:

> Turkey has dramatically lower numbers, or shares, of internet users, PCs per inhabitants, patent applications and researchers as a percentage of the labor force, than nearly all EU member countries, including the new EU members and other candidate countries. When it comes to investment in R&D, at around 0.6% in 2010, Turkey’s gross expenditure on R&D as a percentage of GDP is lower than in most EU member countries (new and old) and the other candidate countries. Turkey’s innovative capacity in international comparison is not surprising that in the European Union’s most recent Innovation Scoreboard (EIS), Turkey currently ranks among the lowest in the summary innovation index. The EIS benchmarks countries to a range of indicators including education levels, ICT access and usage, R&D expenditure, and venture capital investment, among others. In addition to providing a snapshot view of innovative capacity and performance, the EIS seeks to capture the development, or trend, of countries in these areas. When it comes to the trend, Turkey is among the top performers in the “catching up” quadrant. In fact, of the ten new member countries and three accession countries, Turkey ranks among the top three trend leaders for the following three indicators: business R&D/GDP, USPTO patents/population, and high-tech manufacturing value-added share. While these positive trends in national performance are encouraging, and indicate that, at least in some areas, Turkey is on the right track, they should not give rise to complacency. (2011, p. 6).

Additionally, in some areas, like the Information and Communication Technology (ICT), Turkey has high levels of activities, which are conducted at the techno-park of the universities. Some areas are more reachable that other fields so that there is a strong pressure on the universities from the government to increase these kinds of activities. According to the World Bank Report, this situation is explained as follows:

> Another benchmark of Turkey's ability to compete in the knowledge-based economy is provided by the World Bank's Knowledge Assessment Scorecards, which evaluate Turkey's general position relative to other countries in the Europe and Central Asia (ECA) region. These scorecards reveal Turkey's relative strengths and weaknesses. In comparison to the ECA scorecard, Turkey displays a relative strength in the areas of science and engineering enrolment at tertiary level, and scientific and technical journal articles. Turkey is also a bit stronger in the areas of Patent applications and royalty and license fee payments. However, in a number of other areas, Turkey's position is much weaker than the ECA average: royalty and license fee receipts, researchers in R&D (per million population), university-company research collaboration, availability of venture capital, private sector spending on R&D, and gross foreign direct investment. Overall, the Turkish scorecard is relatively stronger at inputs (e.g. S&T enrolment) and weaker on the outputs (e.g. high-tech exports) than other countries in the region. (2008, p. 7).

Furthermore, both the European Innovation Scoreboard and the World Bank Knowledge Assessment Scorecard point out that Turkey has weak position in innovation indicators as it is seen in the Figure 13 and in the Figure 14. Therefore, according to the World Bank Report, the Turkish government has to take action in order to solve these problems mentioned by changing the purpose of education (World Bank Report, 2008). In the report, the knowledge assessment scorecard is prepared to show the differences and weaknesses between Europe and Central Asia and Turkey.

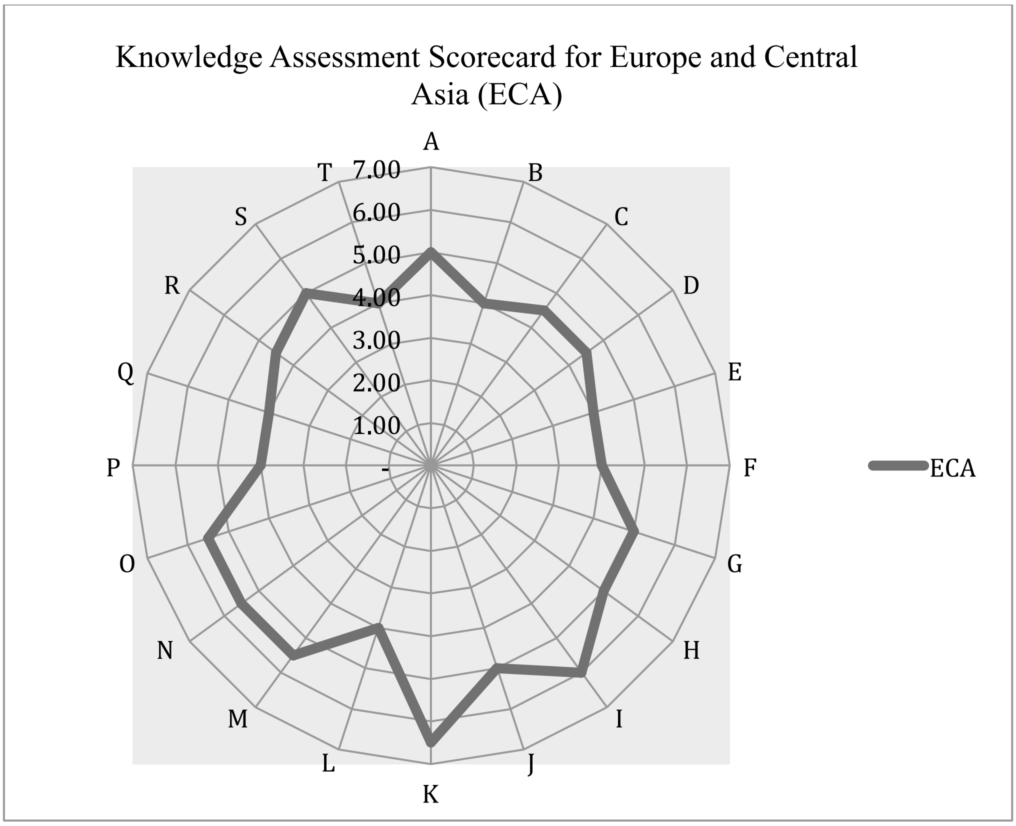


Figure 13. World Bank Knowledge Assessment Scorecard for Europe and Central Asia (ECA) Region.

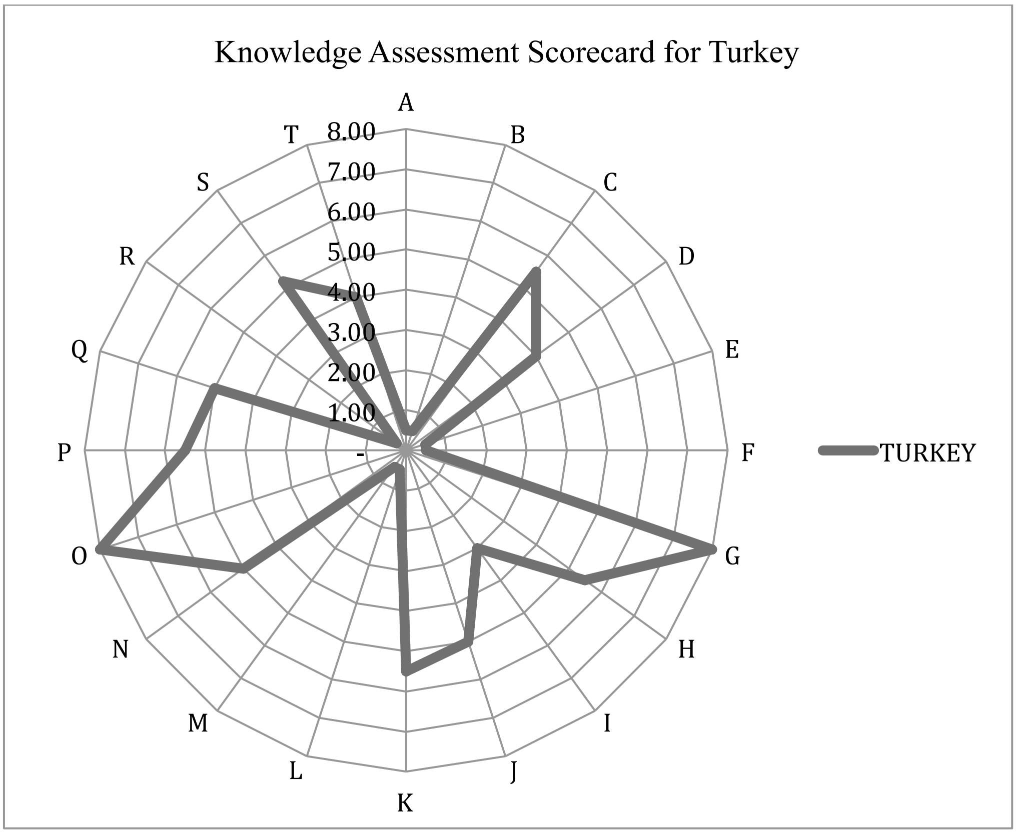


Figure 14. World Bank Knowledge Assessment Scorecard for Turkey.

Figure 13 and Figure 14 (Continued)

A. Gross Foreign Direct Investment as % of GDP;
B. Private Sector Spending on R&D;
C. Royalty and License Fees Payments ($ million);
D. Royalty and License Fees Payments (mil/pop);
E. Royalty and License Fees Receipts ($ million);
F. Royalty and License Fees Receipts (mil/pop);
G. Science and Engineering Enrolment Ratio (% of Tertiary Level Students);
H. Researchers in R&D;
I. Researchers in R&D (mil/pop);
J. Total Expenditure for R&D as % of GDP;
K. Manuf. Trade as % of GDP;
L. University Company Research Collaboration;
M. Entrepreneurship among Managers;
N. Scientific and Technical Journal Articles;
O. Scientific and Technical Journal Articles (mil/pop);
P. Admin. Burden for Start-Ups;
Q. Availability of Venture Capital;
R. Patent Applications Granted by the USPTO;
S. Patent Applications Granted by the USPTO (mil/pop);
T. High-Tech Exports as % of Manuf. Exports (World Bank Report 2008)

According to the World Bank Report (2008), in Turkey, the gross foreign direct investments and private sector spending on R&D are significantly different that Europe and Central Asia. Therefore, royalty and license fees receipts are not as in Europe and Central Asia. More importantly, the number of the researchers in R&D is significantly less that Europe and Central Asia. The university company research collaboration is not developed in Turkey so that it is difficult to find entrepreneurship among managers in the highly technological investments and high-tech exports. As a result, the report shows that the number of the articles in the scientific and technical journals is much less than those in Europe and Central Asia as the number of the start-ups, availability of venture capital, and patent applications. All these activities are directly related to the activities of the universities in general and to the activities of the techno-parks in particular. Consequently, under the pressure of the World Bank indicators of innovation and competitiveness, the Turkish government has changed and increased their expectations from the universities, particularly from the techno-parks.

Additionally, according to IMF Report in 2011, the most significant economic issue in Turkey today has become the sustainability of the current account deficit. Even though the global crises has not directly affected Turkey's economy since 2010, the market has been largely financed by short-term international capital flow and has even exceeded its pre-crisis levels. Under the fluctuating exchange rate regime, exchange rate movements are the first sign of an unsustainable current deficit. Indeed, the depreciation of the Turkish lira, which began at the end of July 2011, should be a warning that the current account deficit has reached an unsustainable level in Turkey. The sustainability of the current account deficit does not depend solely on national conditions—for instance, the financial deficit level, the exchange rate regime, financial/corporate structure, and public and private sector components of the deficit—but also on the lending conditions of the international financial system. Therefore, Turkey has to inevitably reduce its current account deficit risk to get through a European debt crisis-which is likely to spread to the global economy-with the least amount of damage possible (IMF Report, 2011).

Furthermore, according to private industry, as it is explained in TUSIAD Report in 2011, in order to reduce the current account deficit in the long run, Turkey needs holistic and comprehensive education reform in addition to vocational training. While one will overcome the skill deficiencies of the current average employee, the other will help new generations gain such skills, enabling them to adapt to rapid technological changes. Furthermore, an average productivity level increase requires the improvement of production technologies, which, in turn, needs increased research and development efforts. State incentives and support should be extended and made more widely available in order to attract the attention of SMEs as well. In Turkey, where economic growth heavily depends on foreign financing due to its low rate of savings, the current account deficit should be kept at a sustainable level. For countries in similar conditions, international direct investments (FDI)-the most permanent and, due to its contributions to the technology transfer, the most beneficial form of foreign financing-are important for a sustainable current account deficit. VAT exemption, which is currently applied only to machines and equipment, should be extended to all investment expenses. Other inputs, such as licenses, software, and buildings, should also be included in order to attract technology and innovation. Any required restrictions should be imposed on areas other than these initial inputs, such as techno-parks. Investments in specialized and organized industrial techno-parks are of great importance for the development of the industry, as indicated in the "Report on the Chemistry Industry" issued by the Ministry of Science, Industry and Technology. Research and development efforts should be increased to improve production technologies, which can be done in the universities or techno-parks. Therefore, the government has announced new incentives in 2012 to increase the investments in the techno-parks in order to decrease current deficit account in the long run as follows:

> The Incentives in 2012 and called "promoting strategic investments" in three pillars which are "education, transportation, mining and some tourist destinations will receive incentives at the level granted to the fifth province group, regardless of the province the strategic investment is made in. With this new system we primarily hope to increase production and investments in the area of intermediary goods and products, which currently have a high degree of import dependency, so as to cut the current account deficit. With the new system value-added tax

> exemptions, customs tax exemptions, tax reductions, and reduce the insurance premiums employers pay are initiated while attracting foreign investors. The program placed special importance on strategic investments in the defense, aviation and aerospace industries, as well as on the biochemical industry. (Hurriyet Daily News, 2012).

As a result, the development of the techno-parks is directly supported by the government in order to decrease bipolarity among the regions, corruption and inequalities. Additionally, under the pressure of the competitiveness in the world, the government has directly and indirectly warned by the global organizations, particularly by the World Bank and the IMF to improve the innovation indicators and to decrease the current account deficit. From this context, it is so clear that the universities are the only places to perform the requirements of the government. Under the demand of the neoliberal economies, the higher education institutions have been losing their structures and their values in order to adapt o the new innovation system. Consequently, because of all these reasons mentioned above, the techno-parks have become increasingly important as the changing agents in the transformation of the higher education. Hence, as Level 1, the "Educational Practices" (Dale & Robertson, 2008), the practices and processes related to techno-parks issues are taken explicitly into account by overviewing the related documents to understand the higher education transformations. Additionally, how, by whom, and for what purposes these transformations occurred are specifically examined in the related documents in order to evaluate the practices and the processes in the techno-parks. Hence, the first research question, "How do techno-parks develop in Turkey?" is problematized by systematically overviewed the related documents. In the following title is about science and technology policies and national strategies that shape and organize the techno-parks in order to analyze their effects on the transformation of the higher education as Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9).

Science and Technology Policies and National Strategies related to Techno-parks

Science and technology policies and national strategies that shape and organize the techno-parks are analyzed by critically overviewing the related documents in order to understand their effects on the transformation of the higher education as Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9). The transformation of the higher education by means of the techno-parks is problematized so that the questions regarding the "social, economic, political and educational purposes" (p. 9) of these relationships are systematically analyzed, while taking into account "funding, provision, ownership and regulation of educational governance" (Dale & Robertson, 2008, p. 9). "The sectorial and cultural path and dependencies are overviewed critically, to problematize [the] decided, administrated and managed educational politics" (p. 9) of Turkish techno-parks which play a key role in this transformation. Consequently, the research question, "What are the science and technology policies and national strategies that shape and organize the techno-parks?" is reviewed in all the related documents and the research studies to clarify deeply the effects of the science and technology policies, including the nation strategies on the development of the techno-parks. The studies show that in order to be competitive in the global market, the science and technology policies are systematically changes as it is explained in the report of TUBITAK in 2010:

> Turkey has been raising science and technology to new heights, and has recently been engaged in a significant science, technology and innovation (STI) impetus. Such an advocacy is rooted in the advancement of a dynamic ideal based on continuous renewal and modernization under the guidance of science, technology, and knowledge. Around the world, harnessing R&D and innovation as a driver of renewal and sustainable economic growth has also become an urgent need of the present times to attain a more prosperous and welfare-oriented society. (p. 1).

In the same report of TUBITAK (2010), alternative models are discussed to change the dynamics of Turkey by developing policies to integrate “the systemic dynamics of STI (science, technology and innovation) and to reach fast - paced levels by increasing STI indicators and setting perspective towards future-oriented goals” (p. 1). In the report, in order to reach the goals, the Turkish model is developed by increasing “low levels of public R&D funds, industrial R&D, and demand for innovation” (TUBITAK, 2010, p. 1) because of the pressure of the global competitiveness on different sectors. The main purpose of the government is to increase exports of the highly technological goods and services as many other countries. As it is identified in the report, many developing countries have an“ innovation shortfall” as “low productivity and growth levels” (TUBITAK, 2010, p. 1). Therefore, the policies decided in Turkey aim to “catch-up” successfully to “improve economic development, find solutions to societal challenges, and enhance welfare” by increasing R&D and innovation system with the level and change of GDP (TUBITAK, 2010).

The policies are organized into three main sections, namely “long-term visions, strategies and targets for STI driven growth, major instruments in the STI policy mix, and achievements for the advancement of society towards the Republic of Turkey’s 100th anniversary and beyond” (TUBITAK, 2010, p. 2). Before studying deeply the science and technology policies and national strategies related to the techno-parks, it is important to analyze the policies of the IMF, OECD and EU related to the science and technology policies in Turkey due to the fact that their strategies mentioned in their reports have been adopted to the national strategies within the coming years.

IMF, OECD and EU Policies about Turkey

The economic situation in Turkey had difficulties until 2004 because of an inflationary economic climate and increasing public sector debt. Additionally, due to financial crises, a sharp rise in real interest rates and marked depreciation of the Turkish lira, GDP had fluctuated strongly. As in the OECD Report (2010) mentioned, the Turkish government has been stabilized for several years by adapting structural reform programs with the International Monetary Fund, which have been stepped up since 1999-2000 (p. 9). Furthermore, the relations with the EU are another aspect of Turkish policies to make structural reform policy. According to OECD, the government has to make this structural reform in order “to deliver the high and stable growth that can narrow its per capita wealth gap with the highly developed countries, and with Europe” (OECD Report, 2010, p. 9).

Moreover, according to the OECD, there are specific issues that the policies are made to increase “Turkey’s per capita GDP, in terms of purchasing power parity, to stabilize the entry of large numbers of young people into the labor market, a huge shift of jobs from the farm sector to industry and services, and the swelling ranks of women in the labor market” (OECD Report, 2010, p. 9). Therefore, new job creation in industry and services are needed urgently.

Hence, the policies related to SMEs have taken into consideration with the help of the international approaches and with the co-ordination of the European Union. According to the OECD report, the main purpose is to develop new job opportunities by means of the SMEs and to sustain strong growth and to protect the market from internal and external shocks, and to stabilize the growth in per capita income (2010). For that reason, as the OECD Report has mentioned, "Turkey has made in recent years to begin a process of international integration geared towards Europe, it has embarked upon a variety of economic policies and medium- and long-term economic strategies that affect SMEs either directly or indirectly" (p. 10). As the OECD Report indicates, Turkey began the process for the market economy in the 1960s and was reinforced by the general opening of the Turkish economy in the 1980s. The situation is clearly highlighted as follows:

> The Turkish government developed a specific SMEs policy and created SEGEM (Industrial Training and Development Centre) and KOSGET (Small Industry Development Organization), which, later on, were united under the umbrella of KOSGEB (Small and Medium Industry Development Organization) in 1990, as a major instrument for the execution of these policies. A very important step was the creation of the Customs Union with the European Union in 1996, which strongly intensified the influence of international competition on Turkish industry, especially SMEs. The first SME Action Plan was introduced at that time, but it was not implemented owing to lack of funding. Following the acceptance of Turkeys application for membership in the European Union, the policy of support for SMEs was co- ordinated with that of the EU in order to enable Turkish SMEs, inter alia, to sustain competition with their counterparts in the EU and in other applicant countries. Creating a business environment conducive to entrepreneurship and the development of innovative SMEs has been high on the European Union policy agenda, and stressed in the Lisbon European summit in 2000 as part of a broader strategy for economic growth. (OECD, 2010, p.11).

In order to adapt the policies related to the economic growth, the government has adopted the policies related to the universities to improve bilateral and multilateral relationship to improve SMEs efficiency. In the report of OECD, the situation is explained as follows:

> The Turkish government signed the European Charter for Small Enterprises in 2002 and agreed to take concrete steps to develop policies and programs for SMEs. Turkey participates in the Multi-annual Program for Enterprise and Entrepreneurship, in addition to the BEST (Business Environment Simplification Taskforce) Program. Along these lines, the Turkish government also adopted the Bologna Charter in 2000, together with other OECD countries and non-OECD economies, to promote bilateral and multilateral initiatives to foster global SME partnerships. (2010, p.12).

Hence, the government has decided to adapt the policies and declared the plans in the 8th Five-year Development Plan (2001-05). According to the OECD Report (2010), the government "aims to improve the productivity of Turkish SMEs and enhance their international competitiveness" (p. 12). Additionally, as in the report given, the plan is "to raise product quality and to enhance the innovation and technology capacity of small business through collaboration with universities, introduction of new financing instruments, such as risk capital, and modern management techniques" (OECD Report, 2010, p. 12). In that way, collaboration with the universities has suggested and accepted not only by the international organizations, but also by the Turkish government. In the meantime, the universities do not have any information related to the support that they have to give to SMEs. Furthermore, as in the OECD Report mentioned, foreign companies partnership is encouraged to improve SMEs export capabilities by creating "joint centers at local level, synergy focal points, between KOSGEB and the Union of Chambers of Commerce, Industry, Maritime Trade and Commodity Exchanges of Turkey (TOBB)" (OECD, 2010, p. 12).

Empowering the overall business environment is the highest priority of the government by creating suitable economic climate for the long-term development of the SMEs, by optimizing markets and by correcting their dysfunctions and enhancing efficiency. According to the OECD Report, They have changed existing laws and regulations, particularly in "consolidation of public finance, and more particularly of the central government budget, as well as sound management of public debt in order to ease the pressure on capital markets and reduce private-sector eviction" (2010, p.14). This situation is explained by the OECD as follows:

> Consolidation of a favorable business environment returns on SME investment; Further reduction and stabilization of inflation at a low level approaching European Union objectives, in order to eliminate the inflation premium on interest rates and allow for stable real exchange rates at levels compatible with satisfactory international competitiveness; Reinforcement of the financial and banking sectors to enable better collection of savings and steer them towards the private sector and investment to foster development of loans to the economy, and to SMEs in particular. Inter alia, this entails developing a banking culture geared more towards SMEs, especially at the local level; Improving SMEs terms of access to financial markets, fostering the availability of venture capital and access to securities markets; While significant progress has been made, for example, the reduction of the business registration process from 19 steps to three, administrative and regulatory reform and rationalization of the role of government to scale back its direct interventions in the economy must continue. Further easing of bureaucratic constraints will support new business creation and help to attract foreign direct investment; Strengthening of competition policy, so as to avoid monopolies and encourage new players to enter markets; Development of a tax system that does not discourage free enterprise and that promotes private domestic saving, attracts foreign investment, enables businesses to boost their cash flow and, more especially for SMEs, does not impose excessive burdens in the event of divestment or inheritance; Creation of modern infrastructure networks, especially in the realms of transport, telecommunications and energy; Continuation of a regional policy to reduce geographical disparities in terms of lines of business and income that could help to limit SME policy makers must act as

> spokesmen for the necessary reforms in internal policy debates; Increased human and material investment throughout the education system primary, secondary, university and vocational to meet the challenges of the swelling ranks of younger students and the increased needs in the area of research and development (R&D); and ensure that the labor market works efficiently in order to maintain a balance between the imperatives of social protection and employment flexibility for businesses. (OECD, 2010, p.14-16).

Most of the reforms are directly related to the universities so that new places are needed as techno-parks to empower the SMEs. Therefore, the name of the Ministry of Industry and Trade changed and KOSGEB is supported. Additionally, the last incentives in 2012 are related to the structural reforms to decrease political, sociological and bureaucratic rigidities in the regions by mobilizing the necessary political support for the private sector with the help of the universities and the techno-parks. All these strategies explain also why the techno-parks are under the control of the Ministry of Science, Technology and Industry. The government has developed long-term strategies and targets to increase STI-driven sustainable growth. In the following title, these policies are analyzed to answer why they need techno-parks.

Long-Term Visions, Strategies, and Targets for STI-Driven Sustainable Growth

In the policies, the establishment of long-term visions, strategies, and targets is targeted to increase S&T and innovation system as seen in the Figure 15. TUBİTAK defines as a “motor of change” for sustainable growth (TUBITAK, 2010, p. 2).

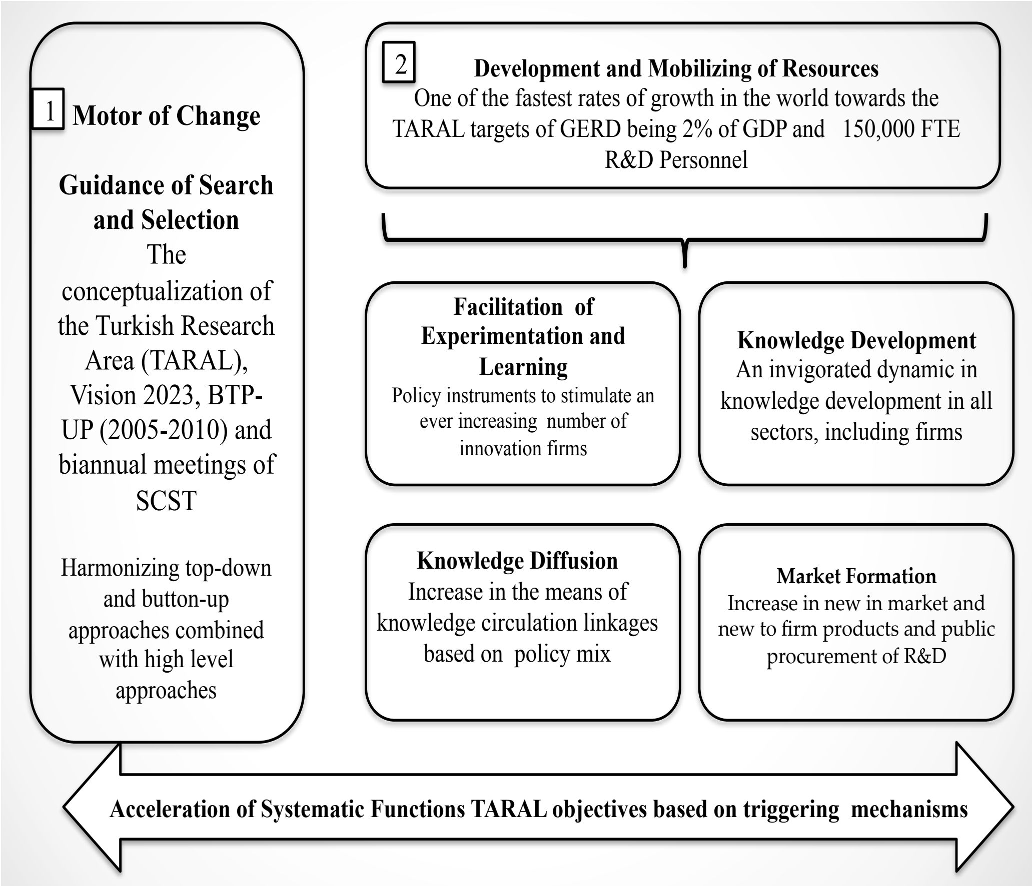


Figure 15. S&T and Innovation System (TUBITAK, 2010, p. 13).

In the STI system the following objective are primarily aimed to achieve which is clearly defined in the TUBITAK Report (2010).

a. “Vision 2023: Science and Technology Strategies”

In order to have sustainable growth (given in Table 12), “Vision 2023: Science and Technology Strategies” is decided to develop an innovative society until 2023, which is the 100th anniversary of the foundation of the Republic of Turkey. In the TUBITAK Report, the situation is explained as follows:

> Based on the Delphi method as a systemic, meta-instrument, the results produced over 90 technology activity fields of which the main domains deemed most vital to secure the attainment of an STI-driven, welfare society are grouped under core socio-

economic goals: Furthermore, eight, cross-cutting strategic technology areas that were seen as common anchor points for achieving socio-economic goals were determined as: ICT, biotechnology and gene technologies, energy and environmental technologies, material technologies, mechatronics, nanotechnology, design technologies, and production process technologies. Being one of the criteria in the peer-review phase of projects, public institutions provide priority to these areas during the utilization of their resources for R&D and innovation, which allows for the better linkage of STI with future-oriented, societal goals. (2010, p. 2).

Table 12. STI and Socio-Economic Goals (TUBITAK, 2010, p. 13).

The Linkage of STI to Socio-Economic Goals	
Competitive Advantage in Industrial Production	Innovative manufacturing systems, clean production process, knowledge-intense, high value-added products as global center of production, and advancement of competences for spac technologies, material technologies, and agricultural production.
Advancement of the Quality of Life	Food security, innovative technologies in health and life sciences, healthy and environmentally-friendly urban infrastructure, next-generation transportation systems.
Attainment of Sustainable Growth	Energy and environmental technologies, including the better utilization of natural resources.
Advancement of a Knowledged-Based Society	Technology fields that further a dynamic, knowledge-based society.

b. Establishment of the Turkish Research (TARAL)

In 2004, the Turkish model is conceptualized as the Turkish Research Area called TARAL. As it is seen in the Figure 16, TARAL "set into motion a mobilization with which the private and public sectors, together with NGOs, strategically focus and collaborate on R&D and innovation" (TUBITAK, 2010, p. 2).

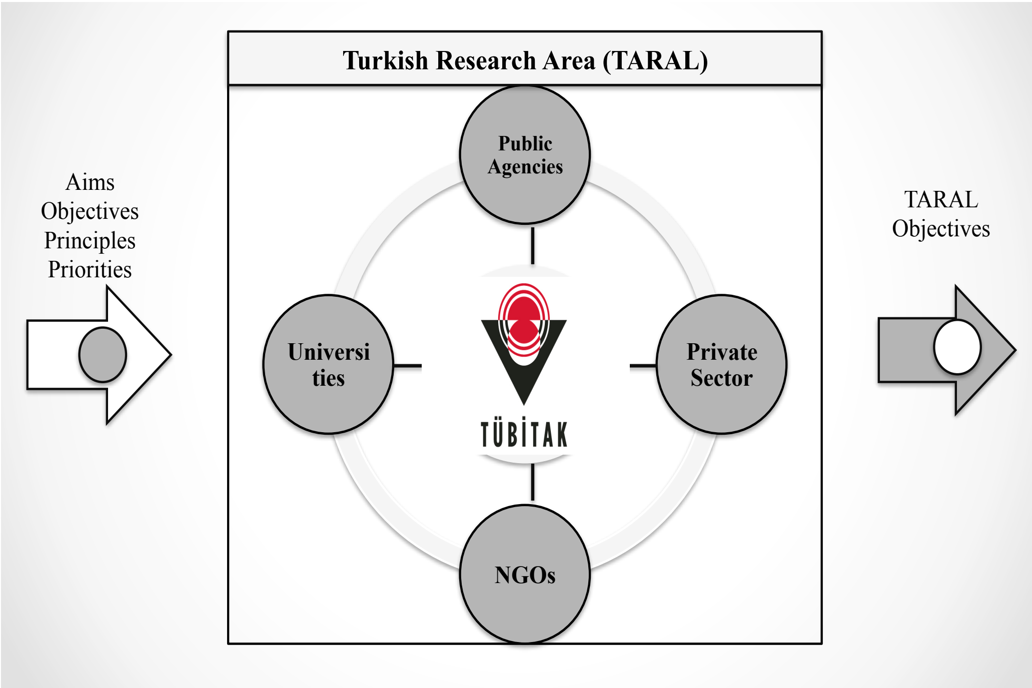


Figure 16. TARAL's Model (TUBITAK, 2010, p. 13).

The objectives of TARAL are defined by the TUBITAK (2010) to:

> (a) Enhance the quality of life, (b) find innovative solutions to societal needs, (c) increase the competitiveness of the country, and (d) foster and diffuse S&T awareness in society. To make such a mobilization possible, the TARAL targets were determined as bolstering (i) the share of R&D expenditures in Gross Domestic Product (GDP), (ii) the demand for R&D, and (iii) the number of qualified R&D personnel. (TUBITAK, 2010, p. 5).

In that way, the new, public investment is done for TARAL in order to use in RDI activities by mobilizing resources towards socio-economic goals.

c. National Science and Technology Policies Implementation Plan for 2005-2010

The long-term goals for the year 2023 are decided under the National Science and Technology Policies Implementation Plan (BTP-UP) as the five year strategy timeframe between the years 2005-2010. The strategic objectives of BTP-UP (2005-2010) are defined in the TUBITAK Report as to:

> Increase S&T awareness in society and improve STI culture; Advance the quality and quantity of human resources for S&T; Support high quality, result-oriented research; Enhance the effectiveness of STI governance; Boost the S&T performance of the private sector; Improve the research climate and research infrastructure by improving the effectiveness of national and international network. (TUBITAK, 2010, p. 2).

Additionally, the programs related to the human resources for science and technology (HRST) and science and society is directly related to the policies at the university and the techno-parks. Defense and space research programs and HRST were put under the auspices of the Prime Minister. According to TUBITAK, the main goals of TARAL are to:

> increase GERD as a percentage of GDP to 2% and (ii) raise the number of full-time equivalent (FTE) R&D personnel to 150,000 by 2013. The combined effect of this initial set of triggers effectively acted as a “motor of change”4 to propel the functions of the STI system and instigate an STI impetus. The second implementation plan with regards to Vision 2023, namely the National Science, Technology and Innovation Policies Implementation Plan (BTYP-UP) for 2011-2016, is in preparation. (TUBITAK, 2010, 2-18).

According to Hekkert, the “motor of change” is used to improve innovation systems and to strengthen the other functions of system (2007, p. 413-432). In that way, major STI institutions and policy instruments have changed. For sustainable growth, the Supreme Council for Science and Technology

(BTYK/SCST) took the power to diffuse the developments related to STI policies by increasing commitments for policy implementation. The State Planning Organization (DPT) and the Scientific and Technological Research Council of Turkey (TUBITAK) paly important roles in STI policy implementation to achieve STI objectives and contribute to the achievements of the TARAL. According to the TUBITAK Report, the institutions take active and important roles in the achievements of TARAL.

d. Supreme Council for Science and Technology (BTY/SCST)

In the TUBITAK Report, SCST has the role of "identifying, monitoring, and coordinating policies in S&T areas in accordance with national goals for economic and social development and national security" (2010, p. 13). As it is seen in the Figure 17, the structure of SCST shows how different actors, particularly higher education and private sectors is represented in SCST meetings TUBITAK, 2010, p. 13).

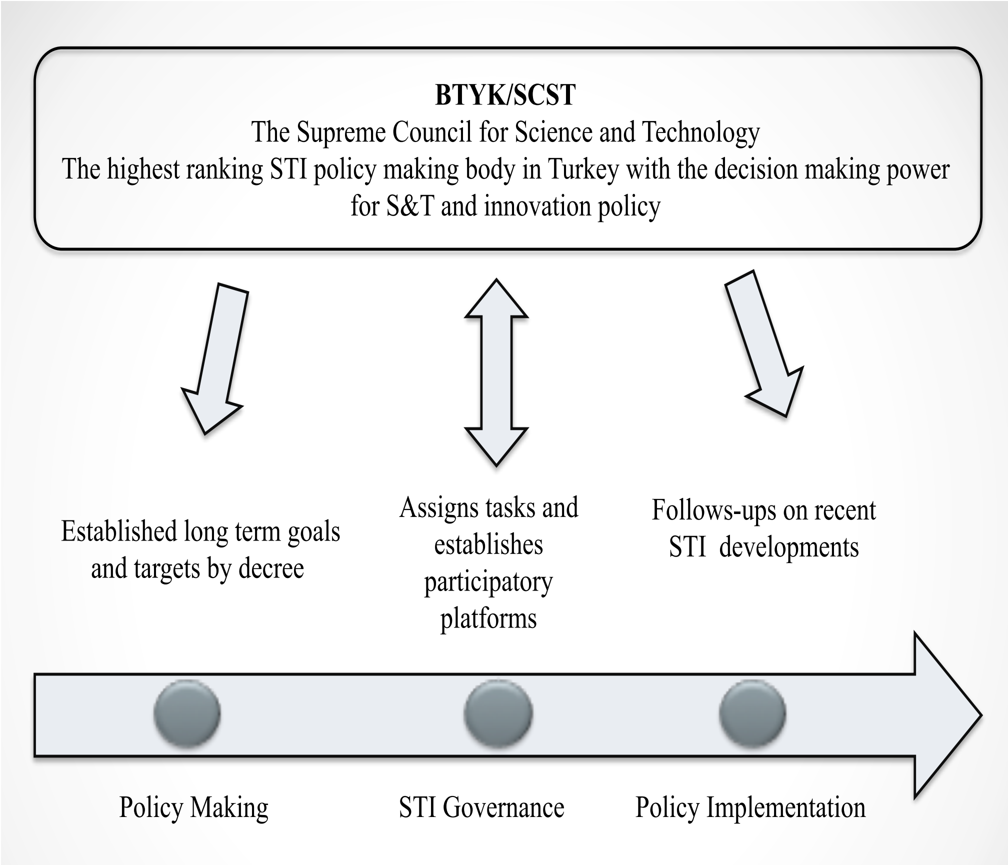


Figure 17. Supreme Council Structure (TUBITAK, 2010, p. 13).

Additionally, SCST provides S&T system while guiding and framing policy intervention by giving tasks to stakeholders. SCST makes also R&D and innovation more visible in the society, while increasing commitments for policy implementation. In TUBITAK Report (2010), it is mentioned that SCST "provide a more effective participation of stakeholders on STI issues, i.e. in ad-hoc committees regarding human resources for science and technology and public institutions that have been mobilized to deploy public research programs" (TUBITAK, 2010, p. 13).

e. State Planning Organization (DPT)

According to the Report of the TUBITAK, the State Planning Organization

(DPT) "prepares, monitors, and evaluates the National Development Plans, and mid-term/annual programs, with the ninth National Development Plan having been issued for 2007-2013" (2010, p. 13). Additionally, DPT prepares the Technological Research Sector Investment Budget as the main source for public (government) funding of R&D. In the budget, the financial resources support the universities by means of the Turkish Research Area (TARAL) under the coordination of TUBITAK. Additionally, the governmental institutions support R&D activities, human resources for science and technology (HRST), and R&D infrastructure projects (TUBITAK, 2010).

f**.** The Scientific and Technological research Council of Turkey (TUBITAK)

In the report of the TUBITAK (2010), TUBITAK is defined as an autonomous and independent institution governed by the Science Board. TUBITAK reports to the government related to "the developments in STI policy and acts as the secretariat of SCST. Since 2004, SCST has assigned TUBITAK as the bridging institution between public agencies, higher education institutions, and the industry in TARAL in light of Vision 2023 (TUBITAK, 2010, p. 2-25). TUBITAK facilitates participation in design in the policies as the coordinator of the preparation and realization of BTP- UP (2005-2010), the ongoing National S&T Human Resources Strategy, and International STI strategy, TUBITAK is actively engaged in policy-making for TARAL in support of an STI impetus" (TUBITAK, 2010, p. 2-25).

By using these institutions, the policies related to the STI are developed and named the Turkish model. According to the TUBITAK Report (2010), these policies, called a policy mix approach, have long-term visions, strategies and targets to develop and mobilize resources. The major mechanisms are to accelerate the systemic functions towards the TARAL objectives as in Table 13.

Table 13. Some of the Triggering Mechanisms utilized in Turkey in a Policy Mix Approach (TUBITAK, 2010, p. 2-23).

Promoting entrepreneurship and technological or innovation-driven research;
An invigorated emphasis on new funding programs to increase the number of innovating SMEs and to encourage the creation of new, technology-based firms and early stage funding, e.g. SME RDI Grant Program and Techno-Entrepreneurship initiatives;
Expediting knowledge circulation for R&D and cooperation networks;
New programs to expedite cooperation networks and knowledge circulation for STI, e.g. Technology Development Zones (Techno-Parks), Industrial Thesis Projects, Funding Program for Initiatives to Establish Scientific and Technological Cooperation Networks and Platforms, Technology Platforms (ISBAP), Project Brokerage Events Grant Program;
Legal framework stimulating R&D activities;
New programs to raise awareness for the increased utilization and stimulation of the legal framework supporting R&D activities, e.g. tax incentives in favor of R&D activities;
Strengthening demand for R&D and innovation through public procurement;
Utilization of public procurement of RDI as a demand-side measure, e.g. Funding Program for Research Projects of Public Institutions to address the R&D needs of public institutions;
Promoting curiosity-driven academic research to sustain innovation
Within the conjecture of substantially increased direct public support for R&D, achieving to maintain an emphasis on curiosity-driven basic research to sustain the future of innovation;
Enhancing infrastructures within the STI system;
New programs to enhance R&D infrastructures aiming at the development of thematic expertise centers with national and international significance;
Fostering a culture that embraces STI in society;
New programs to sustain the emphasis on igniting a dynamic awareness and appreciation for STI in society, e.g. Science Centers and an array of science and society activities;
Sustaining the development of human resources for science and technology;
New programs to sustain the development of human resources for science and technology, e.g. PhD fellowships, National Young Researcher Career Development Program, programs to lure global talent (Global Researcher Support Program EVRENA);

> New ad hoc committees to establish Turkey as an attractive destination for HRST and improve the climate for researchers, e.g. Human Resources for Science and Technology Coordination Committee and the International Researchers Coordination Committee;
> Enhancing international S&T cooperation
> Enhancing better utilization of global knowledge networks through international strategies, e.g. new STI cooperation agreements, active participation in European research programs.

The main goal of these polices is to develop the unity in R&D and innovation at all levels of society. As in the TUBITAK Report mentioned, by translating "the Oslo and Frascati Manuals into Turkish and its free distribution by TUBITAK the unity in jargon was assured" (2010, p.16). The Manuals is a reference point in funding programs and policy-development for a strategic approach in STI (TUBITAK, 2010). In that way, entrepreneurship and technological or innovation driven research can be promoted.

In the TUBITAK Report (2010), "The promotion of entrepreneurship and technological or innovation-driven research" (p. 18) is aimed so that the increasing number of innovating firms is supported in order to increase technological innovation in the manufacturing sector and in the services sector by empowering the private sector. Another aspect is "to increase its absorption capacity, becoming the driving force behind many of the fast-paced increases in the total number of FTE R&D personnel in Turkey and GERD, which is significant for the target of a 60% share of GERD by 2013" (p. 3-23). According to the TUBITAK Report (2010), by increasing the capacity in technology development, innovation culture, and competitiveness of Turkish private sector, the Industrial R&D Grant Program called TUBITAK/DTM:

> Provides competitive, project-based grants to trigger R&D expenditures in the private Sector. Between 2000 and 2009, the Program provided over 1 billion $ in grants and triggered about

> 4 billion $ in R&D expenditures as the largest program to stimulate the R&D activities of the private sector. The sectors that upheld the largest share of the grants during the timeframe 1995 to 2009 was machinery and manufacturing, including the automotive sector, followed by information technologies and electronics. For example, the Industrial R&D Projects Grant Program has facilitated the machinery and manufacturing sector to increase its RDI capacities. In 2008, the exports of the manufacturing sector reached 10 billion $ in close correspondence to the substantial increase in R&D expenditures that climbed to about 250 million $. Thanks to R&D supports, the automotive sector has also become Turkey's leading sub-sector performer of R&D in the manufacturing sector and largest export sector, which obtained a net export surplus of over 5 million $ in 2008 whereas there had been a net export deficit during 1996- 2000. The other programs to increase the RDI capabilities of the private sector include the Technology Development Project Funding Program (TTGV/DTM) based on soft loans and the R&D and Technological Innovation Funding Program (KOSGEB) to better manage cash flows. (TUBITAK, 2010, p. 3-25).

There is a new funding programs to raise the number of SMEs in innovation, to empower the development of technology-based firms, and to encourage existing firms to work in RDI by developing innovative business ideas, increasing the number of entrepreneurs and creating high value-added enterprises. According to the TUBITAK Report (2010), the SME RDI Grant Program of TUBITAK is for SMEs to increase "SMEs productivity, their role in the economy, and international competitiveness by putting forth competitive, project-based grants for the first two RDI projects of SMEs" (TUBITAK, 2010, p. 3). In that way it is possible "to develop new products, to improve an existing product, to increase the product quality or standards, and/or to develop new techniques and new production technologies that will decrease costs to stimulate more SMEs to be vibrant actors in RDI" (p. 3). This program makes SMEs markedly increase their numbers. In the Techno-Entrepreneurship Grant Program as initiated by TUBITAK and implemented by the Ministry of Trade and Industry (MoIT), the number of entrepreneurship related to technology and innovation based enterprises is increased as well to encourages "young entrepreneurs (undergraduate, graduate, post-graduate and doctorate students) lacking sufficient financial resources to transform their knowledge and research into marketable and high value-added products" (TUBITAK, 2010, p. 18). Additionally, according to the TUBITAK Report, the Start- up Support (TTGV) is another program to invest "in talented entrepreneurs with creative, unique and advanced- technology ideas and vision" (2010, p. 18). SME RDI Grant Program is structured to serve the following five goals as mentioned in the TUBITAK Report:

> To enhance the competitiveness of SMEs by increasing their technological and innovation capabilities; to increase their propensity to prepare more projects; to develop high value-added products; to further the RTD culture in SMEs; and to allow SMEs to participate more actively in national as well as international funding programs. (2010, p. 18).

Furthermore, the policies have aimed to expand knowledge circulation to increase R&D by improving cooperation networks. In the knowledge-based economy, as in the TUBITAK Report mentioned, "national systems of higher education are a strategic asset provided that links with the industry are strengthened and the transfer of technological knowledge is accelerated" (2010, p. 18). Therefore, according to the TUBITAK Report, importance of establishing strong linkages between the private sector and the R&D community is strategic by measuring:

> The Law on Technology Development Zones fosters the establishment of technology parks in higher education institutes and/or research centers to expedite knowledge circulation. Currently, there are 21 active technology parks across Turkey, which stimulate the mobility of human resources between the host research institution and the Techno-park as academics and/or R&D personnel are encouraged to work with and/or

> become (co)founders of new firms located in the Techno-park. In addition, Technology Development Centers (TEKMERs) are incubators that are established in cooperation with universities to support the start-up of new, technology-based firms. There are 18 TEKMERs across Turkey whose tenants are provided with services for (i) promotion and marketing services, (ii) information services, (iii) consultancy services, (iv) laboratory and workshop services, (v) equipment and material support. Beyond the specialized structures of Techno-parks and TEKMERs to expedite knowledge circulation, the Industrial Thesis Projects (San-Tez) program provides funding to graduate students who develop new, technology-based products and processes in their graduate (M.S./PhD) theses. The Program seeks to transform graduate research into innovative products and processes that engages in and addresses the needs and requirements of the industry. As a public- private partnership, MoIT funds up to 3⁄4 of the project and the firm partner to the project the remainder. (TUBITAK, 2010, p. 4-14).

Additionally, in the TUBITAK Report (2010), networks in the cooperation of RDI is established by the Funding Program for “Initiatives to Establish Scientific and Technological Cooperation Networks and Platforms (ISBAP), which was designed as a competitive, match funds program where TUBITAK matches the contribution of the network or platform members” (TUBITAK, 2010, p. 21). The Program develops the funding mechanism of the Technology Platforms in the most export and import oriented sectors. Therefore, according to the TUBITAK Report, ISBAP aims to:

> (i) encourage mutual policy learning and networking between policy-making at local, national and international levels, (ii) intensify co-operation among public or higher education research organizations and/or enterprises on R&D activities, (iii) facilitate the development of collaboration between enterprises and other actors with a view to joint innovation activities and knowledge exchange, (iv) increase the rate of commercialization of the results of innovation activity in enterprises. (2010, p. 4-24).

Furthermore, the International Industrial R&D Grant Program in TUBITAK is another funding program to encourage the Turkish firms in the international projects and the participation of Turkish industrial firms in international programs, such as EUREKA (TUBITAK Report, 2010). While encouraging the private sector, as given in the Report, the legal framework has redeveloped to stimulate R&D activities. In order to increase utilization of R&D and cooperation in the networks, legal framework has redeveloped by increasing knowledge circulation and promotion of R&D activities. According to the Report, R&D activities, "such as R&D tax allowance, income tax withholding incentive, insurance premium support, stamp duty exemption, and techno-preneurship capital subsidy" are promoted. More importantly, as given in the TUBITAK Report, the new R&D tax law opens new opportunities as follows:

> The law fosters the employment of R&D personnel by the industry, and hence diversifies the employment opportunities for researchers. As of September 2009, 60 private research centers were certified under the Law in sectors led by the automotive sector, automotive supplier industry, defense, and durable consumer/white goods sectors. In addition, about 2000 firms and 11,000 R&D personnel in the private sector were beneficiaries of the incentives provided in accordance with the income tax withholding. The total R&D tax allowance was about 2 billion USD. In addition to the direct project-support that is provided for RDI projects, the stimulated legal framework for R&D activities, including the R&D tax allowance, contributes in providing a desirable environment for the private sector to boost its R&D activities. (2010, p. 4-24).

More importantly, the last Incentives in 2012 are done to increase the effectiveness of the last decisions in the Law. The main purpose of all these new regulations is to strengthening demand for R&D and innovation through public procurement. According to the TUBITAK Report, "Both technology-push and demand-pull forces" (2010, p. 4-24) are taken into account to increase innovations in the market. Therefore, the TARAL goal is increasing demand of innovation. SCST encourages public institutions to develop research programs "to satisfy the R&D needs of public institutions and to foster R&D demand at societal level" (p. 25). The public institutions themselves decide the R&D to fulfill their needs “while partnerships between the industry, academia, and public research institutions are encouraged.” Consequently, TUBITAK mentions that “it is essential that the end results are utilized by the consumer, stimulating market formation” (TUBITAK, 2010, p. 4-24).

Additionally, infrastructure is critical R&D so that establishing, maintaining and updating high quality research infrastructure are needed as a task of universities. According to the TUBITAK Report, “DPT funds research infrastructures of higher education and public research institutes on a project basis” (2010, p. 14) to meet the needs of public and private sectors by making “applied and multi- disciplinary R&D activities. However, the qualified research environment and collaboration are important as “laboratories, thematic expertise centers which are funded in prioritized technology fields, including nanotechnology, ICT, food security, innovative food processing, hybrid vehicles, biotechnology, and clean technologies” (TUBITAK, 2010, p. 15). The list of the Public Research Programs is given in Table 14.

Table 14. Public Research Programs (TUBITAK, 2010, p. 15).

1. National Health Public Research Program
2. National Agriculture Public Research Program
3. National Environment and Forest Public Research Program
4. National Earthquake Public Research Program
5. National Energy and Natural Resources Public Research Program
6. National Justice Public Research Program
7. National Family and Social Research Public Research Program
8. National Transportation Public Research Program
9. Foundations Public Research Program
10. National Work and Social Policies Public Research Program
11. National Culture and Tourism Public Research Program
12. National Education Public Research Program
13. National Security Public Research Program
14. National Population and Citizenship Services Public Research Program
15. Public Works and Settlements Public Research Program

According to the Report (2010), the main goals of these programs are fostering a culture for STI in the society by building public awareness about science and technology. BTP-UP (2005-2010) has some initiatives and activities, such as the Science and Society Project Funding Program, establishment of Science Centers, and TUBITAK Solar and Hydrogen Car Races. In that way, the activities try to create awareness related to alternative energy usage by motivating university students to use their knowledge and to develop green technologies. Therefore, the techno-parks have become important places to achieve these goals and the programs. Moreover, the national strategies have been improved to sustain the development of human resources for science and technology. In the TUBITAK Report (2010), the development of human resources for science and technology (HRST) is one of the major projects in S&T policy of BTP-UP (2005-2010). HRST goals are defined in the TUBITAK Report as follows:

> HRST has to develop technological advancement and is a transmitter of RDI-relevant knowledge to the future generations. New instruments and programs have been designed in this area based on the target of 150,000 FTE R&D personnel by 2013 towards which Turkey has taken some of the fastest-paced strides in the world. The funding programs directed at fostering HRST at each age cohort assist a prospective researcher from childhood to his/her early research career (TUBITAK). These include the Overseas Research Fellowship Program in support of PhD students who are registered in domestic doctoral programs in basic and applied science fields to perform research abroad. The PhD Fellowships for International Students Program grants highly qualified students who intend to complete their PhD studies in Turkey. The Postdoctoral Research Scholarship Programs are provided for both incoming and outgoing researchers, i.e. from Turkey to abroad and from abroad to Turkey. The Visiting Scientists Fellowship Program funds scientists working at universities or research centers abroad to attend conferences and lectures organized in Turkey, and/or short-term R&D and innovation assignments. (2010, p. 4-14).

On the other hand, according to the TUBITAK Report, the National Young

Researcher Career Development Program is decided to encourage young researchers, “while the Global Researcher Support Program (EVRENA) enables researchers who reside outside of Turkey to partake in brain circulation, such as the Marie-Curie tool of FP7” (TUBITAK, 2010, p. 2-24). The scholarship and grant programs are to attract researchers by developing “financial instruments, meta-instruments and regulatory instruments and by mobilizing HRST” (TUBITAK, 2010, p. 16). Therefore, the Researcher Information System (ARBIS) is developed as one of sub-projects of Vision 2023 to facilitate “the compilation of data on S&T fields and activities of any researcher in universities, the public and private sectors of Turkey and Turkish researchers living abroad” (TUBITAK, 2010, p. 16). ARBIS is developed to manage the sectorial distribution of the R&D personnel by providing a pool project-based funding. The activities are explained in the TUBITAK Report (2010) as follows:

> New ad hoc committees to establish Turkey as an attractive destination for HRST and improve the climate for researchers were established by SCST. The Human Resources for Science and Technology Coordination Committee has worked to improve the climate for researchers in Select Policy Instruments to Sustain Human Resources for Science and Technology The National Young Researcher Career Development Program supports young, PhD holders at the early stages of their research career. By supporting the R&D projects of young researchers who will hold the academic leadership in the 21st century, this program allows young scientists to pursue their career as a researcher and to further develop the level and role of S&T in Turkey. (p. 4-14).

The Global Researcher Support Program, however, is designed for national researchers to cooperate with international experts in their research. TUBITAK supports the international experts in a specific research area who play important role in the success of the projects, including Turkish researchers living abroad. Additionally, as it is given in the TUBITAK Report (2010):

> Turkey, such as enhancing governance in higher education institutions, raising researchers' income, and further increasing the stock of qualified HRST and university-industry collaboration. The International Researchers Coordination Committee has worked on regulatory issues for international researchers, i.e. work and residence permits, contract period, wage, retirement, academic promotion, education for researchers' children, learning Turkish, benefiting from health services, supports for scientific projects, and procedures for Turkish citizenship. A synergy to create the Turkish portal in the EURAXESS network was also established to provide information on visas, work permits, social security, accommodation, language courses, and other social and cultural issues. (p. 4-14).

For that reason, in the National S&T Human Resources Strategy, 12 workshops were organized in which more than 500 research personnel were involved in from different sectors, such as international and national academics, private sector R&D managers, and public sector lab managers by using TUBITAK consultation technique, Common Mind Platform (Ortak Akıl Platformu®). In that way, the international S&T cooperation can be enhanced according to the Report of TUBITAK. Besides all these new changes, other policies were designed and built to increase the STI capability of Turkey on the global perspective of international relations. In the TUBITAK Report (2010), the international STI strategy is highlighted as follows:

> The International STI strategy aims to (i) increase the effectiveness of international relations, (ii) to develop international linkages for STI, (iii) human resource development and mobility of researchers, (iv) to enhance governance and coordination and (v) informing and follow-up. Turkey also actively participates in European research programs or schemes, such as the Framework Programs, and has agreements with international organizations, such as NATO, OECD, UNESCO, ICSU. Furthermore, by taking part in over 23 ERA-NET projects, Turkey enhances its linkages and level of cooperation with the European Research Area. Via INCO-NET projects, Turkey also increases its collaboration with countries on continents around the world, including countries not party to FP7. (p. 4-14).

Consequently, by launching the concepts of TARAL, Vision 2023, and BTP-UP

(2005-2010), top-down and bottom-up approaches are tried to achieve according to the report of TUBITAK (2010). The strategies are clarified in the report as follows:

> High-level leadership, the swift mobilization of financial resources for TARAL and the triggering mechanisms were successful in accelerating systemic functions. In the present global financial crisis, the mobilization of financial resources for TARAL also continued with an additional budget of 130 million $, putting into place a springboard out of the crisis towards a sustainable, economic future based on STI-driven growth. Based on key STI indicators, this section provides some of the achievements of TARAL in accelerating systemic functions and becoming an ever-more dynamic system towards TARAL objectives in view of long-term visions to be a welfare society based on STI by 2023. The high levels of STI-related growth rates allude to ongoing results of the Republic of Turkey's model of instigating an STI impetus. (p. 4-14).

Between 1998 and 2008, Turkey has STI impetus indicators, which are as follows:

> Increased GERD from 2 billion to over 7 billion in PPP $, which has been spurred forth by the launch of the conceptualization of the Turkish Research Area (TARAL) in 2004, and exhibited a growth rate in GERD at 250%, which is almost quadruple the OECD and EU27 averages; Doubled the level of GERD as a percentage of GDP from 0.37% in 1998 to 0.73% in 2008. This puts forth a significant catching-up dynamic towards taking sustained strides to reach the target of raising the share of GERD to 2% of GDP by 2013; Exhibited a fast rate of growth in GERD as a percentage of GDP based on the growth rate at 97.3%. These rates are by far above the 5.9% for the OECD and 7.7% for the EU27 averages; Fostered a business enterprise sector that outperformed the higher education sector in 2008 for the first time as the biggest performer of R&D at 44.2% after a rapid climb and emerging dynamic; Fostered a business enterprise sector that outspent the government to become the leading sector to fund R&D for the first time in 2005, reaching a share of funding at 47.3% of GERD in 2008; Fostered a business enterprise sector as the biggest investor in R&D with a self-funding that reached 38.8% of GERD in 2008 in addition to the transfer of funds for R&D to be performed in the higher education sector, which the industry also funded; Sustained a manufacturing sector as the leading performer of R&D in the business enterprise sector based on its share of business expenditures on R&D (BERD) at 64.1%, which is nearly double that of the service sector at 34.8%. Within the manufacturing

> sector, the automotive sector is by far the leading sub-sector performer of R&D with a leading exporter status to the present. (TUBITAK, 2010, p. 4-14).

More importantly, according to the Report of TUBITAK (2010), there is significant increase on the STI Human Resources. The number of the STI researchers is nearly tripled in quantitative terms the stock of STI researchers to about 53,000 in 2008 (being 80% of the total stock of R&D personnel), especially after 2003, and represents a fast-paced increase of over 180% based on 1998 values of STI researchers. As a national strategy, the target of 40,000 STI researchers is reached for the year 2010. In the year 2013, the number of the STI personnel is expected to increase 150,000 researchers who contribute to technological advancement and the transmission of scientific and technological knowledge to future generations. By increasing the number of R&D personnel and researchers in the country, a young population is considered as a future asset. Additionally, they put efforts in the distribution of STI in the main performing sectors where R&D activities are essential with the help of higher education, private enterprises, and governmental sectors. These dynamics strike the balance of 44% for the higher education and 41% for the private enterprise sectors with 15% for the government sector as shares of the total stock. The number of R&D personnel is remarkably increased in each sector in which the private enterprise sector increased to five-fold in one decade reaching to 28 thousand. This shows a parallelism with the dynamics of R&D investment (TUBITAK, 2010, p. 4-14). As a result, the labor force of the new SIT is going to be supported by the universities. In order to reach these goals, all the system of the universities has to be redeveloped and reshaped.

Furthermore, the national strategies related to the scientific publications and patens are redefined. According to the Report of TUBITAK (2010), Turkey has increased its value on scientific publication to 22 thousand in 2007 namely a 305% increase between 1998 and 2007 with an exponential rate of increase. Additionally, Turkey is found to be the most dynamic sizeable country leading the catch-up process together with South Korea based on an average relative annual growth rate in S&E publications and a share in world total S&T publication output. Furthermore, Turkey was the only exception among the BRICs and South Korea cluster, such that the share in world publications was greater than the share in world PhD degrees awarded, which confirms the role of S&E productivity in Turkey as a driving force behind the catching-up process. Experienced a boom in the total number of utility model and patent applications being filed to TPE, namely an increase of about 950% in one decade reaching to 5217. According to the report of TUBITAK (2010), Turkey has increased the number of international patent applications being filed to PCT as well as to the USPTO, EPO, and JPO (TUBITAK Report 2010, p. 4-14). In the world ranking, the growth rate is calculated between the years 2002-2007, and according to the TUBITAK Report, the results are as follows:

> Turkey takes place in 2nd rank in terms of growth rate in GERD, moving from a position at 25 to 23, 4th rank in terms of growth in GERD as a percentage of GDP, moving from 38 to 35, 2nd rank in terms of growth in FTE R&D personnel, with a position from 26 to 18, 2nd rank in terms of growth in FTE researchers, with a position from 25 to 18, 3rd rank in terms of the growth in scientific publications, with a position from 26 to 18 . (2010, p. 2-24).

According to TUBITAK, all the dynamics in STI within the decade between 1998 and 2008 indicate that Turkey has been accumulating important assets to increase its national capability and to have sustainable economic catch-up by increasing the GDP per capita and by changing the innovation system. Turkey is "ranked the 17th largest economy in the world based on GDP, 10 and 18th in most of the STI input and output indicators in terms of rates of growth" (TUBITAK, 2010, p. 4-14).

By developing sustainable growth in the STI, the policies are developed to transform itself into innovative economy and a welfare society until the year 2023. However, the drawbacks and the negative aspects of these policies and changes on the higher education are not problematized. All these science and technology policies and national strategies related to techno-parks have critically explained the changes in the higher education for the last decade and the challenges for the next decades. In the following title, the university-industry-government partnership is problematized to show how the purpose of the higher education has changes by means of the techno-parks. As a result, as Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9), the transformation of the higher education by means of the techno-parks is problematized questioning the science and technology policies and national strategies related to techno-parks, which have significantly transformed the higher education in Turkey. The following title is about Level 3, the "Politics of Education" (Dale & Robertson, 2008, p. 9). In order to analyze this level, three different research questions are developed. At the beginning, the research question, " In what ways are the techno-parks integrated into the university-industry-government partnership, as a function of the capital accumulation process while also changing the fundamental principles of education?" is systematically analyzed from the related documents, so the higher education and the techno-parks are systematically and critically studied from the literature from the perspective of the university-industry-government partnership, which markedly changes the purposes of education.

University-Industry-Government Partnership Changing Purposes of Education

In Level 3, the "Politics of Education" (Dale & Robertson, 2008, p. 9), three different research questions are developed. The research question, " In what ways are the techno-parks integrated into the university-industry-government partnership, as a function of the capital accumulation process while also changing the fundamental principles of education?" is systematically overviewed from the related documents by analyzing the university-industry-government partnership, which critically changes the purposes of education. Consequently, in Level 3, how the university-industry-government partnership has integrated as a mean of the capital accumulation process is articulated.

The main challenges of the private universities in Turkey, like other developing countries has a similar pattern in the process of privatization in higher education. Not only the national, regional and local realities but also international trends like globalization have affected higher education system in Turkey. In the new world order, the historical missions of universities are put aside and universities are re-defined. The way governments see universities have changed; universities have been regarded not as groups of students and academics but as institutions where knowledge is produced for business life. Academics, in addition to their roles of researchers and instructors, now are regarded counselors and marketing people. As Guven (2007) states citing the studies of Okçabol (2007), universities are experiencing a dilemma. On the one hand, they are pushed to meet the demands of new world order; on the other, they need to maintain their historical mission. It is really difficult for them to find the balance between these two because as Slaughter and Leslie (1997) put it, universities started to be governed as if they are big corporations and they have started to see knowledge as a commodity which can be sold in the market. Which courses are to be given or which studies are to be supported are determined by the market itself. Consequently, universities have become the headquarters of corporations.

Additionally, re-definition of universities has actually affected the relation between government and higher education. Governments have stopped allocating money for higher education for several reasons. First and foremost, governments globally undergo hard times and have less money to allocate for education. Secondly, as Levine has mentioned, their priorities have shifted from education to other sides such as infrastructure, health care, prisons etc. (Levine, 1997). Finally, the idea that higher education is both a ‘private’ and ‘public’ good has changed. The perception of higher education has transformed into this reality. As Altbach explains, higher education help individuals to gain knowledge and credentials which in turn gets high income and more prestigious career (Altbach, 2007). And these benefits are private rather than public.

With the help of the government support, the growing demand in higher education has resulted in large and complex academic systems. Therefore, Turkey, like other developing countries, has experienced privatization of higher education in the last two decades. These universities are expanding in scope and number and the world-wide expansion of such institutions make it necessary to consider the status of private higher education and its specific problems. The tremendous increase in the number of private universities, which is considered to be the result of globalization and new world order, has inevitably affected higher education system all around the world in many ways. As Altbach (2007) mentions, during this transformation process, academics have been influenced to a greater degree. Academic profession, which is an umbrella term for working conditions for academics, has changed a lot. Additionally, as Altbach has clarified, "demand and societal expectations create a blend of forces that produce extraordinary pressure for the 'performance' of higher education in the 21st century" (2007, p. i). Academics who are seen as the 'performers' of higher education are exposed to many challenges in certain ways. According to Altbach (2007), "Not only is there a deterioration in the working conditions of academics, there is also a sense that the market is creeping into universities and determining the lives of academics to a much greater extent than it did a decade ago or two ago" (p. 4). The influence of the philosophy that market knows the best has brought ideas from accountants and auditors. Business practices have introduced harsh and unrelenting competition for funds. Performance indicators, by the practice of benchmarking, are used to assess and measure individuals, departments and universities against each other. These business practices have caused insularity among academics. Greater closed individualism and a loss of a sense of community are the inevitable consequences of such practices (Altbach, 2007).

In this transformation, Turkey has been undergoing radical changes in terms of globalization especially for the past two decades. Therefore, universities and academic staff are coming across new challenges, which have not been analyzed thoroughly. Thus, the universities aim at focusing on massification, privatization, academic freedom, and university-industry-government partnership. By doing so, it tries to find out the solutions for these challenges. on academic profession in private universities. For most of the universities in Turkey as well in the world, massification is an important concept in globalized education and it has implications for working conditions of academics. Actually, massification which is accepted a natural result of globalization in academic literature, has created a much differentiated student profile. Also, working conditions of academics have been subjected to radical changes because of massification. However, this issue, which globally affects higher education, is not seen as part of the university-industry partnership since massification helps the policies related to the labor force in the STI. In addition to massification, privatization of higher education is one of the other issues, which explain indirectly the reasons behind the university-industry partnership. It causes concern as it has implications on academic freedom and autonomy as it is seen in the university-industry partnership. As Slaughter and Leslie (1997) argue, the increased involvement of corporations in academe and the increase in privately sponsored research have changed research funding. It is argued that higher education has become ‘corporatized’, and the interests of companies have become more dominant on campuses. Massification, internationalization, privatization, academic freedom and their effects have been changing academic profession, academic structure, and their values. These issues are more dramatic in the private universities in Turkey. In order to understand better the transformation in the higher education by means of the university-industry-government partnership, it is important to analyze the state and private universities.

State and Private Universities

The term “public universities ” and “state universities” are used interchangeably in Turkey. As Kısabacak (2010) mentions, a state university can be described as an institution that was established by the state. When students graduate from high school, students go on higher education to get a diploma in a variety of fields. A student who wants to go on higher education in a university has to take the university entrance exam with adequate scores. Generally, the scores demanded by a state university are higher than those demanded by a private university. A state university provides education free and a student has to pay only a very low fee per semester. In Turkey, as Kısabacak (2010) points out that the term “private universities” and “foundation universities” are used interchangeably because they are founded by the foundation of private enterprise. Students, who would like to study at these universities, should take the university entrance examination. Nevertheless, in general, the score of the private universities in order to be accepted is not as high as the state universities. Therefore, the private universities have high tuition fees or the students, who have high scores, get scholarships from the private university. As Altbach explains, the development of private higher education shows national and regional variations in Turkey as well as in the world. The private higher education has a significant change in almost everywhere as a growing phenomenon. Even though a considerable diversity is seen in private institutions, their expansion is at the low end. More importantly, they play important roles to adapt quickly the changing conditions of the market in which the demands, the interests, and the needs of the economy as well as because of their students who are defined as consumers. The number of the private universities is growing dramatically in the world as well in Turkey (Altbach, 2007).

Therefore, in order to understand private higher education thoroughly in Turkey, it is necessary to see the development phase of university in Turkish society. According to Dülen's studies (2010), the first university was established in 1863 in order to educate both students and the public. Then, this university structure, which is called "Darülfünün" was closed down because "Darülfünün" was not able to adapt itself to the needs and demands of the modern age. It was criticized that Darülfunun did not support the process of switching from Arabic to Latin alphabet because it did not advocate the republican reforms (Dülen, 2010). After "Darülfünün", Istanbul University was established in 1933. In 1930 when Germany was suffering from the fascist regime because of Hitler, approximately 150 academics escaped and started to live in Turkey for a while. During this time, Turkey has had the chance of doing studies in higher education and the research and such activities done by these academics have developed Turkish higher education to a great deal. Another important turning point for Turkish higher education was Hasan Ali Yucel who was the minister of education. In line with his effort, Ankara University was established and universities gained autonomy and legal entity. In the course of time, several crucial events have affected higher education system in Turkey. For example, during 1950s, under the governance of Adalet Partisi (Justice Party-1961-1980), local universities (Ege University, Karadeniz Technical University and The East Anatolia University) were set to meet the local demands of the areas where they were established. However, as Timur points out that the structure and the system of the universities have been affected by different coup d'états in several ways.

Conflicts between right and left sides were common at universities. Students and academics were hurt or killed as a result of aggressive actions at campuses. Political and social conditions after coup d'états, especially the one in 1980 changed higher education a lot in Turkey. Actually, military takeover of 1980 completed the process of changing the higher education system because within the framework of the new law, a new higher education system was set up and universities were deprived of their autonomy (Timur, 2000), whereas academics people were forbidden to participate in politics. Furthermore, Higher Education Council (YÖK), which is the most influential higher education institution currently, was established during that period. As Okçabol has clarified in his studies, foundations gained the right to establish private higher education institutions in those years with the additional article 2 and 3 in law numbered 2547. In other words, with the additional articles in the Law numbered 2547 in 1983, private foundations gained the right of establishing private universities in Turkey (Okçabol, 2007).

The first private university was established under the governance of Ihsan Dogramaci who was the administrator of Higher Education Council at that time. Okçabol (2007) sees this event as the first step towards the privatization of higher education in Turkey and states that "a new door opens for the privatization of education and destruction of public universities" (p. 131). In 1992 Koc family established the second private university. And private universities were free in that they could choose their own rector and they could get financial support from the state's budget. Another important figure in Turkish higher education system is Kemal Guruz who ad positive ideas about private higher education. He thought that laws, which put a barrier to the establishment of private higher institutions, should be removed. Also, popular foreign universities should be encouraged to open up branches in Turkey and Turkish universities should conduct mutual partnerships with these foreign universities. In line with his politics, the number of private universities increased. Six universities were established in 1996. These are Atılım, Isık, Fatih, Sabancı, Istanbul Bilgi, Yeditepe Universities. Eight universities were established in 1997. These are Kadir Has, Atılım, Istanbul Kültür, Dogus, Çankaya, Maltepe, Beykent, Çag Universities. And in the following years, private universities continued to be established. In 1998 Bahçesehir and Haliç; in 1999 Okan and Ufuk Universities; in 2001 Istanbul Commerce and Izmir Ekonomi and Yaşar Universities; in 2003 Istanbul Aydın, TOBB Ekonomi ve Teknoloji, 2003 and Anadolu Bil Vocational High School were established (Okçabol, 2007). In 2006 Istanbul Bilim, in 2007 Acıbadem Üniversitesi, Istanbul Arel, Izmir Üniversitesi, Özyeğin; in 2008 Gediz, Melikşah, Piri Reis; in 2009 Zirve Üniversitesi and in 2010 Istanbul Sehir Üniversitesi were established (YÖK, 2012). In addition to the ones above, on the YÖK official website, it is seen that the new private universities are going to be established: Gazikent Üniversitesi, Gediz Üniversitesi, Yeni Yüzyıl Üniversitesi, Zirve Üniversitesi.

As it can be understood from Figure 18, the number of private universities in Turkey is increasing day by day. There are several reasons for this. The proportion of young people who would like to attend university is high because parents and students see university degree as a solution for social mobility and setting up a safe career.

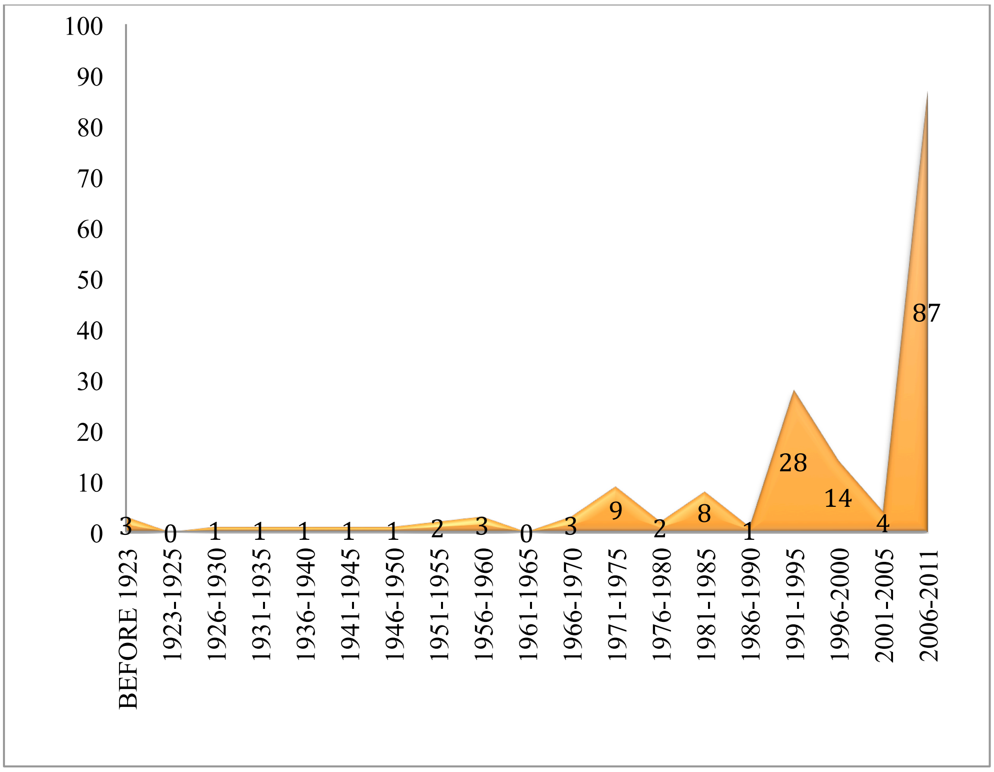
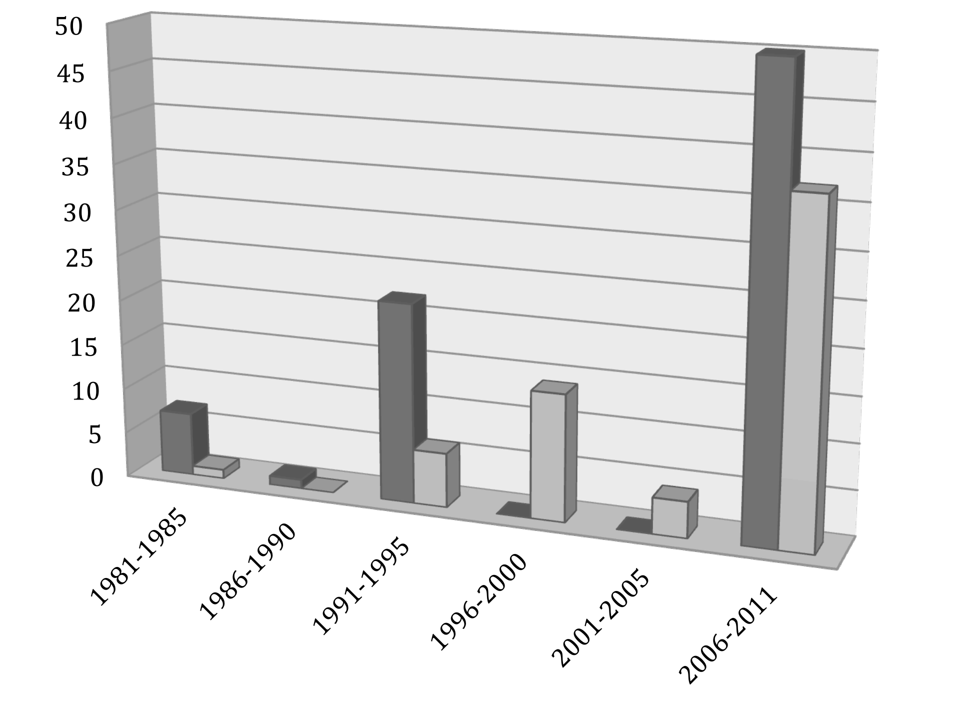


Figure 18. The Number of the Universities from 1923 to 2011.

The same situation is supported by Balkan who quotes in his book British Prime Minister Tony Blair. In one of his speeches, Blair has emphasized the importance of education by saying “the more you learn the more you earn” (Balkan, 2009, p. 12). New middle class families especially in globalizing cities around the world from London to Bombay, from New York to Istanbul, have strongly believed that “the latest round of world capitalist accumulation constitutes a fundamental shift in their ability to provide their children with what they refer to as comfortable life” (Balkan, 2009, p. 12).

Besides the increasing demand in the higher education, in the case of the Turkey, there is another reason. Public universities are not that capable of absorbing the increasing demand for higher education. Also, there is LYS exam, a kind of university entrance examination, to eliminate, select and place students. According to the figures in ÖSYM official page, in 2011, 1 million 511 thousand

980 students applied for LYS. And the number of the students has sharply increased in the last decade. Therefore, students who are not able to get enough scores to study at public universities prefer to attend private universities. This is one of the very reasons for the increase in the number of private universities in Turkey, especially after 1990s. This situation is clearly seen in the Figure 19 in which the dramatic increase of the private universities can be seen since 2000s.



	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2011
STATE	7	1	22	0	0	50
PRIVATE	1	0	6	14	4	37

Figure 19. The Number of the Private and Public Universities between 1981 and 2011.

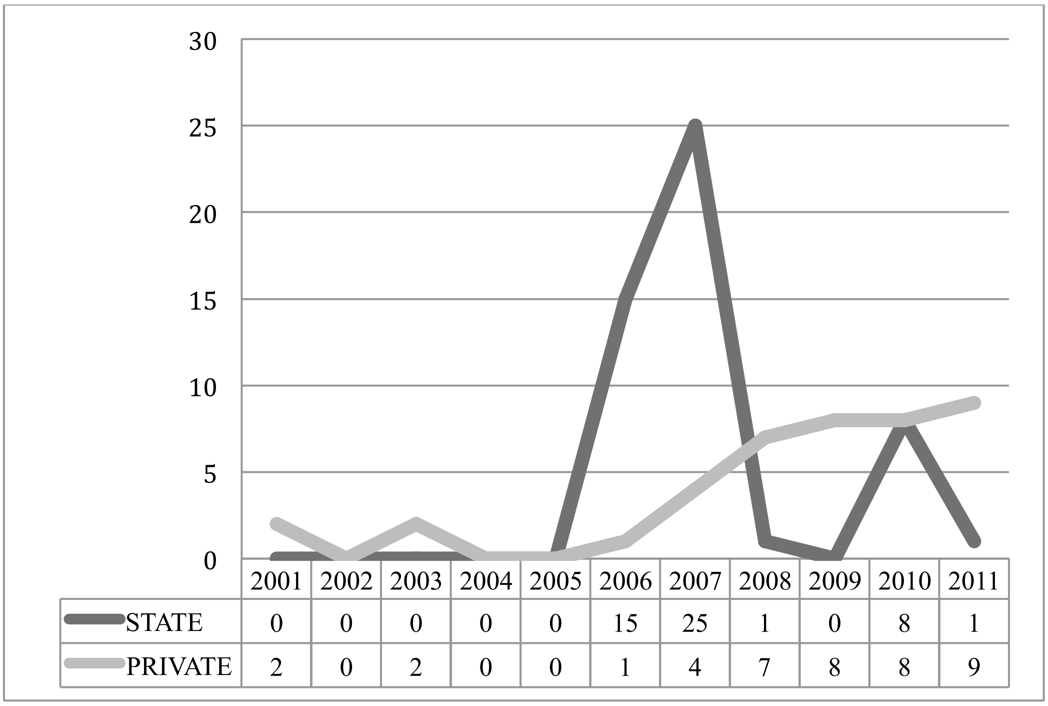
Such an increase in the number of private universities inevitably causes a sharp increase in the number of academics working in private universities. Another important reason for the increase in the number of private universities is the support by the government. As the former president of the higher education council, Yusuf Ziya Özcan (2008) states as follows:

> The ongoing developments in Turkey create questions about the hardships the universities encounter, their new roles and the financial management of them. How an institution that is exposed to such a high expectancy from people will be managed financially? Will the universities be run by the state only? Or do we need to look for other solutions? The recent developments have shown that universities cannot be managed only by the budget allocated by the government. http://arsiv.ntvmsnbc.com/news/431890.asp#storyContinues.

Additionally, in his another speech in Gaziantep, Prof. Yusuf Ziya Özcan mentions that students need to pay money in order that universities become independent. According to Özcan (2008):

> The government should pay the money not to the universities but to the students. If we want independent universities, we should give them financial independence. The state gives the money to universities and the budget of the universities is getting richer. The money, which is allocated to universities, can be given to students as scholarship and the ones who have money can pay their education expenses. This is a more efficient solution. Hence, the universities think and plan more carefully. While establishing a department or a faculty, they decide more carefully. If a department cannot get enough students, it is closed down. For these reasons, it seems to me. http://arsiv.ntvmsnbc.com/news/431890.asp#storyContinues.

The Figure 20 shows the privatization of the higher education in Turkey. The way the states defines education is not a new phenomenon actually. In Ercan's words, "this process-commercialization of education- started in 1970s and gained a momentum in 1980s" (Ercan, 2010, p. 24).



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
STATE	0	0	0	0	0	15	25	1	0	8	1
PRIVATE	2	0	2	0	0	1	4	7	8	8	9

Figure 20. The Number of the State and Private Universities from 2001 to 2011.

According to Ercan (2007), the agent, which started this process, is the state itself. Although there is a high demand from public, limitations on public expenditures is a very important factor, which affects education negatively (1999). Another crucial issue is that although there is an ongoing discussion, which focuses on the inadequate resources for education, private sector is getting state support and there are so many changes, which will enable private sector to get more government support. Incentive credits, discount for investment and exemption from tax are among the examples, which give way to establishment of private universities. For that reason, in ten years the number of the new private universities is 45% of the total number. In other words, 41 new private universities have established since 2000 comparing to 51 state universities as given in the Figure 21.

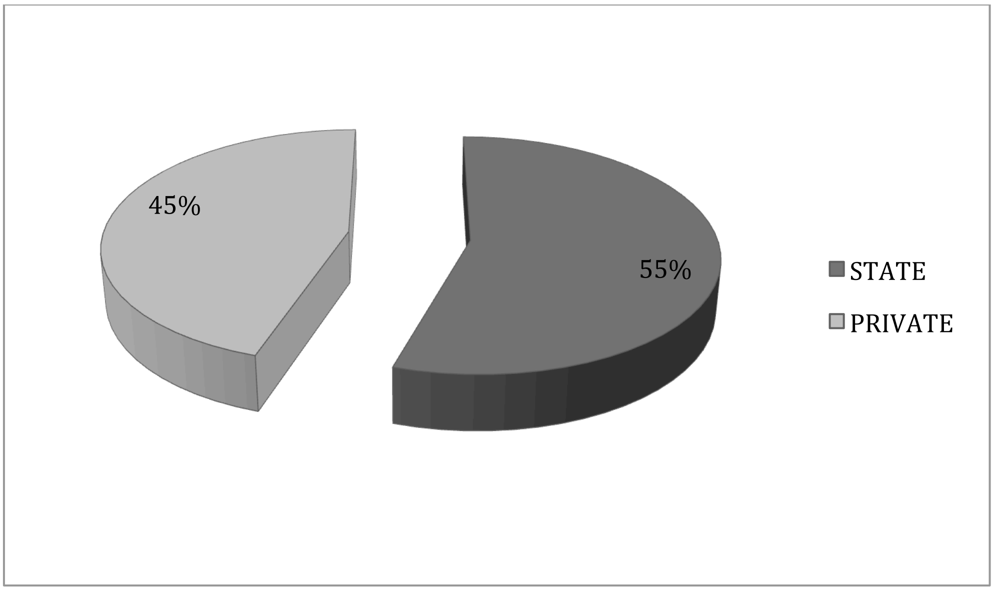


Figure 21. The Percentages of the State and Private Universities in 2011.

To give a specific example about the support of the government for the privatization of the higher education, the incentives between 1983-1984 are enough. The state provided investment incentives for private schools by giving credits to the private sector with low interest for a period 5-6 years. While 50-60 % was equity capital, 40 or 45 % was granted as credits. Also, with the amendment (number 3708) in Higher Education Law (number 2547), the state accepted to donate building land and more importantly, to meet the private 45 % of university's budget (Ercan, 1999).

Guruz (2003) in his book named "Higher Education in the World and Turkey" has mentioned that "I am in favor of determining the salaries of academics in accordance with their performance and contract-based academics. Also, professorship vacancy that is aimed at working with the help of donations should be supported" (p. 12). According to him, to reach an ultimate decision in such issues not an easy thing so that the primary money resource of private higher education institutions is the tuitions of students. Therefore, higher education should be a semi-public and semi-private service. Thus, the students getting the service can have a chance to earn money because of their diplomas while public and private sectors take directly and indirectly advantage. However, private universities as public universities have used equally the governmental support (Gürüz 2003).

Consequently, private universities have better opportunities than those of public universities by using equally public resources, while the tuitions that they ask from their students are addition resources, which the public universities do not have. As a result, the private universities are not only new profit-oriented activities for the private industry, but also new resources for the highly qualified labor force. In order to understand critically the changes and the transformation in the higher education, the dynamics in the university-industry-government partnership is given in the following title by analyzing the vocational education.

Industry-University Partnership in Turkey

According to TUSIAD (2010), Turkey can overcome its deficiencies by improving vocational education. Actually, this is a goal that has been expressed by almost every company. Germany, where the vocational training is provided by companies, is considered the most successful country in meeting this goal. In order to reduce the current account deficit in the long run, TUSIAD (2010) suggest that Turkey needs holistic and comprehensive education reform in addition to vocational training. While the skill deficiencies of the current average employee can be overcome, new generations gain highly competitive skills that help them to adapt to rapid technological changes. Additionally, the production of high-quality products and services requires constant research and development. Hence, most companies have become successful in the global market because of their research and development efforts. Therefore, according to TUSIAD (2010), cooperation between research institutions and the industry should be maximized to improve company innovation capacity. Furthermore, the reduction of the current account deficit requires not only the local production of essential import items, but also an increase in exports. For this purpose, traditional products with export potential should be supported and sold to world markets through geographical indication and brand-building (TUSIAD Report, 2010). In order to reach the targets, the private sector needs a labor force that has the capacity to research, develop, and innovate. Hence, the demand of the private sector related to the vocational education is so clear as to be defined as the first step for collaboration and partnership between the industry and the university.

Besides the vocational education, the demand of the private sector from the universities has significantly increased since 2000. According to the OECD Report (2010), the State Planning Organization (DPT) has been working on overcoming economical problems in Turkey. These problems, such as high rate inflation, internal and external debt, unemployment, injustice in income distribution and irregularity are the obstacles to become an industrialized country in the competitive global market. Since 1999, strict relationship with IMF (International Monetary Fund) has forced the government to develop structural reforms to overcome the crises. In these reforms, small and medium sized enterprises (SMEs) are taken into consideration as the engine of the economy. Additionally, according to the OECD Report, most of them play an important role in improving the Turkish industry’s capabilities in production, employment, exportation, and investment. However, most of these business enterprises were affected badly by the economic crises and even they were forced to close down (OECD Report, 2010).

In order to analyze critically the collaboration among the university, industry, and government, it is better to overview the historical background of the collaboration between the university and industry. According to Elci (2003), in the first decades of young Turkish Republic, universities tried to figure out the tradition of industrialized countries' systems about scientific and technological improvement. As these activities continued, absence of a planned development organization has been observed. In 1963, TUBITAK (Scientific and Technical Research Council of Turkey) was found to organize, coordinate and promote basic and applied research (Elci, 2003). In its first decade, TUBITAK only supported universities for their basic research activities as it is described in its foundation purposes. After few decades as the Turkish economy was improved, the TUBITAK had become active in industrial and technological activities, including in contract research. In the Second Five Year Development Plan, which was between 1968 and 1972, and the Third Five Year Development Plan, which was between1973 and 1977, the technological development and the technology transfer were important. As Elci points out, the term "technology policy," however, was first mentioned in the Fourth Five Year Development Plan between 1979 and 1983. From 1960's to 1970's, the main policy was related to "the basic and applied research in natural sciences". After 1980's, the "integration of the technology policy with the industry, employment and investment policies and enhancing the technological abilities of certain industrial sectors have been envisaged" (TUBIITAK Report, 2006, p. 2-9). As Saritas and his friends mention, the first science and technology policy document named "Turkish Science Policy: 1983- 2003" was prepared at the beginning of the 1980s. In the report, the importance and priority areas of technology were identified (Saritas, Taymaz & Tumer 2006, p. 9). In this report, Turkey's capability in technology was strongly linked with the science capacity, as it is a source of enhanced technology. However, this relation was not one sided. It was necessary to improve technology increasing the scientific knowledge. Therefore, according to Saritas and his friends, "interaction between science and technological development became one of the main goals of science and technology policy" (Saritas et al., 2006, p. 12). As mentioned in the TUBITAK Report, this tendency increased strategically the importance of technology and science in the economic development and social welfare. In the mean time, technology was included in the "science policies" of the country and they became "science and technology policies" (TUBIITAK, 1999, p. 2).

As Saritas and his friends have pointed out, in the sixth meeting, December 2000, the Supreme Council of Science and Technology decided about the new science and technology policies in which priority areas were defined for the following two decades. The purposes were to develop "an innovative economy and society in the 100th Anniversary of the Republic" (Saritas et al., 2006, p. 14). At the seventh meeting, December 2001, on the other hand, the new strategy named "Vision 2023: Science and Technology Strategies" was declared (Saritas, Taymaz & Tumer 2006, p. 11). This vision is defined by Baysal as follows:

> Vision 2023 project was the first foresight exercise of Turkey together with three more sub-projects that aim at collecting and evaluating data on the current science, technology and innovation capacity of the country. The project finished their

> work and submitted to the BTYK in the first half of 2004. In summary, it is believed that the Turkish economy will take new strides with the boost it will get from the wider recourse to R&D in the coming years. This hope is based on the sizable and ever-growing young population, and on their quest for knowledge and learning. It is also believed that the Vision 2023 project will have a substantial impact on the Turkey's future science and technology system, not only in terms of the guidelines it will provide, but also the benefits of the process itself. (2007, p. 14).

As Baysal clarifies, the Sixth Framework Program has been in effect on 12 September 2002 and Turkey has equal position with other members of European Union Countries. The program presented many possibilities to SMEs and research institutions, such as constant collaboration between member countries, presentation and spreading information, which derived from research, using in practice, finding new research areas, university- industry collaboration, education of technical staff (Baysal, 2007, p. 15). Indeed, this program is the critical milestone in the collaboration of the university-industry-government.

Furthermore, the most important global needs of the SMEs are related to the financial needs for investments. Besides the financial needs, SMEs need also technological supports, which are listed as transition to electronic trade, automation, predictive maintenance, technological improvements, use of new ICT systems. The government tries to solve their financial problems by developing regulations related to incentives and credits. More importantly, they try to solve the SMEs technological problems by means of the universities. In that way, the SMEs have become potential members of university under the name of the university-industry collaboration. However, collaboration between SMEs and university in education projects causes problems rather than benefits. Evyapan and Korkut (2005) have categorized university-industry collaboration cases into three main types: structured, semi-structured and unstructured. They have explained these three types as follows:

> The common character of the structured collaboration cases is an institutional communication, and an actual attention in the project. The large-scale companies with R&D facilities were the collaboration members. Companies' short or long-term needs formulated the project statements. Companies regularly participated in departmental evaluation sessions and responded to students' request for assistance. Outcome of design projects was expected in high level by all companies. Intellectual property rights were an important issue because of the companies' trade secret policy. The level at which the collaborating institutions were represented included both high and low levels. (Korkur & Evyapan, 2005, p. 12).

Additionally, Korkut and Evyapan (2005) define semi-structured collaboration types in two sub- categories. The first sub-category is related to large-scale companies, which have in-house facilities at the techno-parks. They have institutional incentive to make collaboration and to ask support from higher education. Generally, the collaborative projects are not dealing with a real problem. The companies offer guidance, technical information and model to make supports. In this system, institutional interests are low in the projects because the company is represented by a representative of the company at the university department. In the second sub-category, however, small-scale production companies, which have no previous collaboration experience are so motivated to collaborate with the universities that they ask their real problems. In most of these companies, the R&D departments are not existed and they are dependent to the university. These companies have provided all the technical information and assisted the making process with the students of the departments. The companies are eager to respond students' desires for assistance. Even though the level of commitment and resources of the universities are low, the companies expect the support of the universities. Most of the time, the success of collaboration is related primarily to the students' initiative so that the achievements are not sustainable. The representatives od the universities do no participate and are not involved in the evaluation sessions. Besides all these, communication and advising from the university are not high in both sub-categories (Korkut & Evyapan, 2005, p. 2-21).

However, in the techno-parks, as Korkut and Evyapan mention that the parties are ready to make the collaboration because they need interrelated and mutual support. They have unstructured collaboration in the projects in which they put institutional commitment. In addition, the companies have real interest about the project outcome. All the parties, even the students are affected by the success of the collaboration. Therefore, the structure of the relations and collaborations has been changed after the establishments of the techno-parks. However, the collaborations are becoming more company-focused oriented. The main motivation of the companies is to respond to real needs of the companies with new knowledge and technology approaches to increase competitiveness and profit in the global knowledge based economies (Korkut & Evyapan, 2005, p. 2-21).

For that reason, according to Korkut and Evyapan (2005), the private industry and the government support education-focused collaboration by supporting the investments in education through the techno-parks. In that way, the techno-parks become companies' place to attract the researchers, the academics, and the students' research and technology-based innovation. Most of the demands in the techno-parks are related to need-focused collaborations in which the researchers meet the urgent needs of the companies. The academics act as consultancies. In this collaboration, the advantages are mainly for the companies, which decrease their cost of highly intellectual human power, while increasing their needs related to the R&D. In that way, their profits increase, while a large number of the researchers and the students have access to the companies' facilities. This situation is explained by Robertson as well. The disadvantages of this collaboration are for the universities. Some of the projects developed in the techno-parks have been taken to the production and commercialization stages. Job offers have been made by the companies to those students and the researchers they have worked with. The project gives SMEs the chance to work with students and the researchers without bearing the costs that would come if it were on a professional level (Robertson, 2006).

As Robertson points out, Knowledge Transfer Partnerships (KTP) become important in the techno-parks in which partnerships help businesses to access to a wide range of expertise available in "Knowledge Base" enterprises funded by government. "Knowledge Base" means higher educational institutions, colleges, private and state sector research organizations. While academic staff can widen their knowledge on business, university expertise applied to a project has vital importance for the progress of company partner. Each KTP has one member or more, who are successful students assigned to work in a project. Academic staffs help the member that will make the transfer of knowledge, skills and technology easier. The university is required to support the organizations in new product development: from user to product launch. Academic knowledge, support and supervision are within the reach of commercial organizations involved in KTP. Knowledge transfer available for commercial organizations is created by means of collaboration made between departments and cross disciplinary areas (Robertson, 2006, p. 3-12).

Furthermore, according to Robertson, several live industry projects were initiated by the courses and those projects provided learning experiences for students. Graduate students are also employed and knowledge transfer plans contributed to improve the synergic opportunities within the course structure. Even though the collaboration aims to promote and to increase the level of innovation, most of the benefits are for the industry. By providing learning experience for the student, generating potential innovations in new product conception and researching current trends for institutional companies and generating potential solutions of commercial value, such as, market search, safety requirements and costs for SMEs, the techno-parks work primarily for the private sector. In that way, the commodification of knowledge has been increased dramatically and rapidly (Robertson, 2006).

As Ercan has highlighted, the short term benefits are seen for the industry collaboration include the enrichment of academic curriculum and student learning experience. Long-term drawbacks, however, are the changes in the curriculum content, academic devaluation and decrease for the public development. Through this open collaboration, industry could benefit from the university's resources. It had also been realized that the forms of knowledge transfer involve human interaction and academics and industrialists with each other. The interests are becoming in common. Courses aimed at educating the engineering students for the industry. Students lacked knowledge in many important fields. The courses are becoming more applied oriented so that theoretical aspects are eliminated to a large extent. Within the scope of these courses, graduates have been taught to perform well in the private industry. The structure of the universities, the academic personnel in the university, teaching qualifications in the areas and research, and the value systems have been transformed since the techno-parks have been established and became powerful in the system of the universities (Ercan, 2011). As a result, the purpose of the education in general, the purpose of the higher education has deeply transformed with involvement of the SMEs in the techno-parks, which are directly supported by the government. This is actually a new for the accumulation of capital by means of the techno-parks where the academics have been strategically used in the capital accumulation. In the following title, how the academic profession is changed in this process of capital accumulation is problematized. In order to make clear how the transformation of the higher education has been systematically developed, the working conditions of the academics are discussed as new labor force in the techno-parks to support the SMEs. Under the name of the industry-university-government partnership, the academics have taken new roles, while the purpose of the higher education is consciously and unconsciously distracted.

As Level 3, the "Politics of Education" (Dale & Robertson, 2008, p. 9) is overviewed and analyzed from the related documents in order to problematize in what ways the techno-parks are integrated into the university-industry-government partnership, as a function of the capital accumulation process. In that way, it is clearly understood that the main and fundamental principles of higher education have been systematically changing. In the coming title, again Level 3 as the "Politics of Education" is analyzed from the related documents in order to understand, explain, and problematize the dynamics in labor force in the techno-parks, which have been changing the structure and the practices at the universities.

Dynamics of Labor Force in the Techno-parks

In this title, the dynamics of the labor force in the techno-parks are discussed and analyzed as Level 3, the ”Politics of Education” in order to problematize how the systems related to the labor force has been significantly changing in the higher education. Hence, another research question related to the techno-parks is about how key managers and clients at the techno-parks and academics, and student interns at the universities work together within and beyond the university-industry-government partnership. In that way, it is possible to analyze critically and problematize how the techno-parks have been deeply transforming the structure and the main purpose of the higher education. Since the government has decided to invest in specific areas to promote innovation-based economies in Turkey, the academics at the universities, particularly in the techno-parks have been chosen as the main human capital. The government together with the private sector and academic institutions develops partnership with the initiatives to support innovation in the Turkish economy. Additionally, one of the government's purposes is to decrease the unemployment rate by increasing the small and medium-sized enterprises (SMEs). For that reason, according to Saritas and his friends, another purpose of the higher education is to decrease the unemployment rate not only by training the well-educated “human capital” but also by supporting directly the SMEs (Saritas, Taymaz &Tumer, 2006). This situation is supported by the report of TUBITAK in 2010 and by the Ministry of Economy report about the Incentives 2012. Additionally, Napier and his friends have clarified this situation as follows:

> There is an imbalance between the demand and supply of jobs and human capital in Turkey, and venture capital can be viewed

> similarly. It would be wrong to assume that it is all a matter of capital, however. According to interviews carried out with venture capital fund managers in Turkey, the shortage of capital for entrepreneurial firms is due both to risk-averse investors and to low investment-readiness among business owners. Hence, entrepreneurs need further education and training in order to better match investors' investment preferences. In addition, market places and match-making events would improve awareness about and access to investors. Promoting innovation and internationalization on firm level affects the demand from the universities. Not only the profile of the graduates has changed, but also the demand of the corporations has increased. (Napier, Serger &Hansson, 2004, p. 77).

Furthermore, according to the OECD, in Turkey, the SMEs do not have enough knowledge to understand the investment process that they are not ready because they do not have transparency and accountability. The SMEs are mainly family-owned businesses since they are so small to make investments on technology and international trade. Additionally, according to the analyses of Saritas and his friends (2006), the OECD has mentioned that the products and the services are not enough in terms of "quantity and quality" (p. 8). Therefore, the government has to decrease the obstacles by increasing the level of investments among SMEs. They clearly emphasize that according to the OECD, "Besides innovation perspectives, growth prospects, international markets and SMEs profiles are factors that investors prioritize highly when deciding where to place their capital" (Saritas, Taymaz & Tumer, 2006, p. 8). In that sense, in Turkey, there is lack of project management in order to predict short term and long term challenges and changes in order to adapt the corporations, particularly among the SMEs. Therefore, the government with the help of International Organizations, like the World Bank and OECD has to support the SMEs by increasing collaboration with the experts at the universities. This collaboration is expected in two different areas: in the managerial departments, in the innovation departments to improve know-how, or both.

However, according to the report of the OECD, the number of the people who are working in R&D is relatively weak in Turkey. This situation is defined as "weak human capital in R&D" (OECD, 2011, p. 2). Additionally, the number of ICT indicators is low to access to the knowledge including the number of the students who are in higher education (OECD, 2011). More importantly, the low scores on innovation capacity is explained because of low "human capital" indicators, particularly in new science and engineering (S&E) graduates even though the numbers of these graduates has increased in the last decade and become more than the number in the EU countries. In the report, it is clearly explained as follows, "Turkey's human capital inputs are clearly well below the EU average. Even more importantly, there are strong indications that Turkey is not using its human capital resources efficiently" (OECD 2011). Therefore, it is expected that the government has to take different precautions, particularly related to education. Saritas and his friends have explained that this is not the problem of the quantity, but the quality of education, training and use of labor force. According to Saritas and his friends' analyses about the World Bank report:

> Unemployment statistics reveal that unemployment rates are disproportionately higher among the members of the labor force with higher education levels than among people with little education. This indicates, firstly, that the available human capital resources are not as strong as perceived, or are not used effectively. It may be that precious resources are being wasted. A second important concern is that education and training are not attuned to the needs of the economy – that universities are not producing graduates with the skills that are in demand. It appears that the mechanisms, which are currently being used to adjust the supply of graduates in different disciplines in order to be consistent with the demand/growth strategies, are not functioning properly. This phenomenon has implications for productivity and innovativeness, as well as creating considerable

> dissatisfaction in an important segment of the population. (Saritas et al., 2006, p. 3).

For that reason, investment in R&D is taken into account to increase innovation capacity. Turkey's records are low especially in the public sector. Among the research and development activity, research projects, patent activity and innovative activity are the most significant ones in OECD countries; however, Turkey has significant low numbers in patents and business researchers in their investment levels. Therefore, as Saritas and his friends point out, the report of the World Bank suggests that Turkey has to increase collaborations between the public and private sectors by increasing collaboration with universities (Saritas et al., 2006).

The collaboration between the public and private sectors is not new for other countries. The effects of the collaboration between the private sector and public sector, particularly with the universities, are significantly negative on the higher education. Derek Bok, in his book "Universities in the Market: Marketization of Higher Education" (2007), focuses on the relation between universities and private sector, and he states that nobody can deny the impact of private sector on universities. It is crystal clear that the large amount of funding, private sector members has changed the structure of universities a lot. Bok explains this situation as follows:

> By comparing business and management departments with the faculties, which provide educational and social sciences, people can see this effect. Trade and industry sectors are deeply affecting the curriculum by providing job opportunities and well-paid salaries. If a person realizes the current popularity of computer sciences departments and if he compares salaries of academics, who teach at philosophy and literature with the ones who work in business and management department, he can see the effect of private sector on university life. (2007, p. 8).

The effects of collaboration, particularly with the involvements of the techno-parks at universities may lead to many problems. For instance, inclusion of private sector may cause erosion in academic standards. Bok believes that selection criterion of students and academics should be in accordance with the purposes of the university about education, research, and other benefits. Therefore, academics should not be hired just because they are conducting a project, which may bring great interests. The project's scientific value is of utmost importance. Moreover, establishing courses for projects will inevitably result in erosion in the academic standards. More or less, the purpose of the universities is to grow up a student who improves himself/herself and contributes to the development of the others. Also, it is expected to have the capability of serving for the needs of the society. Thus, students, after being a member of academic society, should be evaluated objectively. In an academic environment where students' projects are used for the demand of the private sector or even sold for money, the universities are on the verge of losing the trust of public (Bok, 2007, p.107). Additionally, relations among the academics can be badly destroyed. The university-industry-government partnership in an academic context is undermining colleague friendship and trust. Unfortunately, this brings along tension and separation among academics. The ones who make great effort for traditional workloads will get hot under the collar and criticize the ones who spend most of his professional time for counseling for the companies. Academics whose expertise area is humanities will tend to think they are not valued enough. There may be even arguments about patents right share between the academics and the administration (Bok, 2007). This situation has been dramatically affecting academic freedom and academic profession. The same kind of the developments is seen as well at the universities by means of the techno-parks.

Besides all these problems, as Bok (2008) explains, the accountability has become important to answer to different “constituencies” for a responsible performance. Academic freedom and accountability is “as a collective right to self governance” and he suggests a “confluence” of individual and institutional autonomy (p. 19). However, the degree of academic freedom is restricted by the collaboration with the private sector. As Derek Bok highlights, some universities are signing contracts with corporations in order to meet all the research funding of a whole department. For instance, Novartis agreed to pay 25 million dollars to the Plants and Microbiological Department of California University for five years, which make up the 40 % of the total research expense of the department. According to the agreement, the company takes the results of the data driven by the research and also, it has the right to determine the two members of the committee who are responsible for the allocation of fund for the studies carried in the department (Bok, 2007, p. 148). Some universities, as California University, are strong because of the qualified academics who can find other resources to conduct the research, which is interesting for them. However, as Bok underlines, on the conditions that universities are not so powerful, serious problems arise. The departments become oversensitive to the demands of the companies, which fund the department, as they want to re-new the agreement in the following years. Moreover, even if more powerful departments are resistant to such pressure, the ones which are relatively weak can give way to the priorities of the company which is funding. The relation between corporations and universities are becoming more intense, especially after the private universities have increased. Such kind of agreements or activities such as hiring business people as part time academics is considered to be usual. However, the implications of this trend for academics destroy the structure and the value systems of the universities, particularly in the techno-parks. More importantly, these challenges have increasingly affected academic profession in Turkey.

In addition to all the challenges related to academic freedom and accountability, the academics's profession is affected because of massification, which refers to the high increase in the number of students who are having higher education. The philosophy of education is that "regardless of his or her socio-economic background, everyone in line with the talent s/he has should have the opportunity to enter university" (Kısabacak, 2011). However, the effects of globalization have changed not only the dynamics in the higher education, but also the academic profession. According to Kısabacak, "massification leads to privatization of public post secondary institutions. High demand in enrolments and inability of the state to adequately fund means that new ways of funding is necessary" (Kısabacak 2011, p. 23). The increasing number of the private higher education shows that the governments do not support education so that privatization of public universities is becoming a new trend. Instead of facing the needs of the universities, the governments force the universities to find their own finance through higher tuition fees, generation of income through consultancies, university-industry partnerships as it is seen in the techno-parks in Turkey.

As Altbach explains, academics who engage in the knowledge production and transmission that constitute "the raison d'etre of universities" are deeply affected by massification and academic collaboration with the private sector (Altbach, 2007, p. 5). Stromquist explains this situation as follows:

> Different environments and conditions, including stakeholders who have different abilities, attitudes or interests create pressure and stress on academics because highly diverse student profile who has varying competencies and career interests produce considerable variation in academics' professional life. Massification also causes decline in overall academic standards. As higher education expands the overall quality of the systems declines. This is probably an inevitable result of an academically diverse student population, institutions with poorer facilities and less trained professors and less rigorous selection of students. As a natural consequence of massification, 'casualization' of faculty is taking place in the context of a changing student body because massification has brought less conventional students in higher education. Less stringent admission standards have been applied for the student admission as a result of inclusion of private sector. (2000, p. 16).

Like in other developing countries, privatization of higher education has affected academic life in many ways in Turkey. According to Ercan and Kurt Korkusuz, the changes are seen at the universities from a "collegial university" into a "market model university" (2011, p. 121). Therefore, these changes have enforced the transformation in the academic environment and academic content. According to Ercan Kurt Korkusuz, the main reason behind "the market-oriented policies are to decrease the cost of higher education by increasing the demand of higher education on university autonomy and freedom" (2011, p. 123). Consequently, certain conditions in the university environment and culture have changed. Market oriented understanding has affected the structure of the universities, particularly in "the loss of academic freedom for academic staff, more difficult working conditions, increased workload, contract based employment, greater accountability, reduced participation in the decision making process, increased competition to fund research programs" (Ercan & Kurt Korkusuz, 2011). The most comprehensive report about universities is the one prepared by the World Bank Report in which the main aim of the higher education institution is defined as follows:

> Develop an appropriate financing strategy to provide sufficient resources and to realize strategic objectives; diversify education system in a flexible and open manner to allow institutions more autonomy and ability to adapt to changing conditions; increase the employability of graduates and contribute to regional and economic development; improve and ensure quality of higher education institutions and students; increase the number of graduate students and university research. (World Bank, 2007, p. 5).

More importantly, most of the research studies conducted in the last decade and related to the academics in Turkey show that the conditions of the academics are changing. For instance, in the survey about "working life of academics and career problems" conducted by Aytaç and the others (2001), 50 percent of 3512 academics are partially satisfied and 13 percent are not satisfied with their jobs at all. Especially, salary and teaching loads are among the issues that academics are not happy with. Another survey (Yiğitler, 2006) done among the research assistants at private universities indicate "as a result of success and performance oriented policies, research assistants at private universities are at the mercy of the market economy. Their jobs are threatened by changes in market conditions" (Yigitler, 2006, p. 145). Additionally, according to the research of Dost (2007), "the problems of faculty members at the state and private universities" (p. 112) are listed and 66% of them define that the financial issues are the most important problems. The second aspect is related to "the negative interpersonal relationships between colleagues (48.7 %), unjust applications in positions of assignments (35.9 %), and limitations in relation to studies abroad (30.1 %)" (Dost, 2007, p. 176). There are also administrational and educational problems which are related to graduated programs, lack of support for the research, the problems of research assistants and lecturers, inadequate physical conditions, problems related to staff hiring- assignments, scientific culture-justice and objectiveness problems and promotion - foreign language criteria problems (Dost e. al., 2007, p. 124). Furthermore, Öztürk (2004), in the thesis called "Academic, Administrative and Financial Description of State and Foundation Universities with Respect to University Autonomy in Turkey" describes the public and private universities in terms of financial, academic and managerial autonomy. He claims that public and private universities are not autonomous in their managerial and financial issues. Both private and public universities have managerial interventions in Turkey. Board of trustees in private universities and state in public universities intervene in managerial issues. Neither public nor private universities have academic and managerial autonomy and culture related to the autonomy. Moreover, Nejla Tural, in her study, mentions that there are other factors that influence and change academic profession in Turkey, particularly in private universities. Tural defines this situation as follows, "private universities have also been affected by other factors such as the influence of students (customers) who pay high tuition fees, national and international companies that have engaged universities to carry out commercial research, as well as religious, ethnic and ideological groups that provide financial support to the foundations" (2007, p. 34).

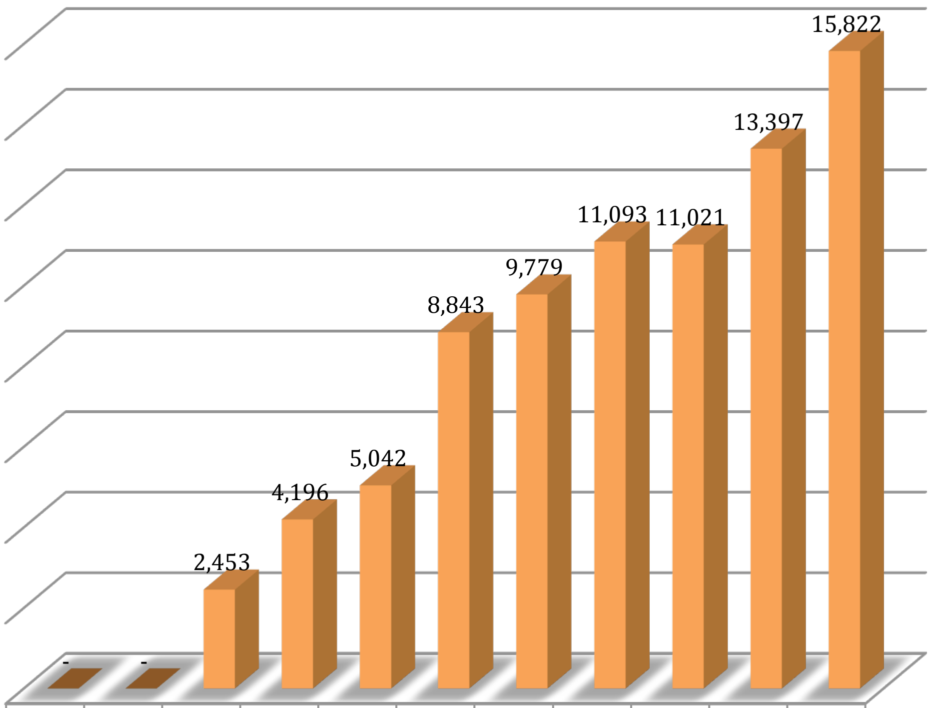
In the changes and the challenges of the academics in Turkey, the development of private universities defined also foundation universities has played important and crucial roles. For instance, the research study about the "Impacts of Foundation Universities on Turkish Higher Education System" conducted by Dr. I. Deniz Erguvan, the effects of private universities on the higher education system of Turkey are studied. The results show that academics agree that private universities create employment opportunities; keep the successful students in the country; and they ease the financial burden of the state because they provide higher education for students who are not able study at public universities. Despite the positive effects, academics criticize private universities. They believe that private universities offer only popular programs with high job prospects to attract students. The differentiation in qualifications between public and private university graduates is not clear. In the private universities, there is low job security and high turnover in some departments. Another striking result of the thesis is that the interventions of founders and board members are considered to hamper the process of institutionalization and autonomy. Additionally, Tüzün & Devrani (2008), in their study of student satisfaction about private universities, underline the fact that private universities are under pressure as they have been competitors because they try hard to get the enough number of students. Thus, in order to attract the attention of the target students, they need to satisfy their needs and demands. Many aspects of private universities, such as advanced facilities and the image of institution in the public, are among the factors, which affect students' decisions in the process of choosing a private university. However, the qualities of academics whom the students get the direct service in reality, will inevitably affect students' ideas about private universities. In their conclusion, two academics state that students are satisfied with the academics when they are happy in a private university. In the light of this study, academics are regarded to be the ones who need to satisfy corporations' demands to make them stay in the institution. The relationship between academics and the management is like in the corporations in which satisfaction should be accepted as a university policy and the academics should adopt this policy in their working conditions. The pressure on the academics is high and the academics complain about the performance indicators that they conduct in a year. This situation is explained by Kısabacak as follows:

> Such a perspective in the society may affect the academics people's certain rights. And actually, the Law No. 2547 is in parallel with this point of view. The Law stipulates that teaching, scholarly research; publishing academic work and consulting are the duties of academic staff. Article 33 of the law also states that academic staff will also carry out other duties imposed on them by relevant authorized bodies. (2011, p. 87).

The same kind of changes and challenges is seen in the techno-parks as well. The number of the academics has significantly increased at the techno-parks and the demand of the corporations as new customers are dramatically dominant on the research subjects and the results of the research studies. The performance issue is another pressure on the academics at the universities where some departments at the universities have better connection with the corporations than other departments. Therefore, the academics who are working at the techno-parks have better mobility opportunities in their academic career. The last changes and challenges in the working conditions of the academics because of the techno-parks are critically given in the following title.

Techno-parks and Academics

Since 2001, the number of the academics who have been working in the techno-parks has markedly increased. In other words, there is a positive correlation between the numbers of the academics in the universities and the numbers of the techno-parks and the number of the people who work in these techno-parks companies. In 2001, there were only 2 techno-parks, whereas in 2003 the number of the techno-parks had increased to 12. In two years, 8 more techno-parks were established in different universities of Turkey, and the umber of the universities had reached to 20. Since 2005, the number of the techno-parks had increased markedly fro 20 to 43. In the meantime, the number of the academics and personnel close to the academic world who are working at the techno-parks has significantly increased as well. This can be seen in Figure 22. Additionally, the number of the companies, which are active in the techno-parks, is significantly upgraded as it is seen in Figure 23.



2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-	-	2,453	4,196	5,042	8,843	9,779	11,093	11,021	13,397	15,822

Figure 22. The Number of the Personnel in the Techno-parks.

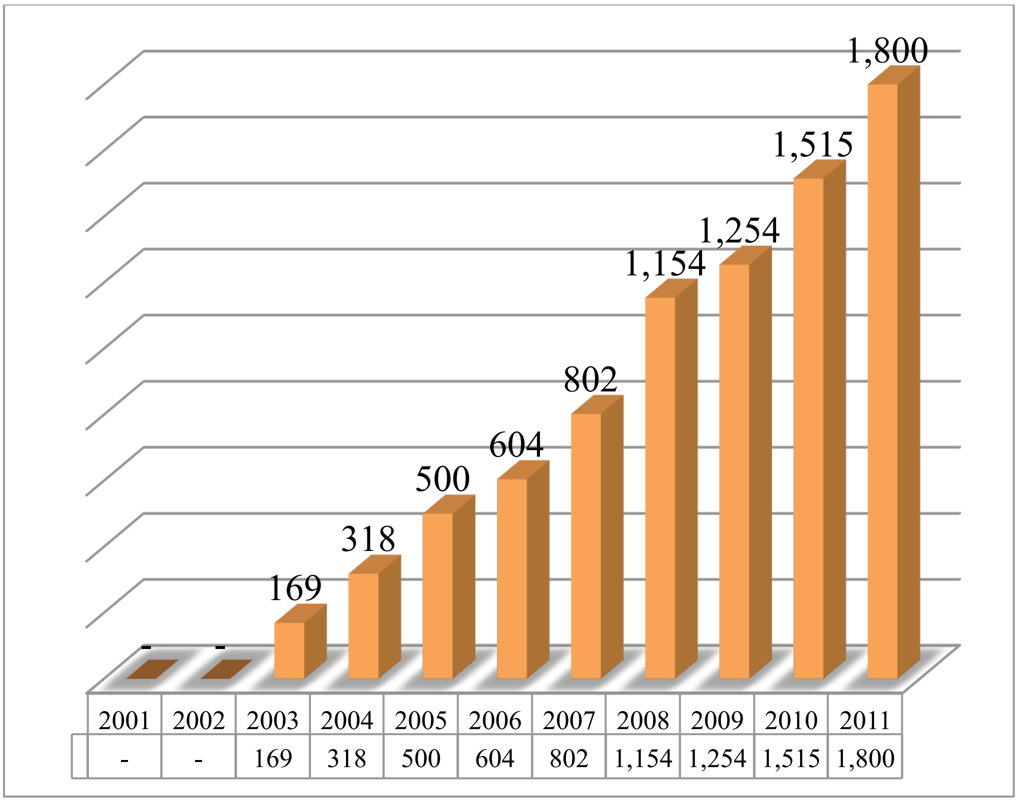


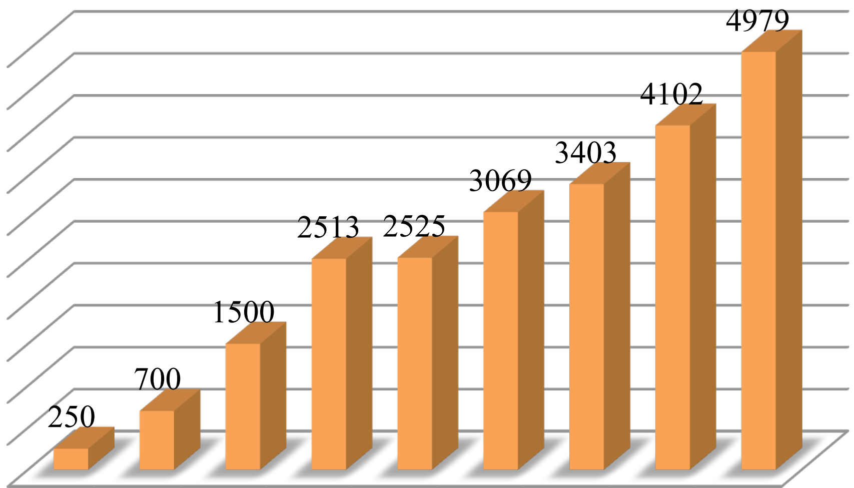
Figure 23. The Number of the Companies in the Techno-parks.

The number of the personnel has reached from 2,543 to 15,822 people in nine years. Most academic personnel work in the techno-parks as managers, clients, academics, and student interns who are defined as the human capital of the university-industry-government partnership by Lauder and Brown (2006). Additionally, the changes at the techno-parks have significantly increased the demand in vocationalization in the universities. In other words, the utilitarian concept of higher education is supported and techno-parks have become important evidence for the vocationalization of the higher education. Indeed, as Ercan and Kurt Korkususuz have highlighted, vocationalization has dramatically increased inequality among the faculties and majors. In other words, vocationalization by means of the techno-parks has increased inequalities among the academics. As a result, as Ercan and Kurt Korkusuz point out teaching and learning are becoming a part of marketization and consumerism by means of the demand at the techno-parks (2011).

Additionally, most academics participated in the highly Ministry of Industry and Trade report, the techno-parks in Turkey accounted for US$540 million of export revenue until May 2011, up from US$144 million in 2006 (Ministry of Industry and Trade Report, 2011). Although this number is still small relatively, it is steadily increasing over time. Most of these export revenue has developed by the involvement of the highly intellectual academics. In some techno-parks, this collaboration between the university and the private industry is more complicated, particularly those which are located at the campuses of the universities. The 28 techno-parks out of 41 techno-parks are located in the campuses of the universities. Meanwhile, there are 20 incubators (TEKMERs) operated by KOSGEB at the campuses of the universities. There are also two private incubators established by Ericsson (Ericsson Mobility World) and Siemens (Siemens Business Accelerator) established at the campuses. The Ericsson Mobility World, which was founded in 2001. It provides know-how, equipment, marketing and sales support to ICT companies, which develop mobile-internet solutions. These techno-parks are known more competitive than the other ones since they establish new businesses for most of the academics and new graduates from the universities. According to the research study of Elci related to the techno-parks, most national and international companies have participated in the techno-parks, and they invest because they can find cheaper labor force, particularly for the technology sector in which it is difficult to find highly qualified people. Additionally, those who are highly qualified ask much more money than those at the university (Elci et al., 2005). Furthermore, the international organizations, like the OECD, support the government policies related to the SMEs development at the techno-parks. In the report of the OECD in 2004, the situation is explained as follows:

> While the government is working to improve the infrastructure on which e-business depends, especially by supporting development of the techno-parks in Turkey, it does not appear to have formulated any overall program for training industrial SMEs in the necessary skills. Providing support for the introduction of the necessary equipment and teaching SMEs to use it would require considerable manpower and a sizeable budget. In many countries the learning process is driven by industry associations and universities which are well placed to identify the best technologies and practices, provide training and disseminate the findings of their market research to identify both internal and external markets. Innovations, whether product, process, or management, spread quickly to these industrial associations and universities. Therefore, the government has encouraged the Confederation of Turkish Tradesmen and Craftsmen (TESK) and TOBB to lead the technology improvement drive, with co-ordination and support provided by KOSGEB activating the potential of academic personnel. (OECD, 2004, p. 6).

Hence, as it is clearly seen in the report, academics have been supporting the SMEs as qualified manpower in an affordable budget, particularly in the projects where highly technological knowledge is needed. For that reason, human and material investment has become important in the higher education system where the government develop policies to "meet the challenges of the younger students in the area of research and development (R&D)" as it is mentioned in the OECD Report (2004, p, 7). The main purpose of these decisions is to ensure "the academic labor market to make work efficiently in order to maintain a balance between the imperatives of social protection and employment flexibility for businesses in the techno-parks" (OECD, 2004, p. 7). All the results of these decisions can be seen in the increasing number of the projects at the universities as given in the Figure 24. The number of the projects with the help of the academics has markedly increased from 250 in 2003 to 4,070 in 2011. In most projects, the academics have planned, organized, and finalized these projects, while earning much less than the prices in the market. The control mechanisms and the benefits of the private sector have been significantly increasing at the techno-parks where some of the academics use partially the financial benefits of these collaboration.



2003	2004	2005	2006	2007	2008	2009	2010	2011
250	700	1500	2513	2525	3069	3403	4102	4979

Figure 24. The Number of the Projects in the Techno-parks.

Additionally, as in the World Bank report highlighted, the collaboration between the university and the private sector has to be supported by the government due to the high university-based intellectual potential. This situation is explained in the World Bank Report (2007) as follows:

> Turkey is R&D effort suffers from too little participation by the private sector; The share of the business sector in total R&D expenditure is around 35%, against the OECD average of 65%, although the number of companies conducting R&D has increased between 1996 and 2000; Most of the rest of the R&D infrastructure is in government laboratories; University-based intellectual potential is high, however, university-industry interactions are weak because there is inadequate funding for cooperative projects at the universities, and research laboratories and equipment are limited in some faculties. (p. 3).

Consequently, activating the university-based academic intellectual for the development of the technology-based economies by increasing partnership of the industry and university has dramatically and deeply changed the working conditions of the academics at the universities. They are expected to perform according to the market conditions at the techno-parks, which are defined as the new work places to manifest such a kind of the profit oriented collaboration. In other words, commodification of knowledge is seen under the name of the private industry and university collaboration by mans of the projects. In these highly profitable projects developed for the SMEs in the techno-parks, the academics have played and taken totally different roles than their roles at the universities. In this context, the teaching and advising conditions have been significantly changed as well.

In the "Policy initiatives in the Development Plan" for 2023, Saritas and his friends highlight that the goal of the government is primarily to increase and improve the productivity, efficiency and effectiveness of the Turkish SMEs in order to upgrade their competitiveness in the global markets by reaching the export amount US$ 500 million (Saritas et al., 2006). Additionally, according to Saritas and his friends, the plan aims to improve product quality and enhance "the innovation and technology capacity of small business through collaboration with universities, introduction of new financing instruments, such as risk capital, and modern management techniques" (2006, p. 79). The partnerships are expected with the international companies and SMEs with the help of the academics at the universities in order to develop SMEs export capabilities. In this plan, the main purpose is to raise markedly and expand amount of service delivery to SMEs by developing joint centers and increasing synergy at a local level among “KOSGEB and the Union of Chambers of Commerce, Industry, Maritime Trade and Commodity Exchanges of Turkey (TOBB) and the universities” (Saritas et al., 2006, p. 8). Additionally, the entrepreneurial training is expected by the academics at the universities for the global market competition. As Saritas and his friend (2006) have emphasized, the occupational education is defined as the most important need of KOSGEB. However, it is much more expensive than expected to develop intensive training curricula. More importantly, delivering such a kind of the curriculum is much more expensive than developing it. On the other hand, according to Saritas and his friends (2006), most of the SMEs in Turkey “cannot afford to have this type of training as apprenticeship programs” (p. 9) so that they cannot compete with the international competitors. Therefore, in order to compete in the market economy, the government is expected from the universities to develop and deliver this kind of vocational training. With the help of the new policies and incentives, the academics who are at the universities are encouraged to help the SMEs at the techno-parks by “the government support through scholarships or loans in incubation program” (Saritas et al., 2006, p. 13). In that way, as Saritas and his friend have emphasized that the SMEs and new incubators redevelop and start their own businesses “with a competitive advantage obtained through education and experience in the techno-parks which have strong programs, like in METU and ITU” (Saritas et al., 2006, p.13). The situation has already mentioned by the OECD as follows:

> Several universities have developed similar curricula to train administrative managers for the SMEs. This training is highly valued by the people in the SMEs, and the students can recoup their investment in education relatively quickly through work in the industry. Once these individuals have gained sufficient work experience, they may start their own businesses. Many of

> the small industrial companies and incubators in the organized industrial techno-parks operated in Turkey also organize apprenticeship or other training activities to improve entrepreneurial knowledge and skills, but they are seen in few techno-parks. (2004, p. 12).

Hence, the expectation from the academics has become higher than ever before. Additionally, while the government is giving certification to the private individuals, KOSGEB provides management consulting and technical assistance services to SMEs in order to increase and provide useful assistance by asking from highly educated academics. The OECD suggests training systems which are seen in Japan called a Certified Small Business Consulting program in which "an additional year of specialized training following receipt of a Master's of Business Administration degree, plus some years of experience working with or consulting to smaller enterprises" (OECD, 2004, p. 6). On the other hand, the United States has a similar program as the Small Business Development Centers Directors Association in which the certification program has been developed "after approximately 20 years of experience operating small business development centers" (OECD Report, 2004, p. 6). Consequently, as Saritas and his friends (2006) have pointed out, in Turkey, IGEM (İhracatı Geliştirme Etüd Merkezi) and TEKMER (Teknoloji Geliştitme) programs have been developed with the help of the academics in order to facilitate a productive certification program.

According to the studies of Saritas and his friends (2006), vocational high schools and universities have been redeveloped by the government policies to provide a general entrepreneurial curriculum in order to develop an entrepreneurial culture. These vocational centers provide skills training in some fields, which are supported by the academics at the universities. Entrepreneurial curriculum has developed to improve occupational and entrepreneurial skills. Additionally, an entrepreneurial input is needed so that entrepreneurial experiences have been added to every skill curriculum in which graduates can examine possibilities of work as an employee or as a business owner. According to Saritas and his friends (2006), “This type of training does not require certification since students can make their own decisions regarding the addition of entrepreneurial training. KOSGEB or the Ministry for National Education can encourage them to add entrepreneurship training without having to introduce a bureaucratic certification program” (Saritas et al., 2006, p.14-15). This is a part of inclusion project for the academics under the name of the training projects. The information about best practices is put on the Internet to make more extensive use of the training programs. According to the report of the OECD (2006), the training programs developed by the academics at the universities are emphasized as follows:

> Preliminary plans call for the provision of additional or expanded training in a number of subjects such as personnel management practices, identification and use of best technology, and project and technology management practices. Many of these subjects can be included in the general training. Similar training could be developed and delivered on an industry basis by the chambers of industry. (p. 56).

As a result, academics from different departments have participated in different activities in the techno-parks, particularly in giving training and consulting for the SMEs in the techno-parks with low cost. According to Ercan (2011), academic knowledge is commodified by means of these activities in the well-developed techno-parks in Turkey. On the other hand, not all the academics have the opportunities to be involved in these activities. Therefore, there is remarkable unbalanced income in terms of salaries among the academics at the universities.

Additionally, each university has its own reason and system to have a techno-park. However, according to Polat, one reason is common which is "to transform the scientific research of university to industrial application" (2007, p. 23). In most scientific research transformation to industrial application, the academics in different roles have played significant roles. According to Monck and his friends (1988), the linkage between university and the companies could be formed in many ways, such as transfer of people, transfer of knowledge, companies sponsoring the research and access to the university facilities at the university. There relations are becoming more complicated after the development of the techno-parks in Turkey.

The last documents and the research studies show that the major goals for techno-park establishment in Turkey in the context of highly educated academics can be summarized as follows; firstly, the labor force of the universities is used in the creation and growth of new technology based enterprises which can be developed even by the academics themselves. Secondly, with the help of the academics, the techno-parks can help turning research and development activities to investments, which are supported even by the government. Thirdly, in order to increase the involvement and the participation of the academics, performance criteria have been developed and followed. In that way, it is possible to see the efficiency and efficacy of the academic personnel. Fourthly, encouraging entrepreneurship is thought among the academics by arranging special scholarships, funding, and financing of the projects even those of the students. Another aspect of increasing the involvement of the academics at the universities by means of the techno-parks is increasing the number and types of economical activities of the region by organizing competitions, conferences, and other activities. Moreover, academics are supported by promoting technology transfer by giving incentives, like tax to invest to the techno-parks. Consequently, commercialization of the university's inventions and know-hows is expected, especially in those techno-parks where know-how is high because of the qualified academic personnel and students. Furthermore, the government has encouraged increasing the education capabilities by promoting PhD programs at the universities where the PhD graduates can be used as labor force at the SMEs of the techno-parks. Generating employment opportunities for the PhD graduates who stay in the techno-parks is reorganized by the last changes in Law known as "Torba Yasa." Most of the projects of the PhD students are used by the SMEs where the students work without social security. Additionally, their intellectual property rights are ignored. Most of the SMEs in the techno-parks have been making much more profit than in other places because of the incentives given to the techno-parks related to the personnel. They can reach to the highly qualified people who are coming mainly from academic background, while paying less for them. More importantly, the employment opportunities at the techno-parks where relatively not higher salaries can be earned has significantly distract the structure and the system of the universities. As Demircan points out first in 2006, and then Ercan and Kurt Korkusuz (2011) mention that because of the close relationship in the highly intellectual environment of the universities, the private sector has deeply use the universities, while creating inequalities among the departments. Since some of the departments, particularly those in engineering, have more opportunities to develop highly technological knowledge than those in social sciences, the academics can much more than those in social sciences. This is also important in the accountability and performance criteria, which are the latest pressure of the academics, particularly in the private universities in which the number of publications is less important than those patents. However, in some departments, particularly those in the social sciences, there have been few opportunities to have patent comparing to the engineering departments, like in ICT and Life Sciences. Consequently, the importance of the social sciences is relatively decreasing in the higher education in which most of the academics who come from technology-based departments have taken important positions in the organization chart. These changes are seen especially in the new universities, which have just established their techno-parks. Most engineering and secondly business administration departments have become involved in the projects where they can earn more, they can publish more, and they can be qualified easier in their academic career than those in the social sciences. Therefore, in most universities, the young academics from the engineering departments have taken higher positions at the administration of the universities. In the light of this evidence, it is clearly seen that the development of the techno-parks has dramatically and deeply changed the structure and the value systems of the academic force at the universities. As it is critically articulated that the related literature justify the dynamics of the labor force in the techno-parks which enforce the system in the higher education have been dramatically transforming the value systems at the universities. These studies as Level 3, “Politics of Education,” show how key managers and clients at the techno-parks, academics, and student interns at the universities work together within and beyond the university-industry-government partnership, while changing the systems related to the labor force, particularly by means of the last arrangements and mechanism related to the techno-parks. Hence, the research question, “How are the arrangements and mechanisms of the techno-parks that promote the university-industry-government partnership?” is overviewed critically from the related literature in order to problematize the transformation of the higher education with the effects of the techno-parks as the “Education Questions” Level 3 which is the “Politics of Education.”

Arrangements and Mechanisms related to the Techno-parks

In this title, as the “Education Questions” Level 3 which is the “Politics of Education,” the research question related to the arrangements and mechanisms of the techno-parks that promote the university-industry-government partnership is critically articulated in order to justify that the transformation of the higher education has significantly increased with the last arrangements and mechanisms at the universities. For that reason, the effects of the arrangements and mechanisms are critically discussed from related documents. As Saritas and his friends (2006) explain, in the Implementation of “Technology Development Zones,” the techno-park is defined as a site where the development of new technologies and the convert innovations to commercial products or processes by utilizing the capabilities of a university or research center. In other words, the techno-parks are taken seriously into account because they support the regional developments (Saritas, Taymaz & Tumer, 2006).

According to Polat (2007), the techno-parks are established inside or close to a university or research institute, and integrate the academic, economical and social structures. Although those differences in description and name, the techno-parks and related entities are generally research based, in close relationships with universities and research institutes, they are on campuses or in close proximity to the campus. This is also apparent in the Turkish experience (Polat, 2007). On the other hand, the terms, such as innovation center or incubator usually describe an entity that formed to foster to the new and high technology businesses by supplying space, relations and support of a research institute and managerial services. According to Polat, in the last decade, the techno-parks have become important because they are taken as the source of the capital accumulation by developing research and jobs. The position of various entities related to the techno-parks can be summarized as it is seen in the Figure 25 (2007, p. 17).

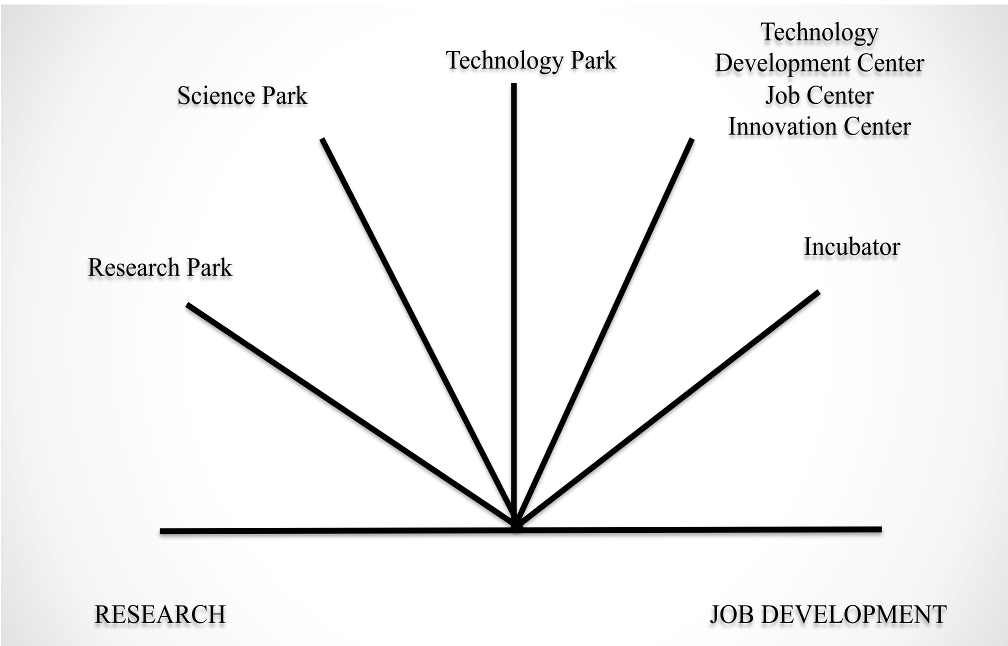


Figure 25. Techno-park Applications for Job Development (Polat, 2007, p. 18).

As Polat (2007) clarifies in his study, together with incubators, technology centers and the other similar entities, the techno-park belongs to a group of political instruments that promote technology development and regional growth. The most important role of a techno-park is to provide an environment to transform basic science to the commercially profitable innovations. Therefore, as Ercan (2011) discusses that the main expectation of the universities as well as the governments from a techno-park is commercialization of the research projects to increase funds for future studies, which dramatically change the structure and the value systems of the higher education. Additionally, according to Polat (2007), the private sector, particularly those high-tech startups ask for highly qualified knowledge because of the close relations with the university, including collaboration with other businesses on the techno-park and the managerial, financial, and legal services. The multinational corporations, on the other hand, are involved in the activities in the techno-parks because of the flexible and short-term projects. The local governments motivate the techno-parks to support the regional growth. More importantly, the national governments expect the competitiveness in the global market by means of the partnership of the private industry and the universities through the techno-parks. As a result, each stakeholder of the techno-park concept has its own reason to have a techno-park. However one reason is common which is to transform the scientific research of university to industrial application (Polat, 2007). As Monck and his friends (1988) have highlighted the linkage between university and the companies could be formed in many ways, such as transfer of people, transfer of knowledge, companies sponsoring the research and access to the university facilities. According to Saritas and his friends, the major goals for techno-park establishment can be summarized as follows:

> Improving new technology based enterprises for economic growth; Turning research and development activities to investments; Encouraging entrepreneurship; Increasing the number and types of economical activities of the region; Promoting technology transfer; Commercialization of the university's inventions and know-hows; Increasing the education capabilities; Generating employment opportunities for the university graduates who stay in the region; Making profit from the park; Creation of employment opportunities which pay higher salaries for the academic personnel, but low salaries comparing to the salaries in the related market; and Developing chances and capabilities for workers. (2006, p. 3-4).

Additionally, as Saritas and his friends (2006) have emphasized that the rationale behind the techno-park application in Turkey can be regulated in law 4691 (2001), which arrange the establishment, operation, management and control of Technology Development Zone, and authority and responsibility of the related people. The aim of this law is to create collaboration between research institutes and industry in order to help the country in "economy, international competition and export trading, production of technological knowledge, develop innovations in products and services, improve the products' quality and standards, improve the efficiency, diminish the production cost, commercialize the knowledge, support the technology based production, leadership and entrepreneurship" (Saritas et al., 2006, p. 12). According to the studies of Saritas and his friends (2006), the law encourages mainly small and medium sized enterprises (SMEs) for highly new technology investments in order to make them invest intensively in technology areas with the permission of the Scientific and Technical Research Council of Turkey. In that way, the SMEs can develop employment opportunities for most young researchers and scientists, while encouraging the technology and knowledge transfer and constructing a well-developed technological structure in order to attract foreign investments (Saritas, Taymaz & Tumer, 2006).

As Saritas and his friends (2006) have pointed out, the firms operating in the techno-parks and the university or the research center associated with these techno-parks are the ones that directly get benefit from the techno-parks. In addition, the city, the region and the entire country benefit from the techno-parks in various ways as it is mentioned in the report of TUSIAD and Ministry of Science, Industry and Technology called 'Vision 2023 Turkish National Technology Foresight Program' in 2006. In the report, it is explained that "Techno-parks create synergy between firms and academic institutions so that the exchange of knowledge, information and even technology between the partners, is stimulated and improved" (TUSIAD Report, 2006). Here, the examples of METU (Middle East Technical University Techno-polis) and ITU Ari are given in order to show the good implementations of the techno-parks. Additionally, as Saritas and his friends (2006) have discussed firms are encouraged to understand and develop the links established between university and industry. Moreover, universities transfer the scientific knowledge and expertise to companies in the techno-parks, which provide an important resource network for firms. In that way, proximity between firms and universities promote the natural exchange of ideas through both formal and informal networks. Furthermore, formal methods contain licensing and cooperative alliances, while informal methods contain mobility of scientists and engineers, social meetings, and discussions. More importantly, tax privilege is supplied to the entrepreneurs with respect to the techno-parks law, which is numbered 4691. For instance, in METU Techno-polis, the tax advantages provided within the scope of the Law of Technology Development Regions are some tax exemptions provided for the companies that are allowed to be active in the region. This situation is explained in the study of Saritas and his friends (2006) as follows:

> (i) The monthly salaries of the R&D staff and software engineers, working in the region, are exempt from the income tax till 31/12/2013.
> (ii) The income generated from the research and development together with software development activities, executed exclusively in the region, is exempt from the corporate tax (income tax from real entity) till 31/12/2013.
> (iii) During that period when the income generated from R&D activities is exempt from income and/or corporate taxes, and services such as the system management, data management, work applications, sectorial, internet, mobile and military command application soft wares are also exempt from value added tax. (p. 34).

Consequently, as Saritas and his friends (2006) have mentioned that the interaction among the firms is promoting, while image and prestige are also supplied in techno-parks to the entrepreneurs. Additionally, consulting services are supplied to the firms from techno-park and university. On the other hand, techno-parks supply some services such as communication, photocopy, and other secretarial services for giving entrepreneurs a chance to use their time more effectively in their major task in order to accomplish firm's survival and growth objectives techno-parks provide shared office services and business assistance including affordable rent and fostering connections with firms inside the incubator and in the local economy. Firms also take help in fields like finance, marketing, and management from the techno-parks so that they reduce consumer research costs. In the mean time, firms can generate new products and processes, which are developed more consumer oriented. Even if techno-parks promote the introduction of radical innovations by firms in the market, this effect is contingent on entrepreneur specific factors, such as work experience in the R&D department (Saritas et al., 2006).

According to the report of the TUSIAD (2010), techno-parks create different benefits for the management of the universities together with the policy makers in Turkey. Universities find financial funds from the governments, which have financial difficulties in supporting the universities. Additionally, the universities' research agenda is becoming related to companies' science and technology demands in the techno-parks where they transfer research finding in science and technology to the private sector to increase their contribution in the innovative ability and capacity. In that way, the competitive performance of the private sector can increase. This situation is explained by Hansson and his friends as follows:

> Technological innovation environment of the techno-parks can provide the catalytic incubator environment for the transformation of pure research into production. Therefore, techno-parks give the academic environment a clear opportunity to start a business to commercialize research. It is reasonable to allege that without techno-parks, most of the academic owned businesses would not have been established in the first place. (2005, p. 27)

Consequently, according to the TUSIAD Report, the techno-parks are taken in to consideration as the engine of the region by the local governments and other organizations, which are dealing with industrial and technical development. They aim to provide an appropriate physical environment to encourage economic development in the specific regions by increasing employment opportunities, like in the techno-parks in Istanbul. In that way, they increase the income level of citizens who live around the techno-park as it is seen in ITU (Istanbul Technical University's techno-park called ARI Kent). Moreover, reindustrialization takes place in regions where the techno-parks are established, particularly in the small regions. Regional development occurs also in zones where the techno-parks are constructed as in Izmit. Education level of region is increased because of the research environment as in METU. According to the report of the Ministry the benefits of techno-parks to the country are seen particularly because of close relations between the universities and the private industries. They are taken into account as having mutual benefits in order to improve the countries' industrial competitiveness. In that way, the development of higher education institutions, as techno-parks is to encourage innovation and production in country, while decreasing the unemployment rate of the country and increasing the image and prestige of the country in the world. The government's expectation is that science and technology level of the country is gone up also among other countries of the world, particularly in the region of Eurasia. They want to increase the number of specialized labor force as a result of techno-park application. Consequently, as the TUSIAD has highlighted, Turkey can be open to international markets until the 2023 by reaching US$ 500 million of export capacity (TUSIAD Report, 2010). However, all these new changes have dramatically drain the power of the universities in teaching and making research, while transforming the purpose of the higher education. In other words, the universities are taken into account as the engine of the accumulation of the capital in the competitive market where they serve their opportunities and facilities to the private sector rather than they work to decrease social inequalities and injustice. In order to understand better, the legal mechanisms and arrangements related to the techno-parks are problematized in the following title.

Legal Background of Technology Development Zones

As Polat (2007) has clearly highlighted in his study, the techno-park law numbered as 4691 was accepted on 26th of June in 2001 while the practical applications were started in 2003 by the decision of the Turkish government. According to Polat (2007), the major aim of this law is to create collaboration between research institutes and industry in order to help the country in economy, international competition and export trading, production of technological knowledge, develop innovations in products and procedures, increase the quality or standard of product, increase the efficiency, lower the cost of production, commercialize the information, support the technology dense production and entrepreneurship, adaptation of small and middle scale enterprises to new and high technology, generate investment capabilities in technology dense areas with the permission of the Scientific and Technical Research Council of Turkey (TUBITAK), create employment opportunity to the people who are researchers and scientists, help the transfer of technology, create a technological infrastructure which helps the entrance of foreign capital. This law contains technology development zones institution, process, management and control and related people and institutions' duties and responsibilities (Polat, 2007). The technology Development Zones Law (Law No.4691) dated 26.06.2001 was revised by the Law No. 6170 dated 02.03.2011 (TUBITAK Report, 2012). In the enforcement of this Law, taken from the web page of the Ministry of Industry, following definitions are used which is given as follows:

> a) Ministry: Ministry of Industry and Trade,
> b) Technology Development Regions (Region): Techno-park where the companies which make use of high/advanced technologies or engage in new technologies produce/develop technology or

software using the facilities of a particular university, high technology institute or R&D center or institute, where they operate to convert a technological invention into a commercial product, method or service, whereby contributing to the regional development, within or nearby the area of the same university, high technology institute or R&D center or institute; the site where academic, economic and social aspects integrate or having such characteristics,

(Amended: 2/3/2011 –6170/ Art. 1) Research and Development (R&D): Increasing the knowledge comprised of research, development, culture, human and society and creative studies which are carried out on a systematic basis for its use for the purpose of new process, system and applications including software,

Research and Development (R&D): Increasing the knowledge comprised of research, development, culture, human and society and creative studies which are carried out on a systematic basis for its use for the purpose of new process, system and applications including software,

R&D Centre or Institutes: The public places where R&D activities are carried out for technology and product development also including machinery, hardware and software depending on the trained qualified labor force and recent modern technologies,

Production Units: Types of production which are established and used by real or corporate bodies operating in the region in accordance with the aim of this Law, which are new, based on new technologies and environment-friendly,

Entrepreneur: Real or corporate bodies who use or wish to make use of the services and opportunities in the region.

Innovation: The processes or the outcome of the processes which can respond to the social and economic needs, can be efficiently introduced to the existing markets or create new markets; which have been developed with a new product, good, service, application, method or the idea of a business model,

Innovation of a Product: The product which has technological variations in the essence in terms of its material, parts and functions, when compared to the previous product,

Innovation in Production Methods: The method, which is used for the production of products that are not produced in conventional production facilities, for the production of new or developed products or the production of products still being produced with the new technologies,

University: Universities which have completed their establishment in terms of labor force and technical equipment in engineering and basic sciences and have been approved by the Higher Education Council that they have sufficient academic staff at the level of PhD,

Founding Committee: The Committee comprised of the representatives of at least one university or high technology institute or public R&D center or institute and other organizations, being responsible for the establishment of the Region in the process

up to the establishment of the regional managing company at the level of relevant institutions and organizations in the province where the region is located,
Managing company: The company which has been established as an incorporation in line with this Law, which is responsible for the management and operation of this Region,
Software: All products and services such as the series of commands ensuring the operation of a computer, communication device or another device based on information technologies, or the relevant operations regarding the data provided, or the programs, their code lists and the documents also including the operation and user guides, in a systematic order, and all of the types of delivery including the licensing, renting and transferring with all rights of these products, goods or services.
R&D Personnel: Researchers, software developers and technicians directly involved in R&D activities,
Researcher: experts having at least bachelor's degree who are involved in design and formation of new knowledge, product, process, methods and systems and management of relevant projects in the projects within the scope of description of innovation and R&D activities,
Technician: Persons with technical knowledge and experience who got higher education in engineering, physical and medical sciences or graduated from technical, science and medical departments of vocational high schools or vocational schools of higher education,
Support Personnel: Personnel like manager, technical employee, laboratorial, secretary, worker etc. who participate in R&D activities or are directly related to these activities,
Software Developer Personnel: qualified personnel who have adequate level of experience and training in their fields and who work in software process and develop and produce programs,
Incubator: Structures where office services, equipment support, management support, access to financial resources, critical work and technical support services are provided for entrepreneur firms under the same roof in one center especially in order to improve young and new enterprises,
Technology Transfer Office (TTO): Structure providing activities for informing and coordination among technology developer R&D institutions and organizations and technology user industrial corporation or among other technology and R&D institutions and organizations, directing the research, encouraging formation of new R&D companies, improving cooperation, protecting, marketing and selling intellectual property rights, management of incomes gained from selling intellectual property,
Technology Product: Product that is formed by qualified labor force using scientific knowledge and technologic researches, which is differing from the existing one on a significant scale and whose added value and competitiveness are high. (The Ministry of Industry, 2012).

The changes in the law have changes the arrangements and mechanisms at the techno-parks as well as at the universities. Therefore, it is important to understand critically the changing mechanisms and the arrangements in order to analyze the effects of these new mechanisms on the higher education. In the following title, this subject is critically problematized, by overviewing the related documents and the research studies.

New Arrangements and Mechanisms related to the Techno-parks

According to the last arrangements, as Saritas and his friends (2006) explain in the report related to the "Vision of 2023", at least one university or higher research institute in the same region or city with the techno-park must be a member of the techno-park management corporation. These institution or establishments can join the techno-park management corporation. Other institutions can also join the techno-park management corporation. For instance, chamber of commerce, local governments, banks, finance institutions, native and foreign corporations, R&D firms, associations, related state institutions, export unions can be member of the techno-park management corporation. Additionally, foreign corporations have to take necessary permissions, which are described in law 6224. This law is related to the incentives for foreign capital (Saritas et al., 2006).

Furthermore, the mechanisms and the applications related to the supervision, supports and exemptions are given by TUBITAK (2011). According to the Report of TUBITAK, the activities and applications of techno-park management corporation and entrepreneurs are controlled by Ministry of

Industry and Commerce. Expenditures, which are necessary for the establishment of the techno-park, are supplied by the ministry budget in a situation which expenditures cannot be financed by techno-park management corporation. Techno-park management corporation exempts the taxes, tariffs, and expenses in transactions which are related with the application of this law. Firms, which are in techno-park, have the advantage of income tax and institutions tax. These firms are exempt from income and institutions taxes for incomes, which come from software products and production activities depending on R&D research, for five years from their starting date in the techno-park. However, the council of ministers can increase the period of this time up to 10 years for special regions and products. Salaries of personnel who are researchers, software developers, and R&D personnel are exempt from the tax up to ten years starting from the establishment of the techno-park. Techno-parks, which were established before this techno-parks law, are accepted as Technology Development Zone and they can also get benefit from the all exemptions, incentives, and supports, which are supplied by this law (TUBITAK Report, 2011). Napier and his friend (2003) explain that the first and major aim of the techno-park in Turkey is nurturing the small and middle enterprises or new start-ups, as well as for firms to conduct research and development or technology transfers, and produce or assemble advanced technology products. The orientation of techno-parks can simply be categorized with respect to the goals and functions of the institution as given below by Napier, Serger & Hansson (2004):

> In Turkey, policies devoted to support and develop enterprises rely on the principle of ensuring constant development of the SMEs, and supporting innovation activities so that they can compete in the global market. This work is ensured through a

> network of public and semi-public organizations. The organizations are mainly structured as national organizations operating under the supervision of the national government. Some of them are managed jointly with members of other public or private institutions. In short, national organizations provide support to SMEs through networks of local support centers (Small Enterprises Development Centers and Technology Development Centers), Universities, Banks, Unions, and Associations (EICC Local Business Consultants System) Private associations of companies sometimes provide SMEs support services locally, or specifically depending on the industry‘s sector. (2004, p. 25).

Furthermore, according to Napier and his friends, Turkish policy is about innovation/incubation oriented techno-parks. This kind of techno-parks tries to stimulate the industrial innovation and technology development; hence, they generate an environment to attract R&D personnel from universities and research institutes. Innovation/incubation oriented techno-parks are usually seen around the universities and research institutes in Turkey to have better position in technology-based economies. According to Saritas and his friends (2006):

> The aim of these institutions is creating technological information through the cooperation of universities, research institutions and the productive sector in order to give industry a structure for international competition and export - introduce innovations in products and production methods - raise the quality or standard of products - increase productivity; decrease the costs of production - commercialize technological knowledge - support production and entrepreneurship - enable SMEs to adapt to new and advanced technologies - create opportunities of investment in technology intensive areas by taking into account the decisions of the Science and Technology Higher Council - create job opportunities for researchers and qualified persons - help the transfer of technology - provide the technological infrastructure which will quicken the entry of foreign capital which, in turn, will provide advanced technology. Since its inception, the law has lead to the establishment of several new Technology Development Zones (TDZs) throughout Turkey. (p. 20-34).

Furthermore, as Saritas and his friends (2006) mention, there are important public and private institutions, given in Table 15, which have been supporting innovation and SMEs in Turkey.

Table 15. Selected Public and Private Organizations Supporting Innovation and SME Development In Turkey (Saritas et al., 2006).

Organization	Description
Auto Industrialists' Association (OSD)	The objectives of the OSD (formed in 1972) are to promote the improvement of the industry and the production of motor vehicles, to contribute both to the automotive sector and to the national economy, to study the problems of the sector and other joint matters, to handle and follow-up all surveys and collective works done on behalf of the sector, and to represent the sector and its members before all public authorities and institutions.
Competitive Advantage Turkey (URAK)	Competitive Advantage Turkey is primarily working with cluster development and knowledge transfer to the local business environment throughout Turkey
Confederation of Tradesmen and Artisans of Turkey (TESK)	The most important establishment binding together small enterprises. The unions act to promote a variety of interests of its members as lobbyists and are instrumental in setting up cooperatives for building industrial estates. In some instances, they are involved in training their members. The unions are organized at the regional level in regional associations, which represent all crafts and professions, and act as channels of communication. At the national level, all the regional associations form TESK.
Export Promotion Center of Turkey (IGEME)	IGEME was established to prepare reports on the development of trade in foreign markets, coordinate the business relations on national and foreign companies and organize fairs.
Foreign Economic Relations Board of Turkey (DEIK)	DEIK wash founded in 1986 by TOBB, TUSIAD, the Turkish Foreign Trade Association, the Chambers of Agriculture, the Association for Foreign Capital Coordination, and Istanbul and Izmir Exporters Unions in order to participate in improving Turkey's external economic relations, and facilitating Turkey's integration with the world economy through bilateral business councils.
Foreign Investors' Association (YASED)	YASED is a private organization formed in 1980 whose members are business professionals from international companies operating in Turkey. Its members share a common vision and work proactively to promote a better business environment by providing information and consultation, promoting networking and communication, developing better communication channels and coordination with other organizations in the business community, and supporting initiatives through lobbying for the harmonization of Turkish legislation

Table 15. Selected Public and Private Organizations Supporting Innovation and SME Development In Turkey (Saritas et al., 2006) (Contined).

Organization	Description
Marmara Research Centre (MAM) Table 14. Continued	MAM was established in 1972 as the first R&D institute of TUBITAK. It conducts contract research for industry in the fields of materials and chemistry, ICT, genetic engineering and biotechnology, energy systems and environment, food technology, and earth and marine sciences. MAM also operates an incubator and a technology park/free zone for high-tech enterprises.
Medium and Small Enterprises Board (OKIK)	The OKIK was established in 1988 under the sponsorship of the TOBB in order to act as an Advisory Board. OKIK is composed of executives and a large number of representatives from Government agencies.
Ministry of Education, Department of Apprenticeship for Vocational and Technical Education Development and Expansion	This department is mandated by law to open apprenticeship training centers in industrial estates having more than 100 enterprises. The centers offer technical/theoretical training as well as vocational/practical training, satisfying needs of SMEs. This department reports to the Ministry of Education.
Ministry of Industry and Trade	The Ministry of Industry and Trade is responsible for studies to facilitate and encourage the activities of SMEs, prepares credit possibilities for Industrial Estates and Organized Industrial Zones, and determines the objectives for the Turkish Industrial Policy. Patent institutes under the ministry coordinate all the activities related with the registry of patents and trademarks.
National Productivity Centre (MPM)	The MPM was established in the early 1950's as a public agency in order to improve the productivity of industrial enterprises. The center provides services to individual enterprises and its activities are geared towards all enterprises without any priority.
Prime Ministry Under secretariat of Foreign Trade	The Under secretariat is responsible for creating legislation and regulations in order to provide transparency, a standardization of the legal base and create harmony with the EU's trade policies.
Science and Technical Research Council of Turkey (TUBITAK)	TÜBITAK, founded in 1963, is the supreme organization in charge of promoting, developing, organizing, and coordinating R&D, regarding Turkish exact sciences fields, in line with national objectives in economic development and technical progress. TUBITAK functions under the coordination of the Prime Ministry and is a government Institution. It supports, encourage and coordinate scientific research by supporting R&D activities and innovations in industry, promoting university-industry collaborations, and establishing techno-parks to facilitate their realization and by providing scholarships and other support to researchers, and organizing contests to discover and train future scientists Governance.

Table 15. Selected Public and Private Organizations Supporting Innovation and SME Development In Turkey (Saritas et al., 2006) (Contined).

Small and Medium Industry Development Organization (KOSGEB)	KOSGEB was established in 1990 and is a public agency associated with the Ministry of Industry and Trade. KOSGEB is a semi- Governmental institution, public corporate subject to private law, and affiliated to the Turkish Republic's Ministry of Industry and Trade KOSGEB helps SMEs adapt rapidly to technological innovations by means of enhancing their efficiency, as well as, their competitive capacity in order to increase their contribution to the National economy. The organization is structured as a Network of support centers and offers Technology Development Centers (TEKMERs), operate as "Business Incubators" aiming to support technology oriented development. Using strong support mechanisms, these centers seek to create new technology-oriented enterprises and to establish suitable infrastructures (for enabling these enterprises) to develop volumes and perspectives supported by consultancy in managerial, technical, and administrative areas.
Southeastern Anatolia Project Regional Development Association (GAP)	The Southeastern Anatolia Project (GAP) is a multi-sector and integrated regional development effort approached in the context of sustainable development. Its basic objectives include the improvement of living standards and income levels of people so as to eliminate regional development disparities and contributing to such national goals as social stability and economic growth by enhancing productivity and employment opportunities in the rural sector.
State Institute of Statistics (DIE)	DIE provides Statistical information related to SMEs. DIE has indirect help for marketing activities of SMEs both at the business planning stage and in further development stages by conducting specially designed household surveys at short intervals and quickly processing them.
State Planning Organization	The State Planning Organization (SPO) is responsible for the overall targets and strategies for national and regional long-term development, including pre-EU accession economic programs and Turkey's national program for the adaptation of the EU Acquis, as well as innovation question.
Supreme Council on Science and Technology (BTYK)	Operating at an inter-ministerial and consultative level, the BTYK annually decides on the action plan for implementation of STI policy. The BTYK designates the responsible bodies and coordinators for each policy measure. BTYK is chaired by the Prime Minister and composed of government ministers and undersecretaries and representatives of other organizations including TUBITAK and TOBB.

Table 15. Selected Public and Private Organizations Supporting Innovation and SME Development In Turkey (Saritas et al., 2006) (Contined).

Technology Board	The Technology Board was established by TOBB in 1995 in order to prepare industry for the 21st century pushes towards university-industry collaboration. The Technology Board is comprised of representatives from the Ministry of Industry and Trade, YÖK, TÜBITAK, DPT, KOSGEB, Istanbul Technical University, Bogazici University, Middle East Technical University, Aegean University, Nine September University, TTGV, and 11 members of Industry Chambers.
Turkish Foreign Trade Association (TÜRKTRADE)	Established in 1986, TÜRKTRADE undertakes research studies on the development of Turkey's export capacity; prepares reports on the formulation and implementation of foreign trade policies; identifies problem areas and submits appropriate proposals to the related public institutions. TÜRKTRADE communicates to its members trade information on markets, products and business opportunities from international and domestic sources; hosts foreign trade missions from abroad; provides educational programs and workshops on foreign trade techniques; organizes seminars on international trade issues; publishes reports on economic sectors and services related to foreign trade..
Turkish Foundation for Small and Medium Business (TOSYÖV)	Turkish Foundation for Small and Medium Business - was founded in Ankara on February 21, 1989 for the purpose of providing support and service to more than 200.000 Small and Medium Enterprises (SMEs) in Turkey.
Turkish Industrialists' and Businessmen's Association(TUSIAD)	Formed in 1971, TUSIAD, in accordance with its mission and in the context of its activities, initiates public debate by communicating its position supported by professional research directly to the parliament, the government, the media, international organizations and other states.
Turkish International Cooperation Agency (TICA)	TICA was established in 1992 to promote economic, technical, social, cultural and educational cooperation programs; to contribute and to coordinate activities of public and private organizations involved in international cooperation; to negotiate contracts and make arrangements with national, regional and international financial organizations and financial markets in order to secure necessary funding for the realization of programs and projects; to provide technical support to the future Development Banks to be established in the Black Sea region, South East Europe and Central European Countries.
Turkish Patent Institute (TPI)	Turkish Patent Institute is a special Government authority connected to the Ministry of Industry and Trade and is organized as a government authority having administrative and financial autonomy. It is a young and dynamic institution that has been established in 1994 in accordance with the decree Law n° 544. TPI strives at protecting industrial property in Turkey.

Additionally, according to the TUBITAK Report (2010), in the techno-parks, knowledge-based activities, such as R&D intensity, human capital and specialization in high-tech activities are expected by the government in order to increase the economic power for regional competitiveness. In most of these companies, highly specialized personnel have been working for the software exporting industry, including small/medium entrepreneurs and individuals working in the related areas because they are comparatively more economic to establish, whereas the profit rate is high; in other words, most entrepreneurs invest minimum amount of money, while they increase their profit in a short time of period. This is also very easy for the incubation in the techno-parks, which are explained by Saritas and his friends (2007).

According to the Report of the Science, Technology and Industry Ministry (2012), the percentages of the industries at the techno-parks in Turkey are given in the Figure 26. As it is seen from the graph, 57% of the SMEs activities are in software development. The second important industry is electronics, whereas the third industry is about the military and defense. The other industries are significantly week comparing to the software development industry.

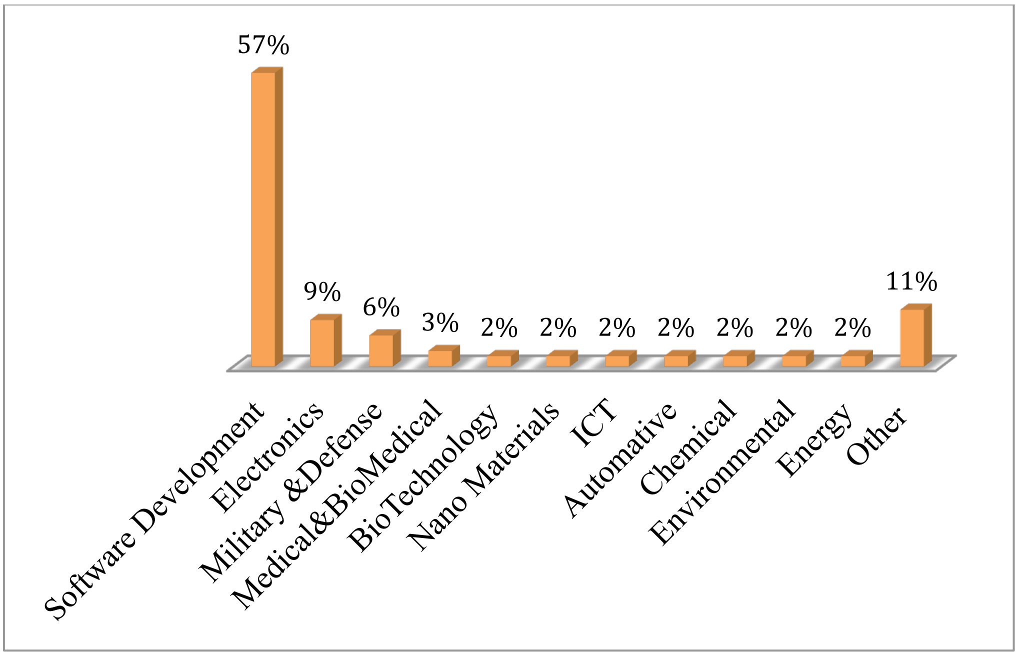


Figure 26. The Percentage of the Companies in the Techno-parks related Industries.

Moreover, as in the Report of TUBITAK is given, in the research and development oriented techno-parks, the main goal is to develop and innovate the technologies mostly related to industry, or to promote industrial upgrading. Attraction of firms, which operate in a region, and evaluation of measures are the major key elements in order to encourage firms to participate in research and development. The best place for this kind of techno-parks is near universities or research institutes, but they are actually oriented on short-term businesses as software development for ICT sector. As seen in Figure 26, most companies which are involved in software development do not need any capital investment, but they use the benefits of techno-parks, particularly in terms of tax and human capital. They have strong connection with the ICT sector in the world, so they sell the developed software programs without any control. This paradox is clearly seen also in the numbers of the patents which have been received since 2001. Alcatel-Lucent, for instance, offers access to its worldwide portfolio which includes approximately 29,000 issued patents through a licensing. However, in 43 different techno-parks, there are only 301 patents registered as it is given in the Figure 27 (The Ministry of Science Technology and Industry Report, 2012).

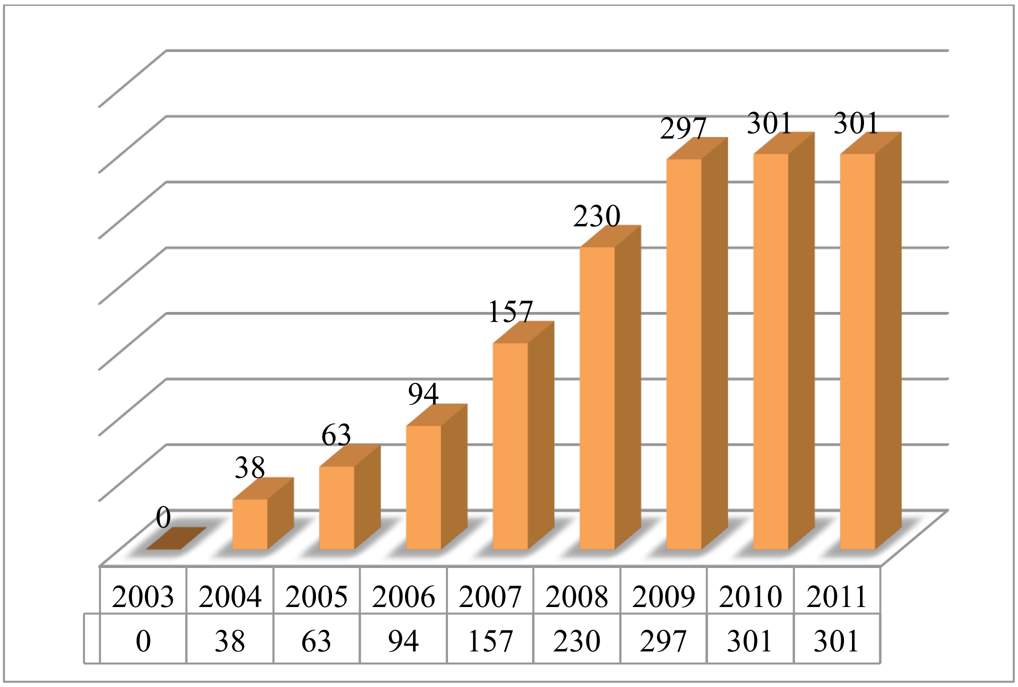


Figure 27. The Number of the Patents registered from 2003 to 2011 (Ministry of Science Technology and Industry Report, 2012).

The issues related to foreign investment have become important in the last decade. According to Saritas and his friends' studies (2007), the techno-parks are established where certain universities, hi-tech institutes and research and development organizations collaborate with high-tech or high-tech targeting commercial companies in order to create a competitive technology-based industry. In that way, it is possible to procure the technological infrastructure to attract more foreign capital in high-technology fields. The number of the foreign investment has increased as it is seen in the Figure 28, but the number is under the targeted numbers declared by the TUBITAK Report (2011).

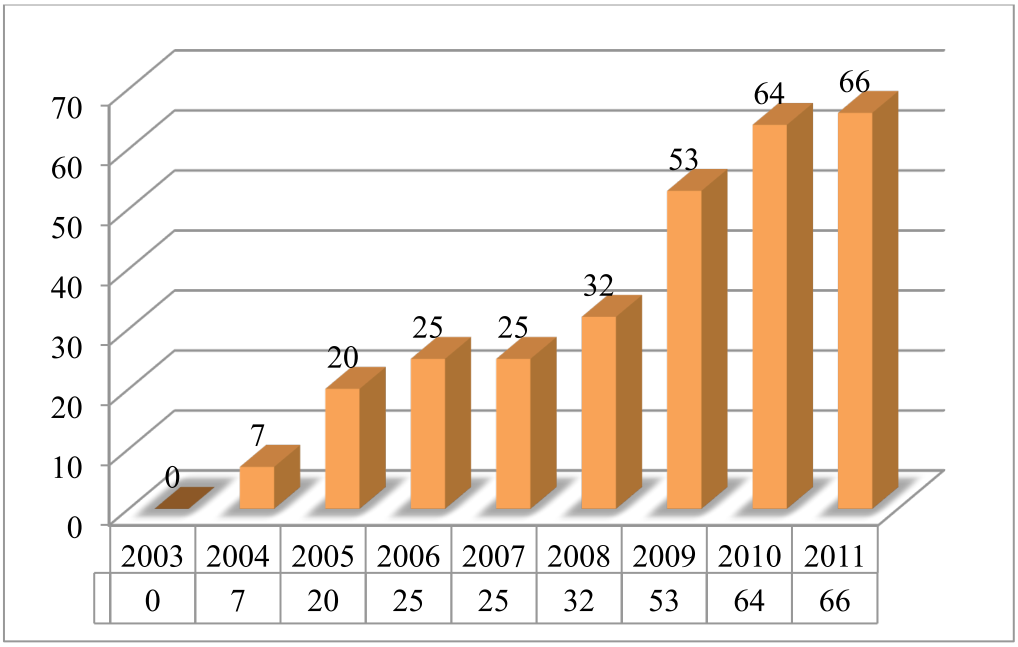


Figure 28. Number of Foreign Companies in the Techno-parks.

Polat (2007) has explained the arrangements and mechanisms related to foreign investments as follows:

> A techno-park is established as a site where academic, economic and social structures are integrated. Its aim is for high-tech companies to develop technology and software and carry out R&D by utilizing the facilities of a university or a high-tech institute or R&D center/institute of which it must be located in or near, to convert technological innovation into products or service and to encourage direct foreign investment. Applications for the establishment of a techno-park are made by the Founding Committee, one of whom the shareholders must be a representative of either a university, high technology institution or a R&D center in the area in which the techno-park is located. Foreign private legal entities may also be members of the Founding Committee in addition to members of local government, banks and financial organizations, Chambers of Commerce and Industry, to name a few. The final decision regarding the establishment of a techno-park is made by the Council of Ministers. Members of the Founding Committee are also the shareholders of the Management Company. Therefore, a foreign private legal entity may also be a founding shareholder or may later become a shareholder of the Management Company. Although the Articles of Association of a company are not generally subject to prior authorization according to the Turkish Commercial Code, it is required for the Articles of Association of the Management Company to obtain advanced authorization from the Directorate General of Research and Development. (Polat, 2007, p. 4)

It is also mentioned in the Report of “Vision 2023” of the Ministry that the Technology Development Centers provide for the ability to employ foreign directors and qualified research and development personnel in the techno-parks to encourage foreign investment (TUBITAK Report, 2010). As Saritas and his friends (2007) clarify, according to Corporation Tax No 86, 40% of the R&D expenses spent by Companies (including Techno-parks) shall be subject to a Revenue/Corporation Tax Abatement unless the entrepreneurs benefit from the Revenue/Corporation Tax Exemption for their earnings concerning their R&D and software activities in Techno-parks in compliance with TDZ. In addition to the above exemptions and support, the SME’s (Small and Medium Size Enterprise) also benefit from non-repayable techno-park rent subsidies and financial support for the construction of production plants and R&D offices in Techno-parks in accordance with the Regulations for the Support of Presidency of Small and Medium-Scale Industry Development and Support Administration (KOSGEB) (TUBITAK, 2010; Saritas et al., 2006).

Finally, as given in the Report of TUBITAK (2010), there are also non-repayable support for various R&D activities granted by Presidency of Technology and Innovation Support Programs (TEYDEB); the interest-free credits granted to companies entitled to a certificate of industry register or to software companies for various R&D activities by Technology Development Foundation; and long- term credits with low interest rates given by the European Investment Bank, as other important incentives to companies in Techno-parks (TUBITAK, 2010).

The services provided in the techno-parks are also arranged by the arrangements and the mechanisms that are regulated in the law. According to

Saritas and his friends (2007), techno parks have been established not only in Ankara and Istanbul but also in different regions of Turkey such as Izmir, Eskisehir, Konya, Kayseri, Kocaeli, Antalya and Mersin to improve entrepreneurial activities in these regions. Additionally, the techno-parks provide various consultancy and incubator services as well for the SMEs. The EU center, venture capital consultancy, access to financial and donation sources consultancy and life- long education center are the main services that companies may benefit from the techno-parks, like in Kocaeli. Moreover, the Ankara Cyber park, incorporated with the participation of the Bilkent University, offers specialization in the fields of nanotechnology, financial consultancy, Labor Law, trademark, patent and tax management consultancy, business and project development consultancy, enterprise consultancy and human resources. At the Arı Teknokent, Istanbul Technical University's Techno-park, technical and legal consultancy, marketing consultancy, information technologies consultancy, publicity and advertisement consultancy, venture capital consultancy, permanent education services and incubator services are available. The Gebze Organized Industrial Zone Techno-park (not regulated by the TDZ Law No: 4691) has been established with contribution from Israeli Stef Wertheimer in cooperation with foreign capital. Its most important service is the entrepreneur development program. In this program organized by Sabanci and Tel Aviv Universities, entrepreneurs benefit from assistance in business planning, feasibility preparation, marketing and management strategies development in accordance with their needs. In conclusion, according to TUBITAK Report (2010) due to the hybrid defined under the TDZ and the establishment of techno-parks in various parts of the country, Turkey has taken a crucial step forward in its technology-centered industrial and economic policy. The support and exemptions provided by the techno-parks to both foreign and domestic entrepreneurs as well as the high quality services will encourage more entrepreneurs to invest in techno-parks (TUBITAK, 2010).

In this part, by taking into account the first five research questions, the phenomenon of the effects of the techno-parks on the transformation of the higher education is critically understood, explained, and problematized from the perspective of the first three levels of the “Education Questions” in the “Multi-Scalar Governance of Education” Analysis. Thus, the increasing importance of the techno-parks for Turkey’s economic development has been redefined the role of the universities. In other words, the main purpose of the universities has been changing within this period on which most of them are becoming more focused on these kind entrepreneurial aspects rather than improving the quality of education as social justice. In the following part, the ten research questions are articulated critically by gathering data from the experiences at the techno-parks in Turkey.

Second Part

Experiences in the Techno-parks in Turkey

In the second part of this study, however, the transformation of the higher education by means of the techno-parks is critically studied by using the empirical phenomenological research. In that way, comprehensive descriptions related to the experiences are gathered by asking open-ended questions and dialogue to the participants who are working at the techno-parks. In the second part, the experiences are collected in two different ways. In the first way, the open ended questions are asked to the participants at four different techno-parks where they critically problematize the same questions given in the first part. In other words, the data, which gathered from the documents, are rechecked from the experiences in order to have the insight about the phenomenon. In that way, as Level 1, called "Educational Practices" (Dale& Robertson, 2010), the experiences of the participants related to the development of the techno-parks are critically analyzed. Additionally, the experiences of the participants related to the science and technology policies and national strategies that shape and organize the techno-parks are critically analyzed together with the university-industry-government partnership as a mean of the capital accumulation process. In that way, by means of these two research questions, Level 2 of "Education Question" is problematized as Dale and Robertson called the level of "Educational Politics" (Dale & Roberson, 2010). Furthermore, the experiences of the participants related to the academic labor force within the university-industry-government partnership are critically highlighted together with the arrangements and mechanisms of the techno-parks that promote the university-industry-government partnership. Hence, Level 3, called "Politics of Education" (Dale and Robertson, 2010) has been strategically analyzed. In the light of the three levels, the phenomenon of the transformation of the higher education by means of the techno-parks in Turkey has problematized by asking the experiences of the participants.

In the second section of the second part, the different open-ended questions are asked to the focus group participants at two different techno-parks where they critically problematize their experiences as the outcome of the phenomenon. According to Dale and Robertson (2010), the last level of the analysis called Level 4, "Educational Outcomes" which critically analyzes the outcomes of the phenomenon of the transformation of the higher education by means of the techno-parks. In that way, by asking critically the experiences of the focus group, economic, educational, cultural, and spatial inequality are problematized together with the segregation in gender, fields, and space in the context of the urban redevelopment. Furthermore, the effects of the techno-parks are answered from the economic, educational, political, and cultural transformation standpoint in order to understand how the techno-parks have been changing the purpose of education while creating inequalities and social injustice.

Experiences related to the Development of the Techno-parks

In Level 1, the "Educational Practices" (Dale & Robertson, 2008), the practices and processes related to education issues are taken explicitly into account by asking of these higher education transformations: "what, where, how and why, when, where, by/from whom, under what circumstances and broader conditions, and with what results?" (p. 9). Additionally, how, by whom, and for what purposes these transformations occurred are specifically examined in order to evaluate the practices and the processes in the techno-parks. Hence, the first research question, "How do techno-parks develop in Turkey?" is problematized using Level 1 of the "Education Questions" in the analysis. The related sub questions of this study are given in the Appendix B in Turkish and Appendiz C in English.

In this part, the research question related to the development of the techno-parks is posed to the participants at the four different techno-parks. Each of them has different experiences regarding the changes and challenges. However, most of them do not directly mention that these changes and challenges have been transforming the higher education. Most participants are happy to be involved in the activities in these techno-parks. They have some complains and critics regarding the implications. Some of them have played important roles in the development of the techno-parks since they were established. One of the Interviewee, I BA2, mentions that he has different experiences related to the techno-park where he has been working. He has been involved in all aspects of the development. He critically shows how the techno-parks have been used for the purposes of the SMEs. Additionally, he has observed how the funding of the government has wrongly used and invested at the universities. According to him, learning environment is different than the learning environment of the university. As he ironically claims:

> In the techno-park, informal learning is much better and different than at the university, particularly in understanding values and beliefs of the people, of the system, of the university administration, of the private sector and of the government (I BA2).

Additionally, the facilities of the universities have been used for the purposes of the SMEs, but they do not see any problem to use them. Particularly, the laboratories of the universities have been used for the companies in the techno-park since it was established. For instance, the manager of the techno-park D strongly points out how they are good in developing the innovation because they have access in using facilities at the universities. Even at the campus of the university, the private sector has built and opened its own buildings. Additionally, the partners from the government have special agreements related to the techno-parks where they have been renting the places of the university, but the income is not taken by the university. The history of the techno-parks clearly shows the stages of the political decisions. It is no doubt that the expectations from the government as well from the private sector can be seen directly from the investments and authorities that the private sector has. The shift from the public to private can be easily seen because the facilities of the universities, particularly those in the public universities have been given to the service of the private sector. Or the best universities open new laboratories just for the private sector in order to earn money and create income for the university. As the Interviewee DA3 clarifies:

> There are university laboratories in which firms can use only because they have strategic information, equipment, and technical people. By giving these laboratories, the university is gaining other opportunities, like rent income and reputation. Additionally, their professors and academics can be part of the R&D and they publish partially these research studies. ın the long run, the universities can gain good places in the ranking list of the universities. But more importantly, people have networks for the projects. The environment gives highly intellectual opportunities related to projects, tests, prototypes, products and services. In other words, the private and industrial sector improves strategically the knowledge of the university. In the mean time, the investments have been done in right sectors by means of the advanced technology. As a result, the number of the highly intellectual experts can be increased in the industry as well as in the universities. Consequently, highly technological products and services which are efficiently produced can be sold in the competitive global market. For that reason, in these days, the demand of the government is related to the highly qualified technological goods and services to increase exports.

Additionally, for some academics, working at the techno-parks is easier compared to the university, particularly when they want to conduct research. In the last decade, most research projects have conducted at the techno-parks rather than at the university. It is stated by academics that administration of the techno-parks is more eager to listen to your proposals or suggestions. According to one interviewee, I DC1, the situation is explained as follows:

> I have worked at the university since 1989, so I can make a clear comparison. When working in the departments, I always face problems regarding funding, finding right people, distribution of the money, paying large part of the budgets to the university. Let’s say you want to conduct a project related to the technology, you can never do it smoothly. At the techno-park, however, this is not the case; if they do believe that what you want is worth doing, you can convince the administration to conduct different research based projects since the procedures are much easier than the procedures at the university. Soon, you will see that most of the research projects will be conducted at the techno-parks rather than at the university (I DC1).

Participants of the study seem to believe that people who are working at the techno-parks have been using efficiency concepts. In other words, they take their duties more seriously. The administrative structures are different than the university and in the process they have become like in the corporations. The Interviewee BC1 has highlighted this situation as follows:

> Also, people who are working here are more dedicated to their work. For example, the administration sent a project to write it. After people in the techno-parks had received, they wrote a thousand pages in a week and they put online. I do not think that it would be happened at the university where things can’t be happen so fast. It was not like this at the beginning, but the power of the administration has gradually increased. Hence, the system has become, like in the private sector (I BC1).

All the data collected from the participants show that, the working conditions at the techno-park are different than at the university. Most of them have already become a part of the neoliberal policies, but they are not aware about the pig picture related to the development of the techno-parks. As is known, the techno-parks in Turkey have established mainly for ten years and their activities have become more significant since 2005. They are strategically involved in in applied research and development rather than basic research, like at the universities. Furthermore, some of the best ones have new start-ups and incubator facilities to increase value of the R&D-based products and services.

The participants agree that the development of the techno-parks is related to the development of the other techno-parks in the world. Most universities are involved in the technology-based activities in the world, especially those in the US. As the manger (I DA2) of the well developed techno-parks emphasizes:

> New economies empowered partnerships and interactions between universities and industry. I think that these relations have become more complex since 2003 and will become even more complex in the coming decades. Since the technology-based economies are the main pioneer, the university and the corporation has become as one institution. By the way, people ask whether such new economic change is desirable or not. I think that the answer is not clear. However, there are many different new policies that manipulate partnerships between universities as R&D institutions and the industry. Of course, there are not only private but also public and non-profit institutions that are involved in these partnerships in the techno-parks. The main reasons of the partnership are related to the costs so that the new policies try to increase benefits of the corporations by decreasing research time and costs. Additionally, the effects of the new policies have direct commercial interests at the techno-parks, but I am not sure about the benefits for public interest. Even though the governments try to upgrade the economic level of the countries, the regional differences are not only related to economic reasons, but also social, cultural, and even educational. I think that the effects of the techno-parks are much more serious than we think on the academic missions of universities because the changing dynamics of the innovation system have manipulated the university and academic environment. Even though it looks great at the first glance, “in the kitchen of the universities” there are many different issues that have created the pressure on the academics, the administration and even the students (I DA2).

After the science and technology policy were initiated by the Turkish government, even after the Incentives 2012, the main purpose of the techno-parks is to increase the technological potential and capacities, including resources for R&D, higher education institutions, and SMEs. In that way, it is possible to develop highly new-technology based products and services by establishing technology-oriented firms and by commercializing innovations as the major national science and technology programs. Additionally, the techno-parks could strategically increase new and highly developed technology based products and services to commercialize and to take place in the global market. However, according to the participants, some of the techno-parks could not help for the development of technology-based economies because they are not going to reach the technological development in the world, as the Interviewee who studied and worked in the US has emphasized:

> I studied and received my PhD in the US. I have still many connections. I visit their techno-parks as well. The Research Triangle Park of North Carolina, for instance, turns fifty and more than 40 parks are twenty-five years old. Imagine the organizational background of their techno-parks. Since 2000s, thinking about the next twenty years of change and innovation, I believe that we should work hard and we should have a strategic plan to be successful in the development of the technology-based products and services. It is not easy. Here, the techno-parks have name, but not the function. The new places have been established with hope; however, most of them do not have strategic planning because of the lack of the highly qualified personnel. We are lucky because ewe have connections and experiences at the different techno-parks in the world. In Turkey, most of the techno-parks that I have visited so far are only just simple buildings where they work like office buildings for the SMEs. Instead of producing technology and innovation, they have become the open places to use the incentives of the government (I DC2).

Another participant who comes from academic world agrees that techno-parks are the new places to transform knowledge to economic commodity, but it is not easy in these changing economic conditions. However, under the name of the techno-parks, the benefits have been taken by the private sector, rather that the university. In the past, most opportunities have been channeled to the private industry by using the universities. This situation has become even worse in the last decade. According to him, the situation is explained as follows:

> Some of the university techno-parks could catch and develop technology which helps for the economic development of the region. But, comparing to the efforts of the other countries, I do not see chance for small universities, particularly those in Anatolia. They have limited resources of in developing vision because of lack of qualified people in these subjects. For instance,

> we do not have PhD programs in order to replace the right people to encourage the technological development. However, those who had taken scholarship to study abroad preferred to work in foreign countries rather than coming back to work in Turkey. Additionally, the large amount of money from the university budget is allocated to establish a techno-park rather than to establish a PhD program. As a result, we loose our best students who can produce innovation and technology. We are not so successful because we do not find right people and more dramatically, we loose our financial resources in order to establish the techno-park in which the private sector has intensively use the benefits. However, the investment should be on people rather than buildings and SMEs (I CC2).

Voices of the participants who have experiences at the techno-parks in Turkey highlight that techno-parks cannot be denied in the economic development of the countries, but there have both positive and negative effects on the universities as well as the academic environment. Especially, those who are coming from the academic environment think that the effects of the techno-parks of the economic development would be less that expected effects since these techno-pars are behind the technological developments and the techno-parks in the state universities need to take action to overcome the drawbacks related to the investments of technology by getting help from the government. In the following titles, the experiences of the participants in the Turkish techno-parks are given related to the science and technology policies as the national strategy. In that way, it is aimed to problematize the effects of the science and technology policies as the national strategy on the universities through the experiences of the participants. Hence, the first research question, "How do techno-parks develop in Turkey?" is problematized using Level 1 of the "Education Questions" in the analysis. In the following title, the experiences of the participants related to the science and technology policies as the national strategies are systematically understood, explained, and problematized by asking the sub questions given in the Appendix

B in Turkish and Appendix C in English. In that way, Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9), the transformation of the higher education by means of the techno-parks is problematized.

Experiences related to the Science and Technology Policies as the National Strategies

In this title, as Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9), the role of the techno-parks on the transformation of the higher education is problematized. Therefore, the questions regarding the "social, economic, political and educational purposes" (p. 9) of these relationships are systematically analyzed, while taking into account "funding, provision, ownership and regulation of educational governance" (Dale & Robertson, 2008, p. 9). "The sectorial and cultural path and dependencies are overviewed critically, to problematize [the] decided, administrated and managed educational politics" (p. 9) of Turkish techno-parks which play a key role in this transformation. Consequently, the research question, "What are the science and technology policies and national strategies that shape and organize the techno-parks?" is developed by asking the sub questions (see the Appendix B in Turkish and Appendix C in English).

Hence, under the research question of "What are the science and technology policies and national strategies that shape and organize the techno-parks?" the effects of the science and technology policies and national strategies are asked to the participants in the four different techno-parks. The science, technology and innovation (STI) policies are mentioned in the programs of the government in order to have sustainable economic growth. Most of the recently changed policies have impacts on the techno-parks in which most firms and universities have been involved in these changes. Even though these policies are new, the change is so rapid that the role of the academics, the students, and the firms has been redefined. After the ninth National Development Plan had been decided between 2007 and 2013, as in the TUBITAK report mentioned, the Technological Research Sector Investment Budget was arranged in the public investment budget as the main source for public funding of R&D (TUBITAK, 2010). This situation is supported by one the interviewees, I AC2, as follows:

> Since 2007, the budget is under the coordination of TUBITAK. In that way, the governmental institutions can support R&D activities. There are also other policies, which are related to the human resources in order to improve science and technology by increasing the number R&D projects. However, the effects of these policies are not so strong as expected. There should be other strategies to support R&D projects as it is seen in Silicon Valley (I AC2).

Additionally, the participants agree about the importance of funding the researchers, like it is seen in the world. They support TUBITAK program related to encouraging Turkish scientists to come back to Turkey in order to conduct their research here. However, they have some doubt about the efficiency of these researchers because they think that the STI system in Turkey is not well organized. Since 2004 TUBITAK has played a bridging role among the public agencies, the universities, and the industry in TARAL in order to achieve the goals in the “Vision 2023.” The participants mention about the policies which have been directly affecting the use of human resources in Turkey, like guiding and encouraging young people to become scientists. One of the participants clearly explains this situation as follows:

> I was supported by TUBITAK Science Fellowships and Grant Programs, which are for strengthening human potential in science and technology. The main goal behind these grant programs is encouraging researchers in order to become a center of attraction for science and technology, like Silicon Valley. However, I do not see any efficient program, project, and even system to participate and to create synergy (I DC3).

The road map of the Vision 2023 affects the science and technology policies. According to the techno-park managers, there are not sufficient researchers studying on technological improvement in Turkey. According to one of the managers of the techno-parks:

> The number of the researchers trained on current improvement is not sufficient to create critical structure. Although the laboratories are quite good in universities, they are not adapted according to the changes in the world. These laboratories are not at the desired level. Therefore, most of the policies are not properly followed by the universities and by the techno-parks. I strongly believe that there should be first need assessment for each university and for each techno-park. Instead of directing from to top to bottom, it is important to manage the issue from bottom to top. As usual, the resources are misused and the institutions are mismanaged. They have to empower first the universities rather than SMEs (I BA2).

As it is clearly understood from the participant's explanations, the national policies related to the science and technology policies have the risk to lose their focus. More importantly, the resources allocated by the government can be misused. Since the dynamics of each university and techno-park are different, there should be more decentralized policies to improve science, technology, and innovation. The same issue is explained by the managers at the techno-parks from different perspective. They point out the science and technology policies related to the firms. Most of the time, the firms have limited knowledge regarding the changes in science and technology policies. According to the manager of the techno-park:

> There are few firms working on improvement in Turkey, but

> their competition capacity is very limited. The policies should cover all the aspects of the technological development and innovation (I CA2).

There are no firms performing in specific subjects and improvements. Even though the last policies are related to basic researches, which are planned to increase until 2013, the firms are not specialized. Additionally, according to the professor who is actively involved in the techno-park policies, there are significant decisions that they can impact on the development of the industry-university partnership. This situation is explained as follows:

> I know that these science and technology policies support also applied and industrial researches until 2018 because they decided to have industrial development activities between 2008 and 2017. Additionally, there are also regulations to develop R&D infrastructure to support start-up companies in the techno-parks by supporting their R&D projects until 2013. In that way, it is expected to have significant changes in some highly technological areas, like in biotechnology. ın order to develop the field, there would be controlled projects support until 2018. Of course, there are also policies regarding human resources in order to achieve the goals of 2023. But, most of the time the results are different than the planned ones with the help of the policies and regulations. There should be another system to revise and help the development rather than control the system (I DC3).

Hence, as the participants have mentioned, the science and technology policies as the national policies have been developed in order to achieve primarily better position in the competitive global market. However, these policies are decided from top to down and they are not applicable for all the universities and the techno-parks in Turkey. More importantly, the participants agree that the policies related science, technology and innovation and the development of new technologies have significantly changed the relationship between the government and the industry as well as the relationship between the university and the industry. This situation is explained by one of the participants as follows:

> Today, instead of mutual relations between the government and the university or the industry and the university, we see al these three parties, the university, the industry, and the government, in the same table because innovation and new technologies increase the importance of the universities in the world, especially in those industrialized and industrializing countries. The more the universities will be active in the industry, the better the economy will have better scores, particularly in the records of unemployment and foreign investments. Therefore, there will be more pressure on the universities to play important and crucial role in emerging technologies which have significant effects on the industry, the economy, the society and the environment (I AA1).

According to the participants who are actively engaged in the implications of the science and technology policies, there is another reason why the government is so demanding from the universities which is related to government spending. According to the participant's analysis:

> The government has limited resources because of the high public spending. In order to balance their budget they need technology based economic development. However, they have limited budgets for research and technology. Therefore, they need to conduct economic R&D for the industry, which can be done in the universities as it is seen exactly in other countries (I BB1).

Moreover, there is another significant reason why the industry as well as the government needs the help of the universities, which is changing nature of knowledge production. In other word, the emerging technologies are increasing the importance of the particular research and technology areas. The situation has been highlighted by one of the participants as follows:

> There is an increasing need of the universities in the field of communication, networks, partnerships and collaboration. Therefore, the industry needs researchers who have these new knowledge which is taken with the connection of the other world class universities. But, more importantly, the industry needs qualified people as researches who can work in these fields. So, the last changes in the universities are related to the

> changes in the world. This exactly explains the effects of the neoliberal economies in the universities (I CC3).

The participant has pointed out that the roles of the universities has been changing in the world as a part of the neoliberal policies. Related to these changes, the impacts and the expectations of the government as well as the industry are more than ever before on the universities. As the participants mention, the industry is in their campuses in order to collaborate in the R&D. More critically, instead of following the rules of the university, the university follows the rules of the private industry. According to the interviewee, this situation is clarified as follows:

> The Organized Industrial Zones are not enough to increase the industry and university partnership so that the companies, particularly those who are specialized in high technology and need laboratories come close to the universities and ask strategic planning to use properly the resources of the university. That is the reason why the techno-parks behave become so popular and it will be more popular in the long run (I BA2).

Furthermore, the researchers and other academic members together with the students in the universities are not really aware about the changes and the transformation of the higher education. Those who have good connections with the Higher Education Council and TUBITAK have better ideas about the science and technology policies and their consequences. Few of them have critical approach related to the effects of the science and technology policies. As one of the student interns has pointed out:

> We do not really feel direct partnership with the industry, but I have realized that most of the projects are related to the demands of the firms in the techno-park. Most of the time the funding is related to the projects, which have industrial purposes. Most of the funding is to develop and strengthen the linkages between the industry and university. I find critically important that intended objectives are to improve high productivity and quality, resistance to stressful conditions in products, and economic

> significance by deciding about the specialization areas in the specific techno-parks. Therefore, in these techno-parks, qualified researchers are trained, while related resources are allocated, including advanced laboratories in which advanced and applied industrial research are conducted as R&D projects (I DC2).

Additionally, the participants agree that in the last decade, there is an intensive development in the allocation of the budgets to the specific areas of the science. The effects of the science policies are seen in the allocation of funding and investments in the universities and the allocation of the new researchers as labor force. According to the observation and experiences of one of the participants, the changes at the universities can be summarized as follows:

> Even though some departments are lost their importance, some departments are becoming important, like Electric and Electronic Engineering, Life sciences, Nano-technology, Material Sciences, and Mechatronic. Most of the investments at the university are done on these areas. For that reason, most of the academic researchers are asked for these departments as well. The management of the university takes these investments as the new income resources, so they encourage the profit-oriented investments to increase the power of the budget of the university by means of the techno-parks (I BC1).

In general, the participants who have academic background do not mention specific problems related to the impacts of science and technology policies, but they see the clear difference between the departments. This situation is discussed by one of the academics as:

> The departments which have strong connection with the techno-park and the industry take better funding from the government resources as well other international funding resources. For that reason, most of our colleagues have better academic performances since they publish internationally in the best journals; consequently, they have better academic positions in the university as well as in the university management. In other words, most of the young professors are coming from the engineering or high- technology-oriented departments rather than the social sciences and business management. Additionally, they establish their own firms or

> they work as consultants in different techno-parks, which are different than their universities (I CC3).

On the other hand, the firm representatives are not happy with the science and technology policies. All of them agree that they are nor enough to develop R&D. According to firm representative, the expectation of the policies related to science and technology is defined as the partnership between the industry and university. The details are given as follows:

> There should be more strategic planning and action rewarding to the university and industry partnership. In the university, bureaucratic formalities diminish the collaboration. Additionally, some professors and academics are not ready to collaborate with the industry. They are so slow or inefficient. The management of the techno-parks should take radical decisions to increase efficiency. The most important benefit of these science and technology policies is related to the young researchers. They are so bright that they solve many critical problems easily and economically. The wages of these researchers are cheap comparing to the wages of the market. Some of them are working just only to conduct their research. We do not pay their taxes of social security. They are under the coverage of the university, hopefully (I CB1).

Another aspect, which is mentioned by the firms' representatives, is related to the laboratories and other space facilities that are used by the firms at the techno-parks. According to incentives given by the national policies, they have the chance to use the facilities of the universities. The consequences are explained by the participant as follows:

> We use laboratories of the universities. We do not make investments so that we decrease our costs. The investment in science and technology is very expensive than you think. The university makes investments on these laboratories or buys different software programs by using government funds. They buy even technological devices, which are used in our research projects. This is also very beneficial for the education at the universities because students have better chances to see the latest technological developments at the market (I BB1).

The most significant advantage related to the science and technology policies and national strategies taken by the firms is tax reduction. In the techno-parks, the SMEs have many chances regarding the tax. Therefore the firms' representatives are very happy. The tax breaks are the main attraction of the techno-parks. There are exemptions from corporate and value added tax on the income if it is generated by R&D activities. Consequently, the benefits of these polices related to science, technology and innovation are mainly seen at the SMEs. They use advantage of these policies. According to the experiences of the firm representatives, this situation is explained as follows:

> We are very happy about the exemptions together with the exemptions from income tax for R&D personnel who are working in the techno-parks. The law is accepted until 2013. But, I think that the Ministry of Science, Industry and technology will extend the duration of this law in order to increase the efficiency in the technology-based economies. The R&D activities should be supported intensively al over the country by giving strategic subsidies. There should be more in order to increase intensively and extensively the investments (I AB1).

Furthermore, the techno-park at the universities are established with the help of the Ministry of Science, Industry and Technology and managed through their foundations. The chambers of commerce and representatives of the industries are the common partners. Private firms, banks, and other private sector organizations are among the least common partners with the smallest shares, which are supported by these science and technology policies. As the manager of the techno-park emphasizes, these policies, particularly those related to the tax reduction, have specific goals to upgrade R&D. This issue is highlighted by the interviewee as follows:

> The tax reduction policies have three main goals, which are mainly increasing markedly the university-industry collaboration, commercializing new in the global economy, and

> supporting information and technology based entrepreneurship (I CA1).

Hence, as the data collected by the participants, the collaboration between the university and industry has directly commercialized and commodified the activities of the academics and the university facilities. In other words, not only the knowledge is commodified by means of the research, projects and training, but also the physical facilities of the universities are commodified and commercialized.

As another manager, the Interviewee AA1, mentions, these policies are especially good for the development of local industries. While the goals of the techno-parks are largely the same, they have different strategies in order to attract the firms using these policies. The national policies related to science, technology and innovation have transformed the purpose of the higher education from educating and cultivating the society to improving economic conditions of the regions through the SMEs. This situation is explained by one of the firm representatives as follows:

> We have companies here, which have more than a hundred researchers but they do not pay any tax. We do not exactly know what is the income and profit of these firms by using the science and technology policies. We care only the success stories in the techno-parks. More importantly, we try to decrease the inefficiency in the firms so that we try to facilitate their activities with the help of science and technology policies (I CA2)

Under the coverage of the science and technology policies, some of the techno-parks chose to focus on two or three sectors in order to attract significant firms in each sector. On the other hand, the others do not have any preference in terms of the sector, yet they try to attract multinational corporations in order to conduct R&D by means of the academics who have good contacts. The gathered data from the participants show that tax incentives are the main reasons of the great demand for the office space. The situation is explained by the interviewee as follows:

> We have offices in the techno-parks in order to use tax incentives in the techno-park but we do not use these offices efficiently. We have intensive activities in the organized industry zones in which we collaborate with our firm in the techno-park. In that way, we decrease our costs in R&D, particularly those related to the researchers' expenses (I DB1).

On the other hand, the universities, particularly those of the state universities work as landlords at the campuses. The resources gathered from the techno-parks have been used by the university administration for their urgent needs and for the research studies. Some techno-parks are operating at full capacity and have waiting lists of applicants. These techno-parks increase capacities by using the incentives and focus on real estate development. They like to grow markedly and they have long-term goals to grow internationally, like METU. According to the interviewee:

> Turkey is becoming one of the emerging markets in the world. The national policies have supported the techno-parks by providing the benefits to their tenant firms, like creating opportunities to collaborate with a university to use their "human resources," opportunities to benefit from tax exemptions and tax breaks, providing good locations and prestige, increasing relations and collaborations with other tenant firms, improving the infrastructure, and using business support services (I BA2).

From the gathered data from the participants, it is clear that the firms and the managers of the techno-parks have been intensively used the benefits of the science and technology policies. However, the benefits for the universities are questionable. Most of the facilities and services provided by the universities are commercialized and given to the service of the industry in order to improve the economic level of the country, while decreasing the unemployment rate. Most of the opportunities of the techno-parks are mainly given mainly to the important

SMEs and startup companies by using the direct financial supports of the science and technology policies.

The consultancy and technical services are given to the firms by the academics at the universities. They provide office space and meeting conference rooms, laboratories with high-speed Internet access, library, and cafeteria/ restaurants which are better than the university environment and services. In other words, the budget are channeled mainly services for the business development. The techno-parks help companies with networking among the companies and help with access to investors, potential mentors, clients, and strategic partners. In the light of this evidence, the data gathered from the participants related to the science and technology policies show that these policies have opened new opportunities for the SMEs in the techno-parks where the physical facilities of the universities and the academic potential have been prepared by these policies to increase the efficiencies of the SMEs. While these policies have rearranged and redefined the system of the universities, the relationships and the dynamics at the higher education have dramatically and deeply changed and transformed to the new platform where the neoliberal policies are pushed. In the following title is about the experiences related to the university-industry-government partnership at the techno-parks in Turkey. By asking and collecting data related to the experiences and observations of the participants at four different techno-parks the effects and the consequences of the university-industry-government partnership on the techno-parks and on the universities are critically discussed. It is no doubt that the university-industry-government partnership has dramatically changed the system, the relations, the structure, the value systems, and even the reputation and the ranking of the universities. More importantly, the purpose of the higher education has shift from the education and cultivation of the public equally to the production of highly technological products and services, the development of the private sector through SMEs at the techno-parks, and even the development of the nation state in the competitive global markets. As a result, in Level 2, called "Educational Politics" (Dale & Robertson, 2008, p. 9), the role of the techno-parks on the transformation of the higher education is significant and their effects have increasingly becoming important. More importantly, the science and technology policies and national strategies have shaped and organized the techno-parks which have systematically changed and transformed negatively the purpose of the higher education.

Experiences related to the University-Industry-Government Partnership at the Techno-parks

Under this theme, the participants have tried to answer the following question, "In what ways, are the techno-parks integrated into the university-industry-government partnership as a mean of the capital accumulation process while changing the fundamental principle of education? In Level 3, the "Politics of Education" (Dale & Robertson, 2008, p. 9) of higher education and the techno-parks is systematically and critically studied. Hence, as explained by Dale and Robertson (2008) "what functional, scalar, and sectorial divisions of labor of educational governance are in place" (p. 9) is asked, in order to understand "the core problems of capitalism, which are accumulation, social order and legitimation, in the context of the "mandate, capacity, and governance of education" (p. 9). While analyzing these issues, "how and at what scale are contradictions between the solutions addressed" is taken into account. Additionally, regarding the transformation of the higher education by means of the techno-parks, "the boundaries of the education sector" (p. 9) is critically examined in order to understand "how the education sector overlaps with and relates to the other sectors" (Dale & Robertson, 2008, p. 9).

Hence, the data gathered from the interviews show that the partnership between the industry and the university has strategically empowered by the policies since 2005. The effects of these partnerships have clearly seen at the techno-parks. The main goal of these partnerships is to increase competitiveness of the country by means of the private industry in the global market. Additionally, the accumulation of capital has been created at the universities and at the SMEs by means of the activities at the techno-parks. The experiences of the participants have supported the changes at the universities.

In order to understand deeply what is happening at the universities, it is important to problematize first the structure of the universities and their activities. For instance, some of the state universities are research-oriented organization mainly develop innovation and technology, while provide the transfer of new knowledge. The industry, on the other hand, is strategically involved in technological innovation and knowledge application while transmitting the knowledge. As Yujian explains, the university transmits knowledge and provides highly qualified talented people while managing innovation and transfer of knowledge (2005). At the beginning, the expectation from the universities is cultivating qualified human power for the industry. However, according to Yujian (2005), especially after 1990s the system innovation program has changed by the governments with the help of Non-governmental organizations, like World Bank and IMF, And the programs consist mainly in organizing sub-networks of the government, industry, research institutes and universities in order to improve technology based economies. The government as the core organization provides arrangements for the satisfactory operation in order to reform the current systems. The legal background has changes to increase collaboration between the university and industry. From this context, the participants agree that in the last decade there are radical changes in order to increase this partnership. As it is seen on the web page of the techno-park named METU Techno-polis, they offer incentives, which are decided by the government policies as follows:

- Corporate & Income Tax Exemption for Earnings on R&D Activities;
- Income tax exemption for R&D staff;
- Income tax exemption for management companies;
- VAT Exemption for software products and services;
- Incentives for the faculty members working for science park companies;
- Foreign investors and companies are eligible for all incentives. (METU Techno-park, 2012).

Even though the contribution of the industry looks positive, the participants who have academic background have negative experiences. The managers and the firms' representatives, on the other hand, strongly support the partnership as mentioned below:

> Most of the time, researchers think that industry involvement improves the number of publishing papers. However, the publishing number of the articles is less than expected. Please tell me what is the advantageous of having collaboration with the industry for the academics? There are two reasons of the benefits for the academics who are academic publishing and the academic mobility. Financial benefits are secondary for us. It is no doubt that finding funds for research and projects are critical. However, the industry partnership, which are highly involved, negatively affect research productivity because they do not give

> the permission to academic publishing. Therefore, the existence of industry partners is positive but the intensity of industry collaboration is negative (I BC1).

Additionally, the student interns who have been involved in the industry and university partnership emphasize that this kind of partnership improves the relationship with the people in the market and business environment, but academically they could not take the advantage of their research. According to one of the student interns, the situation is highlighted as follows:

> We are lucky to participate in these projects. The partner from the industry has invested about US$ 650,000 for the research project which is partially the subject of my thesis. I have been working on this project more than three years. At the end of this project, two important patents will be registered by the partner from the industry, but not by me or by the university because the registration process is so long and expensive. Of course, I will take position in the hierarchy of the academia which is my gain, but what are the benefits of the university. The administration of the university could do something to use their resources positively (I DD1).

Another aspect, which is mentioned by the academics as well and by the student interns at the techno-parks, is the sustainability of the technological development. In some cases, even though great investments were done at the university, they were not used or could not be used after the research projects. As one of the participants has pointed out:

> There are equipment and gadgets, which were used in the research projects. But now they are in the warehouses (I DD2).

Additionally, the academia believes that they are the ones who can control the technology. However, they do not want to be technocrats of the system. This situation is clarified by one of the participants as follows:

> Most of the successful researchers have been attracted and interested by the industry in order to make collaboration. Therefore, they can have more publications than the others because they dominate the system. Otherwise, they are abused. Therefore, a dynamic model is needed to understand what is

> right and what is wrong for the university (I CC1).

In other words, they are not 100% disagree in industry and university partnership, but they support strategic partnership which balances the relationship. One of the participants has critically emphasized the situation as follows:

> The number of academic publication is higher in collaboration with the industry than that of no collaboration. However, the high levels of collaboration can be even be lower than expected since the industry takes the benefits and the productivity of the academic studies instead of the university (I AD1).

Furthermore, the academics have mentioned also the danger of the focusing on specific subjects manipulated by the industry rather than focusing on the subjects, which have strategically important for long-term progress. As one of the participants clearly explains:

> Most of the funds given by the government could be used for the benefit of the industry, but this kind of strategy could kill the field in the long run. The university is the institution which takes its decisions strategically taking into account the future of the field because improvements in the field can be more beneficial in the long term period which improve the industry better than ever before (I CC3).

Additionally, the academics have questioned the issues related to patenting and licensing. They strongly believe that they should be taken under the umbrella of the universities. As one of the professors who is involved in the techno-park points out,

> The universities are changing agents in the societies. Not only the industry, but also even the government could follow the universities. There should be regulations about arranging the partnership between the university and industry. By the way, the patents should be taken by the universities rather than the partners in the industry. In the long run, universities can develop their own funds. Even they create better opportunities for their academics and students. I firmly believe that equality could be created in this way. The better the research and the project in this changing technology based environment, the

> more the universities can have patents and licensees under the coverage of the universities. In the long run, they can attract independently the best partners in the world industry. In that way, they can develop their own price (I DC 3).

The students are in between. Some of them think that the partners in the industry would be more dominant rather than the university because they know the trend better than the university. As one of the student interns has clarified:

> Most of the time the research conducted by the university is not contemporary or not used so that there are many PhD dissertations or research papers on the shelves of the universities. Therefore, the private institutions as the leaders in the market should help the universities to decide about the subjects of the research projects. The rights should be arranged as the other universities and techno-parks have done in the world. Of course, intellectual property rights are important (I AD2).

Furthermore, the student interns who are coming from the best state universities suggest that the authority should belongs to the university techno-parks rather that the private industry. In that way, by using the government's funds highly technological and innovative products and services can be developed. They give the example of the system at their techno-park as follows:

> Our techno-park clearly puts its leadership in funding funds and supporting the innovation and technology. Of course, there are some cases, like governmental companies who work in the techno-park. They have strategic position, so they have to protect their own licensees and patents. However, in the other cases, the university has the authority to decide about the intellectual property rights. There are problems in the collaboration sponsored through research grants. Most of the time there are conflicts between the industrial partners and the universities in the techno-park about who is going to have patenting or licensing (I DD3).

The firms' representatives and the managers of the techno-parks, on the other hand, strong believe in the importance of the partnership. They do not have ideas related to the intellectual property, but they would like to have the right of the patents. As one of the interviewees has highlighted:

> Most of the time, the firms are more effective in conducting projects. They are more efficient. They know management and strategic planning. The techno-parks should work like them. Therefore, the firms are the pioneers. They are more successful in sustaining the projects. After the students' graduation, or academic changes, it is difficult to find right people at the universities. The techno-park management should work together with industry to sustain the system. In the academic world, they are not taking patents because of the financial reasons or because of lack of interest. In that case, the firms, which have the financial potential to register the patents and the organization background should take the patents (I AB1).

Another aspect given by the firm representatives is that in 2011 was a record year at the European Patent Organization (EPO) because they received almost 250,000 patents, which were the highest number ever in our 34-year history. This situation is highlighted as follows:

> However, few patent of them belong to the Turkish people or institutions. Besides the cost, most of the time researchers and institution do not apply because it takes time and the formalities are difficult. So, most of the innovative ideas are not taken into consideration. Therefore, the industry has been involved in registering. I believe that the partnership has helped university as it is seen in the Silicon Valley. The partnership has created profit for both sides. The best companies of the industry prefer to be a part of the techno-park, like Apple, while the university gains reputation as Stanford (I CA 2).

Additionally, as one of the firm representatives mentions that the entrepreneurship can be encouraged in the techno-parks environment, especially those who do not have any chance. This situation is describes as follows:

> Everybody complains about corporations and neo liberal policies. In most of the cases, the best well educated students, like most of my friends, have worked in the best corporations in the world, like slaves. Please tell me what is wrong with that. In this techno-park, I found chances to establish my own company. I did not have any chance to establish my firm because my family was neither rich nor well educated. Establishing my own company was a miracle. I did have only one chance, which was studying. While studying at the engineering department in this university, I worked in one of the firms at the techno-parks. Then, because of my hard working and patient, we are successful to develop a new project related to the software

> development. The techno-park management offered me to establish a firm in their incubation program. After using grants of the government, I established my own company. Firstly, I did not have any capital. Secondly, I did not have enough knowledge how to establish a company. And more importantly, I did not have enough courage. Now, I am here. More than 40 people are working in my company, and I make fortune comparing to my friends who are working in the corporations. Please, tell me what is wrong with that (I CB 1).

In the light of this evidence, the techno-parks are the new arena where the relationship between the industry and the university is becoming more complicated. In the university campuses, the best companies in the country as well in the world can be seen and they actively work using the resources of the universities. Even though the techno-park environment has opened new doors and new opportunities for those who have just their ideas, most of the time the facilities and the financial support have been used for the benefits of the well-organized SMEs. They use the university techno-parks to use the incentives related to tax and/or financial credits. On the other hand, the universities make money as landlords by renting offices and laboratories. Some of them are really good in channeling grants and fund received from the government. In that way, they have developed financial autonomy to invest in the areas that they want. However, most of the state universities, particularly those in Anatolia cannot mange as other techno-parks. The dynamics are different in those universities. The mutual benefit of this partnership is not clear and it is questionable, particularly in terms of labor force. Additionally, the places, which belong to the universities, are given to the private industry while using the funding and incentives of the government. The effects of the neoliberal policies have been dramatically seen at the universities where most academics have been involved in these activities and negatively affected. The following title is about the effects of the policies on the academic labor force. By gathering data from the participants at four different techno-parks, the effects of the science and technology policies have critically problematized on the academic labor force. Since in the university-industry-government partnership the knowledge produced by the academics plays important and strategic role, the commodification of the knowledge has changed dramatically the university system, structure and values. This transformation will be even more dramatic in the coming decades since the development of the nation states in the competitive global markets is dependent to the highly technological knowledge. Consequently, as Level 3, the "Politics of Education" (Dale & Robertson, 2008, p. 9) of higher education and the techno-parks is systematically and critically studied in order to articulate how experiences related to the university-industry-government partnership, as a type of capital accumulation process while also changing the fundamental principle of higher education. In the following title, again as Level 3, the "Politics of Education," the policies about academic labor force are systematically analyzed.

Experiences related to the Policies about Academic Labor Force

Under Level 3, the "Politics of Education," the policies about academic labor force are systematically analyzed. Hence, the educational sector is studied from the perspective of the citizenship and gender regimes. For that reason, study asks: "How do key managers and clients at the techno-parks, academics, and student interns work together within and beyond the university-industry-government partnership?" In that way, the collaborations and cooperation of the academia in the techno-parks that promote innovation are problematized taking into consideration the personnel policies in techno-parks. While analyzing working environment, the annual budget is discussed as well together with the incentives, which are given to the techno-parks. In other words, the transformation of the higher education is problematized, by giving the details of the changes and challenges of the academic profession in the implications.

Under this research question, “How is the working environment of this university?” is asked as sub-question to have an insight about specific working conditions of academics in the techno-parks. For most academics, techno-park is a new working place, which provides them with an opportunity to do research in their field. Moreover, in academics’s view, the techno-park creates a free environment, which allows them to be flexible on their working schedule and working hours. The same reactions come from the managers in the techno-parks related to the working conditions in the techno-park:

> The most significant feature of the academia is freedom. When I was an employee at a software company, I was tired of doing business in front of the computer. I was looking forward to 5 pm. Well, there was no motivation. I did not want to work at all. But here, I can work very effectively, because I work when I am motivated. Here is more flexible. You are not an employee who has to stay at work from 9 am to 5 pm like a civil servant (I DA2).

Additionally, the student interns think that working in the techno-park open new dimensions for them. As one of the student interns has highlighted,

> I do have chance to express our ideas without having to hide their personal opinions or personalities. We work here as an academics. We make research. It is very productive to be here (I BD2).

The Interviewee DB4 has given the same kind of reaction for the academic environment of the techno-parks as follows:

> I am really content with what I have. Compared to working as an engineer, here is more relaxing. Well, it seems easy. You don't have to work from 9-5. You can decide when to come and leave. To clarify, you have the control over your working schedule even if it is busy and you have to take care of lots of things like having meetings or helping students, but it is a relief to know that you have flexibility (I DB4).

However, the techno-parks have business model rather than academic model. The representatives of the firms agree that they need policies and procedures related to the personnel, particularly related to academics and student interns. The overall business model mentioned by the managers and the representatives of the firm is very different from one institution to another. In general, universities have focus on teaching and focus on protecting their academic personnel whom course design and teaching materials are very strong. They are not concentrated on the patents and licensees. They do not have strong IP models. In the research-intensive universities, the number of licensing and patents plays important role, so the role of the academics and inters are different. They are considered as the strongest candidates for investment. As can be understood from this context, participants of the study have different perspectives regarding the academic environment in the techno-parks. Some of them find difficult to teach at the universities, and they prefer a flexible and free environment of the techno-parks atmosphere. As one of the participants has clarified:

> The atmosphere enables me to work more motivated and disciplined. Furthermore, different from other working environment of the university, working here is regarded as a place that gives me a chance to express my ideas according to my personality (I BC1).

Most academics declare that their decision about working at the techno-park is a conscious decision. On the other hand, according to the sub-question "How did you decide to work here?" the participants answer differently, depending on their status at the techno-parks. The academics and students have participated in working in the techno-parks because of their areas, which have been requested by the firms related to the projects. This situation is explained by one of the participants as follows:

> It is all about my engineering background. They offered me a job related to the project that they could not manage. After starting to work, I have been automatically involved in many different projects since your name becomes familiar for the projects (I DC1).

Additionally, some academics themselves have developed the projects and they attract other parties. In the techno-parks, academics have incentives to establish spin-off companies in which they develop significant projects. According to pne of the academics, this situation is explained as follows:

> They offered me a job related to the project that they could not manage. After starting to work, I have been automatically involved in many different projects since your name becomes familiar for the projects (I DC1).

Most students have same kind of experiences. After having selected for the graduate studies, they involved in the activities in the techno-parks. Students are channeled by their advisors and the professors at the university in order to work at the techno-parks firms as interns. One of the student interns has pointed out as:

> I am very lucky because my professor have good contacts with the firms in the techno-parks. After he had called the project manager, I sent my resume and in two days I was accepted to work there. It was a privilege to work here. You have many different chances. First, I began to work here as an intern in the summer in the summer of the sophomore year. Then, I realized the importance of the graduate studies. While studying at the graduate studies, I chose the subject of my thesis according to the project that we could get grant. At the end of the project, I took an award. Hence, I strongly believe the importance of social network

> here in this techno-park. Even the cafeterias are best places to find a job (I DD2).

Furthermore, in the techno-park firms, their employees should have a business or industry background, ideally complemented by experience in funding mechanisms. They need to know well the local, as well as relevant national and international networks in all these areas. As one of the interviewees at the techno-park firm emphasizes:

> The employees need to know the business logic, understand research to distinguish the most interesting scientific results and their potential commercial value, and know how the collaboration between research and companies is to be financed. Therefore, we choose from the university students who have background in related sciences. In these cases, the professors help us to find the best students. However, about finding funds or budgeting issues are critical and a few people know the details. Therefore, people who have experience in this subject are very expensive. The market is so small, so social network is important to find the right people who are working as consultants in the techno-parks. Legal aspect is anther important area in terms of consultancies that we need while applying for licensees (I BB1).

Hence, techno-park experts need networks and personal relationships with research and business actors, as expressed by a female expert in the techno-park firm,

> Personal contacts are important in the projects since knowing the right people increases achievements. Just investigation and surfing on the Internet is not enough to find a company. It is better to know right people personally. For that reason, we choose our personnel strategically who have references from their professors or the managers that they work for before (I DB1).

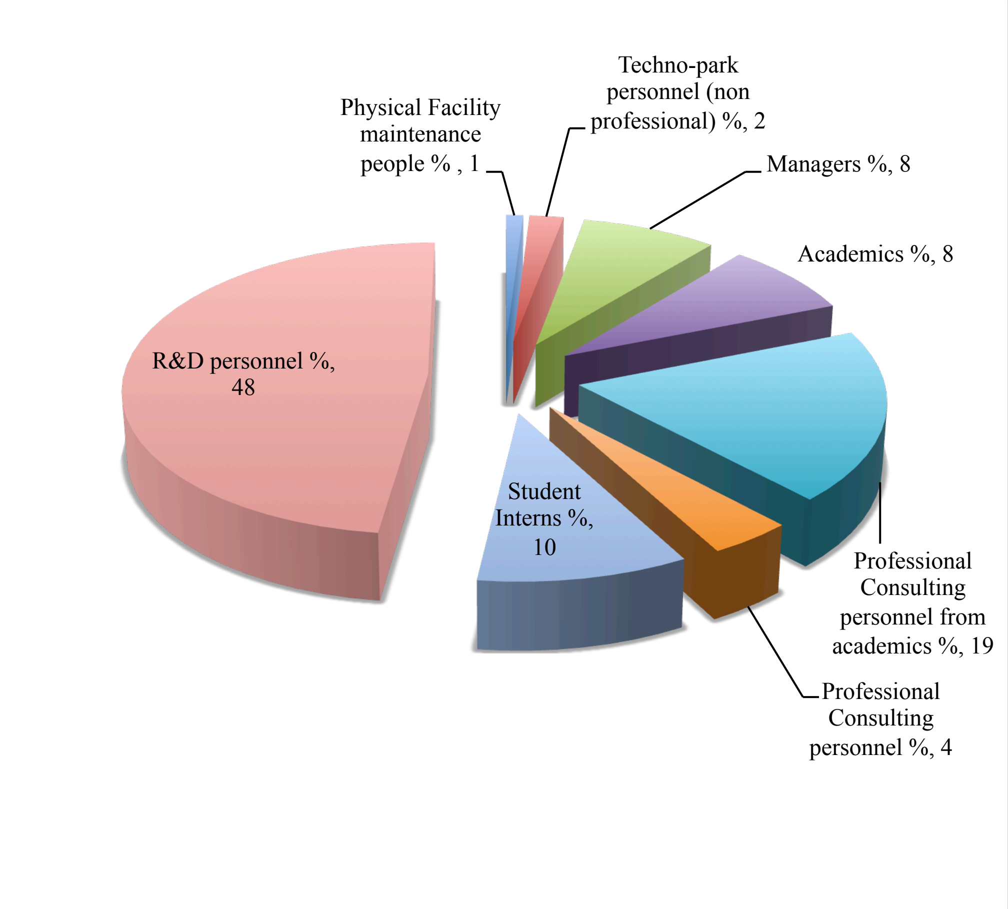
The managers of the techno-parks, on the other hand, are coming both the academia and professional world. Even in one of the techno-parks, the headhunting company was involved in the selection of the professional managers. As one of the managers at the techno-park has mentioned, working in the techno-park is more competitive than working in the university. This situation has been explained as follows:

> Before starting to work here, I had interviews with the top management of the techno-park. Their focus was on being successful. As a manager, I need to be here. I am an academician too. The research or articles were measures of our performance. But besides the academic activities, the managerial performance is more important. Instead of controlling working schedules, performances are important to decide about the success of the managers. So, there is a competition among the managers as well as the academics. Even we follow the firms in the techno-parks. We support them by giving consultancies in order to increase their performances. We warn them if they are behind their goals and budgets. The same kind of measuring should be for the managers and we should promote them according to their performances (I DA3).

From this context, the sub-question related to the performances is asked as well to the participants. Even though the managers and the firm representatives support measuring the performances, the people from the academia are careful about answering this question. The professor, who has the measuring performances experience in the US, has highlighted this situation as follows:

> Measuring performances is very stressful for many academic personnel. It kills creativity. However, it should be a kind of measuring performances. If not we can see same kind of situation in the universities in which there are professors and academics who do not perform, but sit in their room without doing anything. There should be a balance in order to measure performance without creating stress. There are also some departments, like from social sciences that they cannot perform like other engineering departments. It is so difficult ta have patens for this department. How you can compare these departments with the engineering departments. It should be fair measurement among the departments. It should be taken into consideration related to division of labor. There would be some departments, which are specialized on teaching, and there would be other departments which are specialized on research (I CC2).

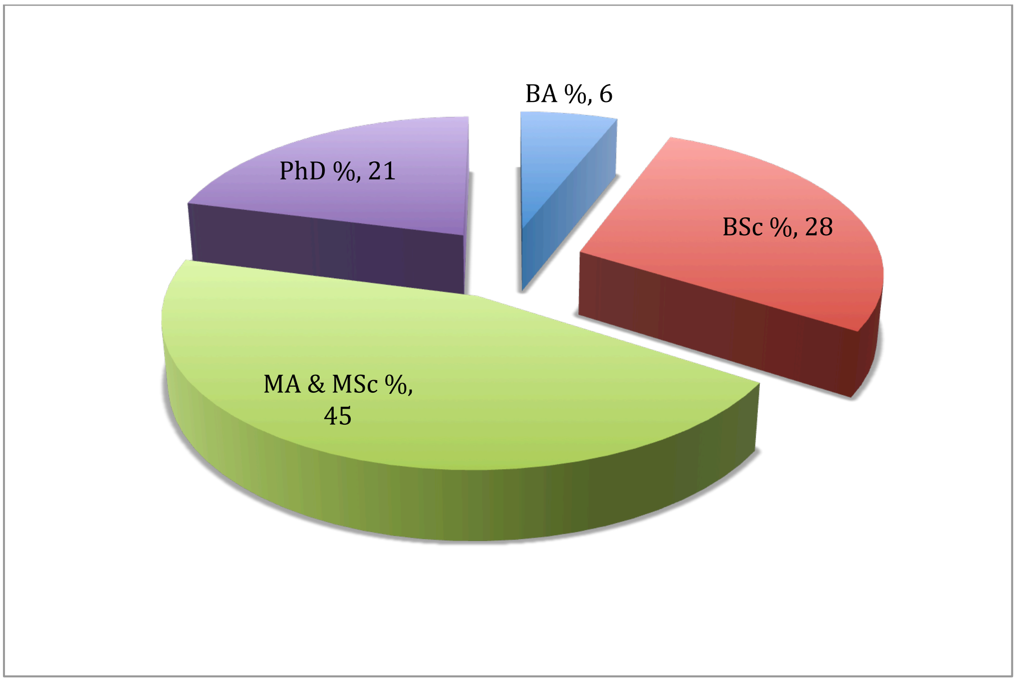
According to the information gathered from the participants, the performance criteria makes the academics stressful and they strongly believe that the performance indicators have increasing used and will have increasing used as a control mechanisms at the techno-parks. The effects of the policies related to the labor force have not been understood clearly by the participants. The political arrangements and mechanisms have decided at the top level, but they have not been discovered yet by the academics at the universities. Additionally, in this study, an analysis has done about the personnel profile. This analysis has been conducted among the four techno-parks where eight firms are selected. The following percentages are gathered as it is seen in the Figure 29. At the four different techno-parks, in the eight different firms, he highest number of the people is under the position of R&D personnel with 48 %. The second largest number is under the position of Professional Consulting Personnel from Academics with 19%. On the other hand, 8 % belongs to the Academics who are involved in the activities in the techno-parks. Their position is not clear, but they are seen in the personnel of the SMEs. The managers are only 8% active in the techno-park firms. The rest belongs to the Professional Consulting Personnel who deal with the financial and legal issues. Only 3 % belongs to the non-professional techno-park personnel and physical facility maintenance people.



Physical Facility Maintenance People %	1
Techno-park Personnel (non professional) %	2
Managers %	8
Academics %	8
Professional Consulting Personnel from Academics %	19
Professional Consulting Personnel %	4
Student Interns %	10
R&D personnel %	48
TOTAL %	100

Figure 29. The Percentages of the Personnel Profile in the Techno-parks.

Furthermore, as it is seen in the Figure 30, when the personnel profile is checked in terms of education, it is gathered that 45% of the personnel have MA or MSc and 21% of the personnel have PhD. More importantly, 34 % have undergraduate education. 89 % of the participants have diploma in the field of engineering, whereas the 6 % of the personnel have diploma in business administration. The rest belongs to other fields, like medicine and social sciences. As it is clear seen in the Figure 30, the techno-parks attract the PhD personnel after the academic studies rather than to the universities.



BA %	6
BSc %	28
MA & MSc %	45
PhD %	21
TOTAL %	100

Figure 30. The Percentages of the Education Level of the Personnel in the Techno-parks.

According to the data gathered from the participants, the incentives at the techno-parks are analyzed by asking "What would say about the incentives that have been provided by the techno-parks for the members, managers, clients, academics, and student interns in the techno-parks?" The participants of the study have perceived the incentives issue in two ways. The first one is the support or allocation that they got for their projects and academic work. The second is about the incentives that got personally while doing their profession.

Related to the incentives about the project or research support, the academics and managers of this study agree that working in the techno-parks have positive sides in terms of finding grants and funds for their research. As one of the participants has clearly highlighted this situation as follows:

> When working in the techno-park, I feel free from pressures in terms of finding money for the projects. There are many formalities to take funds at the university. More importantly you pay extra tax for the projects so that many private companies do not prefer to work with us because we are expensive. However, in the techno-parks, collaboration between university and industry is encouraged by the government as well. There are many different incentives that the industry uses. The most advantageous part of these incentives for us is the manifestation of the projects that we had as dreams (I CC1).

The firms and startup companies' representatives underline as well the positive sides of working at the techno-park in which they are supported, particularly in terms of tax. All the firms' representatives mention that they use their profit to reinvest on their projects. One of the participants has mentioned as follows:

> People who are nerd and rich create technology and innovation. The rich people can be attracted if the benefits are created. And the nerds are the ones who are highly intellectual and crazy in order to develop something with passion and patient. For that reason, the government should change their policies to rearrange the procedures to make open the doors of the universities. For that reason, techno-parks are the right places to create incentives to increase innovation and creativity (I AA2).

Furthermore, in the last decade, the government and the NGOs are supporting intensively the startup companies in Turkey. They established different agents to give incentives equally and strategically. Most participants are happy about the incentives but they find not efficient. According to one participant:

> Most of the techno-parks do not have good and efficient startups companies and small businesses so that these companies cannot do money. If they can do money everyone else will move to the techno-parks. Most of the incentives are given to the firms, particularly to the startups, but there should strategic planning in

> order to improve the profit of these companies. Providing only incentives is not enough; however, it should change their mindset. Tax relief is one of the first action which can be taken by the government. I think that the university and techno-parks management should train these SMEs in order to improve their system. Training and consulting should be real incentives for them if they conduct projects in the techno-parks (I BA2).

On the other hand, neither the academics nor the students clearly mention that they are aware about the details regarding the incentives given by the government to the firms. The only important issue for them is increasing the number of the projects and the number of academic publishing. They see the techno-parks as the new platform to increase the technology, while increasing their projects and publications. This situation is clearly explained by one of the participants as follows:

> The exciting thing in this techno-park is the people. There are many smart students and professors as well as the entrepreneurs who are mobile. They go where life is good. I like to be here because it is nice to be here. The incentives help the techno-parks like magnets. You can attract not only the best students and professors, but also the entrepreneurs who can work together (I DA3).

According to the managers, however, the incentives given to the professors and the students improve the quality of the products and services in the techno-parks. Some of the students are encouraged by their professors to conduct their master or PhD theses in the techno-parks. At the end, some of them take academic awards, which motivate them to be a part of the projects. According to one participant's experiences, this situation is emphasized as follows:

> I had the award two years ago because of my master thesis, and today I am here. While doing my PhD, I am working here. I am a research assistant. I do not have any financial income except my salary that I get every month. But working here and conducting research are very prestigious milestones in my academic and professional career (I DD1).

However, the working conditions of the student interns are not so good as other academics. As they mention, they do not have any social security. Those who are coming from the academic environment are under coverage of the social security because they are research assistants. However, those, who are doing PhD but not under the coverage of social security, work without earning any money. More importantly, they do not have rights. After the project, they leave the techno-park. As one of the student interns points out:

> Actually, I am participating in the project because it is important for my thesis. I am working hard here. But, I have to work (I BD1).

Additionally, most academic incentives are more performance and award oriented or academic mobility oriented. In other words, researchers could publish the academic papers after the projects so that they can have better chances to be professors and managers at the universities. The benefits are explained as follows:

> The only benefit in the techno-parks is conducting research. At the end of the project, if they give the permission, I use the data to write an academic paper which helps me to improve my academic performance and position at the university. Having patent is another side of the coin, but I could afford by myself so that the firms use them and am not interested in. I do not earn more than my salary. Most of the time, the academic environment demotivates you to take money. Most of the time consulting the firms in the projects is seen a part of your duty. Earning extra money is like a sin. Therefore, at the universities, the structure related to the financial incentives are so new that they are not well-organized and well-informed (I BC1).

Moreover, in the last two years, there are also more well-organized incentives which support the academics financially. The income obtained in the zone by academics or research personnel are exempted from the university revolving fund deductions. In other words, legal permission is given for academics to establish firms or become a partner of existing firms in the zones to commercialize their academic works (with the approval of their university). The commercialization and the commodification of the knowledge by means of the working conditions at the techno-parks are explained as follows:

> While deciding about the projects, my professor friends and I consider the quality of the project. Since good projects attract highly intellectual and young researchers, the ranking of university will increase. But it could not be overnight. Therefore, sustainability is important at the universities in order to be the best university. However, the students and the researchers were leaving, after the project had finished. Whatever you gained as experiences during the projects was not taken into account. Conducting such a kind of complicated research and projects is very expensive for just writing the academic papers and gaining credits in the performance charts. Therefore, the academics should establish companies to support systematically and strategically innovation and creativity since they need accumulation of knowledge and learning from your errors. For that reason, I believe in having incentives primarily for the academics. In that way, you could compare your university with others in the world. ın that way, the university could have self-sustaining system. In the long run, you can earn money to establish another university or you enlarge the capacity of the existing university in terms of research, social responsibility, and teaching (I CC3).

Additionally, the government principal purpose is "to eliminate the inter-regional imbalances, to facilitate a larger capital contribution by the public to the capital structure and also to support activities that have a positive effect on employment" (Price Waterhouse & Coopers, 2010, p. 2). For that reason, incentives given to increase investments are foster activities to attract the import of foreign currency by advancing suitable technology. As a result, they try to improve their international competitiveness. The situation is explained as follows:

> Incentives relevant to investments are given in these developing techno-parks to increase employment through tax exemptions. The techno-parks provide offices to the well developed companies as well as the SMEs and startups in order to increase technological investments (I AA2).

However, all these incentives have short term effects rather than long term effects since the benefits have been used by the SMEs for their short term profits rather than by the universities. According to the manager of the techno-parks and the representatives of the firms, the last changes and developments regarding the incentives given by the government are significant in order to increase entrepreneurial activities in the techno-parks, but not the quality of the higher education, which can produce long term knowledge for technology. In the R&D activities, as in the TUBITAK report mentioned, "R&D tax allowance, income tax withholding incentive, insurance premium support, stamp duty exemption, and techno-entrepreneurship capital subsidy are given as incentives" (TUBITAK, 2010, p. 2). All these incentives are positively accepted by the participants, but the effects of these incentives are still unknown as one of the participants mentions:

> They are really important. However, I think that not all the companies in the techno-parks can use these incentives. Or they use, but we do not have any idea about what are the benefits of these incentives (I CA2).

Furthermore, according to TUBITAK Report, there are other incentives which are mentioned below:

> The new R&D tax law should also be highlighted such that the law fosters the employment of R&D personnel by the industry, and hence diversifies the employment opportunities for researchers. Many private research centers were certified under the Law in different sectors, like the automotive sector, defense, and durable consumer/white goods sectors. More importantly, almost 3000 firms and 14,000 people in R&D in the private sector were beneficiaries of the incentives. In other words, the incentives have provided "income tax withholding. In total, R&D tax allowance was about 2,5 billion USD" (2010, p. 3).

In other words, there is a direct project-support by the government for RDI projects in the techno-parks. The firms directly apply for the financial support to the ministry of Science, Industry and Technology. There are also other foundation to support incubations and SMSs. All these supports are related to giving consultancies or finding cheap funds and credits for the academics and the SMEs. It is no doubt that as the participants mention, the government incentives are more helpful in the techno-parks in which they develop "legal structure for R&D activities, by giving R&D tax allowance" (TUBITAK, 2010, p. 4). Most participants strongly agree about the incentives of the government as mentioned below:

> I strongly believe in the role on the government incentives in the techno-parks. These kinds of legal and financial incentives provide a suitable environment for the private sector to increase R&D activities (I AB1).

Additionally, according to the TUBITAK Report, most of the well-known public R&D programs are supported by the "Funding Program for Research Projects of Public Institutions," according to the needs of the R&D (2010, p. 5). The benefits of these incentives are explained as follows:

> The firms plan the R&D projects in order to fulfill the needs of the partnerships, which are among the private sector, academia, and public research institutions. However, in order to find cheap credits and funds, the SMEs should deal with the criteria of the government to use the incentives. Consequently, the end results are better when government incentives are used, particularly for the consumers and the development of the market (I BB1).

Even though different incentives are provided from the government as well other governmental institutions, some firms have the chance to use them properly, The rest have just learned the incentives. On the other hand, few academics can use these incentives, especially those who are coming competitive engineering departments and have better connections with the industry. Most academics play important and crucial role as consultants to the firms and they get money from the firms, but each has different procedures. More importantly, most students do have limited access to use these incentives. In the last two years, there is a strong promotion by the government to support directly the students or young researchers. Most of the time they have scholarship and/or they are working as research assistants. Additionally, the Public Planning Department put the policy related to educating the PhD students for the industry, which is another aspect of the incentives.

In the reality, using the academic force of the universities by encouraging them and by giving them incentives has significantly destroyed the ethics and the purpose of the higher education. Such incentives have dramatically changed the equality within the institutions. The incentives provided by the government have primarily used in the private sector where the knowledge produced by the university personnel is commercialized and commodified. In other words, the incentives have increasingly and negatively affected the academic profession and working conditions of the academics. While the new techno-parks creating social injustice, they motivate the academics in the commodification and commercialization of their knowledge, which can be used for the public good. In the following title, the effects of the political arrangements and mechanism at the techno-parks are problematized in order to understand critically how the universities have changed and challenged by means of the techno-parks again as the part of Level 3, the “Politics of Education.”

Experiences related to Political Arrangements and Mechanisms at the Techno-parks

In order to understand the transformation in the universities by means of the techno-parks, the practical implications are questioned and problematized by asking "How are the arrangements and mechanisms of the techno-parks that promote the university-industry-government partnership? While analyzing deeply the changes at the techno-parks, the impacts of the techno-parks on the industry are checked as well. As the last research question of the part one, the data are gathered from the interviews by asking sub questions given in the Appendix B in Turkish and appendix C in Englsh to answer Level 3 of the "Education Questions" called "Politics of Education." The participants agree that the arrangements and mechanisms in the techno-parks are not enough to face the needs of the R&D. The spaces are limited. More importantly, they expect to have more intensive policies to improve the partnership with the universities. The general impression regarding the partnership is that the firms and the managers of the techno-parks see the universities as the service-supplier institutions. In other words, according to them, the universities are the ones who have to develop technology and they have to transfer the latest knowledge to the firms. As one of the Interviewees explains:

> We came here to increase the collaboration with the universities. We expect to have same kind of relationship, like in the US. We should need to have patents in order to compete with our competitors. Most of the research and dissertations are on the shelves of the libraries. They like to serve to the science. Here, we are. I do not see any other best institution than us to serve to the humanity. Turkey has important problems. The universities should work to solve these problems, like the energy problems we have. Therefore, I do not see the decisions which are taken from the management of the techno-parks and the university

> management are enough. They should help us to cultivate the industry. In that way, it is possible to cultivate the economy as well as the society and the culture (I BB1).

The first concern of the firms is economic. They need the techno-parks and well-organized and well-developed techno-parks in order to increase economic competitiveness. They need high-level of education in order to solve their "human resource" problems. They need help of the government in order to decrease their costs and develop incentives regarding again for their economic competitiveness. According to one of the interviewees, the situation has highlighted as follows:

> The techno-park management with the help of the highly-intellectual academics should develop incentive mechanisms and instruments in order to help SMEs and startups companies because the universities have accumulated knowledge and experiences to solve the problems. Their academic background can help to decode the secrets of the highly competitive multinational corporations. Additionally, the incubators should be supported by the university because they have an objective environment to decide about who have the capacity or not. By the way, the Chambers of Industry should support them as well. The only help that the government should provide is related to the bureaucracy and funding. The rest belongs to the universities because they have the knowledge and the research methods to improve our companies (I AB1).

The techno-park management, on the other hand, strongly suggests the policies regarding the improvement of the social network. According to the interviewee, the situation related to the policies is clarified as follows:

> The policies regarding the techno-parks should be mainly about forming policies to make establish effective communication networks among the parties. In that way they can create synergy. Creating flourishing environment for collaboration and cooperation in the communication is the most significant action, particularly among those service providers, purchasers, universities, departments which make technology transfer, and R&D in order to increase competencies in the world competitive markets (I BA1).

Additionally, the managers see the techno-park as the best place for business incubator because they have been inspiring the young talents to establish their own companies. How the techno-parks have become the place of the entrepreneurship is explained by one of the participants as follows:

> Here, many young students have become the owners of their companies rather than seeking jobs in the market. This is the right place to become the entrepreneurs easily. They are motivated to transform their innovations and thesis into commercial products and services. I do not see any place as techno-parks in the world to develop your own companies. The government support them financially and formally. On the other hand, the management of the techno-park provides cheap offices and services to bloom their business. More importantly, the university support them newest tacit knowledge. And most of the young students as young brains work for them. After having right guidance and knowledge, they can be successful entrepreneurs. Whenever they need the management support them technically, financially, educationally, legally, and even personally (I DA2).

Some of the techno-parks are growing so fast because they have good students from the best engineering departments, while the private businesses are also interested in investing in these techno-parks. Most of the best companies in Turkey have established an office in the techno-park. In other words, the techno-parks have been used even by the well-developed corporations in order to use the benefits. One of the participants has highlighted the reasons why they establish an office in the techno-park as follows:

> We establish an office in the best techno-park in Turkey because the best knowledge transfer is here. Furthermore, we recruit the best students here to make work here. Most of them are ambitious students who have high self-discipline. We developed much innovation here because of these PhD students who work young and day. They are ready to solve problems 24 hours a day and 7 days a week. We, on the other hand, provide the most conducive working environment to develop them. More importantly, some of them work for us independently. This techno-park is the best place to develop entrepreneurs by supporting their innovation through incubation (I DB4).

The firms' representatives and the managers of the techno-park agree that some universities are so good that they are pioneers in using the advancements in the different fields so that they are known as the leader in the ranking list because they bring economic prosperity to the state. However, these techno-parks are taken into consideration as business institutions rather than educational institutions. However, the academics and the students take the techno-parks as the new arena for R&D rather than entrepreneur development places. They think that funding and conducting research are easier in terms of the practical implications in the techno-parks. The academics say that these are the best places, particularly for those talented ones. In other words, universities academic environments, particularly those who have solved their problems related to political arrangements and mechanisms. As one of the participants has emphasized:

> Universities are becoming popular because students see that they can earn money by choosing the academic career. Last years, most of the students left the school without any graduate studies for the international corporations. However, most of them are coming back to study in the graduate studies because most of their friend earn much more money than them. Their friends at the universities are travelling all over the world and they have much better career than them. So, the techno-parks are the new business environment where foreign investments are increasing as well because the political arrangements and mechanisms have been developed according to the needs of the SMEs, academics, and students (I DC1).

Most of the students mention that the techno-parks provide enough guidance related to the arrangements and mechanisms to support technology. For instance, all the research assistants are happy because they think that the techno-park help in getting funding, mentoring and business consulting assistance whenever they need to make them successful. Some of them have just become aware about the success of the startups after hearing the success stories in Turkey. They are also applying for the competitions which are opened by the government. As a result, the effects of the last political decisions on the implications are found positive in the techno-parks. The situation is explained by one of the participants as follows:

> I find strategically important about the practical implications in the techno-parks which are mainly services, like legal, financial, managerial, tax planning, research and development activities. But among all these creating networks is the most significant one because they help us commercialize our products and services (I DB4).

From this context, it is clear that the participants see the techno-parks as for the economic development and profit by improving technological development in products and services. Even though the political arrangements and mechanisms can be equally used in any techno-park, in practice only the techno-parks, which have strong organization, academics, talented students and well-developed SMEs, have intensively used these incentives and privileges. More importantly, the purpose of the higher education is changed and instead of educating and cultivating the human beings, they are taken into consideration as means to achieve the economic goals related to the prosperity of the private sector. The participants agree the highest the education level, the more prosperity will have the countries. In that way, it is possible to diminish inequalities in the society, which is defined in many different communities as the motto of the neoliberal policies. However, the effects of the political arrangements and mechanisms related to the techno-parks have dramatically increased inequalities among the regions, universities, and even within the same institution. The implications of the techno-parks have showed that the inequalities among the departments, the academics, and the students have been significantly increased which cause social injustice in the community.

Experiences related to Educational, Economic, and Spatial Inequality at Techno-parks

In the second part, the last five research questions are answered. In that way, the data collected by the participants at the focus group interviews have been used to answer the forth and final "Education Question" Level 4, the "Outcomes" (Dale & Robertson, 2008, p. 9). Hence, it is possible to analyze more deeply the outcomes and the consequences of the Turkish higher education's sector transformation. The twelve participants of the two techno-parks are participated in the focus group interviews. Under the research question "What kinds of economic, educational, cultural, and spatial inequality are created by means of the techno-parks?" the data are collected by the focus group interviews in order to understand whether the techno-parks created any inequalities or not. Two categories 'educational inequality' and 'economic inequality' are generated based on the research question. The spatial inequality is given in the following subject as segregation of space. The perspectives of the interviewees are perceived critically important about inequalities, which could be more problematic in the long run. Findings of the research have highlighted certain aspects of negative sides of working at a techno-park in terms of the inequalities, which are classified as educational and economic. In the following subjects are about these inequalities.

Educational Inequalities

Universities are specialized on the specific disciplines that they have taught for centuries. Nevertheless, there are some disciplines, such as biotechnology and mechatronic that are new enough that universities have tried to improve their impact in these fields. On the other hand, the markets and economic changes have forced universities to make changes in their curricula. As the participants have mentioned, some competitive universities have followed trends by designing innovative programs and curricula to meet the needs of the market. In changing their curricula, they take into consideration the need of their students who are taken into account as customers. According to the experiences gathered from the focus group, some courses as well as some programs which are easily replicable, are then implemented by other universities. However, there are some highly technology-dependent courses and programs, such as those in nanotechnology that are not replicable and consequently increase the reputation of the universities. The interviewees have also highlighted the fact that there are certain other obstacles to creating, designing and validating a new course. For instance, according to the academic at the best techno-park in Turkey, finding right academics for the specific programs is another concern since these individuals are mobile and often difficult to find experts in their field. On the other hand, as the participants have clarified, some universities are very careful in managing and controlling their courses and related materials. Such managerial policies create discussions even though some of the best universities such as MIT, Stanford and Harvard have put their courses online. According to the experiences of the academics at the focus group, an increasingly marketized and commercialized environment has resulted from online courses. The students have been taking courses online without attending the classes. At the end, they all get the best scores in their exams. Therefore, they critically emphasize that they need to protect their students, their position, their reputation, and their freedom to operate efficiently and effectively at the university. The university management has certain kind of problems, while they need to do the right and necessary investments. As the interviewee I DC3 emphasizes:

> Research projects have changed when private and government sponsors are involved in. The biggest challenge in ineffective teaching, particularly in engineering, is not ensuring knowledge accumulation in science. However, some lessons are developed related to the research so that the university's freedom is restricted while conducting and publishing research outputs (I DC3).

Additionally, as one of the participants have clarified that universities often provide routine services to business in the techno-parks, even to governments. The most asked services from the techno-parks are related to "problem solving, materials testing, manufacture of drugs for clinical trials, analyzing policy options for governments or providing business advice, but universities must consider the need to preserve their own "background" which is teaching and developments of their fields. However, in the technology-based dominant economies have changed even the textbooks of the engineering departments. After taking advance level courses in Mathematics, Physics, Chemistry, and Biology, student become more concentrated on their courses related to their field. Most of the elective courses and senior year courses are more oriented on research subjects. Most of the time the research subjects are becoming from the environment of the techno-park. As one of the Interviewees (I CD1) points out:

> The content of the lessons are based on the research. Most of our assignments are related to the research questions, which are asked from the techno-park firms. We like to work for the market because we become ready for the market. The research or the assignments that we did are very important for our CVs. Most of the companies which are specialized on the technology, look at our CVs and ask the research that we are involved in. we ask from our professors to conduct contemporary and hot subjects in the market. We are lucky because our professors are partners of these companies and they know better than the professors of the other universities. They help us to be ready for the business environment. ıt is also possible to find better internship opportunities. They help us to find as well. They suggest us to work in the techno-parks firms as interns. More importantly, whatever we do in these companies are so similar to those assignments that we do in the classes. So, it creates synergy: whatever we learn during the intern, we can use in the classroom.

On the other hand, from the perspective of the academic, the content of the lessons are changing because the relationship between the firms in the techno-parks and the academics is improving. As the Interviewee DD1 points out:

> The private sector, the managers and the researchers are only interested in their own interests but not the university activities. Therefore, they ask research related to their interests. These research subjects are so difficult that they cannot conduct by themselves. They ask the help of the university. The university professor cannot do all this research alone so they ask from their research assistants, PhD and /or master degree students. Most of theses as well as the assignments are related to the research subject which has asked from the clients in the techno-parks. Similar problems are seen particularly on commercial licenses. The individual property rights are not covering properly the right of the researchers so that commercial benefits are used by the private sectors. But, academic research and publication plans should be protected (I DD1).

Furthermore, the best universities are playing strategically to protect their individual property rights. In the knowledge transfer, besides teaching students, the patents and licensing rights are strategically protected and controlled from one center. However, not all the universities are financially strong to protect the rights. However, in the last year, the university environment is changing as the Interviewee I CC3 mentions:

> In the techno-parks, companies and organizations, which have problems, use knowledge at the university to solve their problems. Therefore, they have direct relationships with the university where they pay materials testing or help for their marketing strategy. The government helps by giving incentives; therefore, learning environment of the university is not always beneficial and protectable. Most of the time, these activities creates benefits for the private sectors, like research outputs (I CC3).

However, according to one of the professors at the focus group:

> Care is required in contracting to preserve the university's background and any developments of the background that come out of the project. The university should not allow the property rights to become the property of a company (I CC3).

This situation is supported by Claire and his friends' studies that it is generally important to ensure that client relationships are not exclusive. For instance, "the university is free to work with others in the field although there may typically be restrictions on using reports or other deliverables previously generated for one in new projects for others" (Clare et al., 2010, p. 14). Additionally, in many universities, academics are involved in consultancy activities while spending their time in the techno-parks. As the Interviewee DB1 points out:

> This is an important strategy in the knowledge transfer from the university (in both directions). Most of the time, educational inequalities are created empowering the private industry. The professors do not spend enough time with their students because they are consulting. More importantly, homework assignments are related to the projects directed by the private industry. I strongly believe that there is a hidden agenda of the professors that it is not known by the students. Most of the lessons are so superficial or thought by the research assistants rather than the professors. One of my friends at Stanford University has complained about the same problem. None of the professors has seen in the classes since they are in the highly funded projects. I think that we will see the same situation in Turkey (I DB1).

Additionally, the conflicts of interests are seen between the private industry and the universities since common activities can lead to misunderstandings and expensive litigations. According to Claire and his friend, universities have to have policies to ensure first the responsibilities related to R&D for the public interests; however, private consultancy creates conflict because of the commercialization of the activities. The borders are not clear, so whether the academics advise properly or not is not controlled. In these days, the private consultancy has turned to commodification of knowledge rather than knowledge transfer in order to improve the field (Clare et al., 2010, p. 7). This situation is supported by one of the participants as follows:

> In the last decade, some departments at my university are not organized to make student study to earn a degree. However, they develop projects to increase their income by commodifying the knowledge. Therefore, they work with the SMEs at the techno-park in order to develop specific management strategies. However, their interest towards the techno-parks have significantly decreased the quality of the teaching and learning at the universities. Additionally, in order to protect their know-how, they do not have any arrangements (I DB1).

As Claire and his friends (2010) mention, universities are consistently creating new knowledge which is seen as research output for the public interest "through publication in journals and free dissemination, including through institutional repositories and theses of students" (p. 9). However in the case of the techno-parks know-how is not protected and used directly by the private sector. More importantly, as one of the participants has mentioned that professors at the university have channeled their master and PhD students to the projects at the techno-parks. Indeed, they have to help postgraduate students to publish their thesis and to develop their research careers. Even though this is the right of the postgraduate students, their theses are used inn the projects of the techno-parks where the permission is not given for the publications of these theses. This creates indirectly a kind of inequalities and social injustice. One of the student interns has explained this situation as follows:

> Even though the studies of the PhD students are critically important for the university research, some projects at the techno-parks are conducted under the thesis of the PhD students with the industrial partnership. In my university, there are potential conflicts between the university and the industry. Furthermore, in some cases, the benefits are taken by the firms in the techno-parks. There is a pressure on the researchers, like us to take patents before publishing. In some cases, the SMEs at the techno-parks have asked to allow the rights of the patents to the industrial partners. They have even asked to delay the publications. In most of the cases, taking patents is so expensive that we cannot take alone. As a result, the knowledge, which is produces by the researcher, is used for the benefit of the firms rather than the researchers themselves or the university. Even in some cases, we cannot see our name on the projects. Our intellectual knowledge has drained by the system at the techno-park (I DD3).

Most of research projects in the techno-parks are developed under the funding of private industry or the government. However, the most important parts of the projects have been done in the laboratories of the universities by the PhD students or the young academics. The participants agree that the firms of the techno-parks can use them since these projects are funded by them. However, most of the participants at the focus group have complained about first their rights in publication and reputation, then their right in financial income. As the Interviewee DD2 complains:

> I understand that these projects are funded and paid by the firms or by the government, but we conduct these projects for nothing. Just to protect our relations with the professors. More importantly, our names are not mentioned in the projects. Most of the credits are used by the seniors. More importantly, I cannot even write in my statement of the purpose or resume to show my academic activities, while I am applying for the postgraduate studies (I DD2).

From the data gathered from the focus group, it is clearly seen that there are some educational inequalities and social injustices that they are rarely mentioned in the academic arena. This can be seen also in the numbers of the patents as well. The techno-parks in Turkey have generated only 1,481 patents in eight years, which is a small part of the iceberg. However, the economic effects of this new knowledge have created benefits for the SMEs at the techno-parks while limited jobs and limited innovation are gained publicly for the economy. The benefits as profit and income are distributed by the firms. The royalties cannot be used properly by the universities. Therefore, strategic policies are needed to protect individual property rights, which have been increasingly creating social injustice and educational inequalities. While all these changes are happening, the climate of higher education is transformed. Most of the students and academics of the universities in the engineering department have the chances to take more opportunities from the university budget, the other faculties related to education and social sciences lose their importance and have limited number of academic publishing because of funding problems. Most of the funds of the universities are channeled for the activities in the techno-parks but not for the other departments. Consequently, the inequalities in the higher education begins with the economic background of the families who cannot support their children during the university entrance exams or they cannot support their children to sent to the private universities. Additionally, at the university, the segregation of gender is seen as educational inequalities, especially for those girls who cannot attend in the engineering departments. At the departments, however, the inequalities get worse because their intellectual knowledge and talents are drained by the private industry through the projects at the techno-parks. In the following title is about the experiences of the participant related to economic inequalities that they meet at the techno-parks.

Economic Inequality

Most techno-parks with the help of the universities have actively engaged with the market. By means of these activities, they can increase consistent profits for the university. But in Turkey, the most successful universities are not able to generate revenues from patent even though income from the patent can be significant. Furthermore, the most important aspect of the income related to patents is that the profits and economic benefit are collected by the private industry rather than the university and the academics. Even though the SMEs at the techno-parks have been using the university intellectual outputs and facilities, particularly those of academic intellectual knowledge, they take all the benefits for short tem profits. As a result, at the universities techno-parks, the economic inequalities are created. Claire and his friends (2010) point out that the effective IP protection strategies can still be important for the financial returns in the university techno-parks (p. 14). In the last decade, a large number of the students start their own business after leaving university, or even while they are there by using different opportunities and facilities of the universities and the techno-parks. But, the number of these startup companies is still less and most of the big SMEs take the advantage, As the Interviewee DB5 points out:

> Universities have been involved in different activities in the techno-parks by investing directly in new businesses, supporting firms,

consulting them in management and introducing their and their students' research in social networks. However, in Turkey, all these activities are done individually. The university needs strategies to make all these activities. Transparency, accountability, equity, and affordability are important for the future of universities and public interests. If not, the universities and their facilities will be used for individual and private sector interests" (I DB5).

Another participants has critically highlighted this issue as follows:

> It is not possible to describe all the responsibilities of the universities, but first they should concern public benefit as their missions. Even though autonomous institutions are discussed and accepted by many stakeholders, autonomy does not prevent to work for public. However, funding in the autonomous institutions will manipulate and change the decisions and responsibilities related to the public benefit. In the long run, managers and academics can consider the activities related to funding which could create conflicts in their vision and mission. In these days, universities are becoming known related to their know-how in the global market so that the market will change their strategies" (I DC3).

Furthermore, another economic inequalities are created among the department. The structure of the Engineering Departments is changing with the involvement of the activities in the techno-parks. In this sense, most members of these departments are participated in the projects where they can earn much more money than those in the other departments, particularly at the Social Sciences. As the Interviewee DC3 mentions:

> Most of the researchers, especially professors, make fortune at the projects. I know a professor who earn a million US$ a year at the university by conducting and managing research projects together with SMEs at the techno-park. However, his colleague at the same university can earn approximately US$ 30,000 a year. These differences will increase in the coming years since the government incentives become well-known by the researchers. Unbalanced development of the university will increase conflicts at the same institution.

Clare and his friends (2010) have supported this situation that the potential for conflicts in the techno-park landscape is large. Additionally, they do not have strategy to reduce the inequalities (Clare et al., 2010, p. 15). As the Interviewee CC3 points out:

> The techno-park environment is totally different than the environment in the universities. The research and technology transfer cannot be done as it is done at the universities. The income plays important and crucial role in

> technology transfer. There are conflicts between the groups who support commercializing of knowledge and opening freely the sources. Hence, I strongly believe that inequalities between the firms and the universities will increased because of the policies and regulations. However, there should be a system in order to protect knowledge, academics and students (I CC3).

Additionally, the perspectives of the firms in the techno-parks are different as it is seen in the words of the Interviewee I CB1:

> By transferring the knowledge, the university tries to increase direct income from commercial activity, whereas the private sector has increased income from knowledge transfer. In that way, the activities in the techno-parks generate direct profits and economic benefits for all the stakeholders who are firm members, academics, researchers and students in the universities. There are also other advantageous but there are not direct benefits, such as opportunities for entrepreneurial activities. Today, supporting the activities in the techno-parks is becoming more desirable that the activities at the universities because there is direct economic and social impacts for all the stakeholders (I CB1).

Universities by means of the techno-park environments create income. While creating income, they can create also economic inequalities at the university, which destroy long-term relations and structure of the system. As Clare and his friend (2010) have highlighted, “Universities should understand the cost of all their activities. In most cases, they cannot remain sustainable in their activities and be able to take into account other considerations, such as their social mission and long term strategic relationships” (p. 19). By means of the projects, the private firms at the techno-parks become dominant at the university. Therefore, the firms set prices in the market about the projects and they decide even the income of the academics and the universities. In that sense, the firms are becoming stronger at the universities than the administration and the academics. Most of the time, the firms in the techno-parks take the profit, while the academics earn minimum. However, they are the ones who conduct the projects. In other words, as Clare and the others have clarified that he investment in intellectual assets in financial terms produces outputs that are not wholly used by the university (Clare et al., 2010). Consequently, all these new dynamics have been creating economic inequalities within the institution and among the universities. The consequences of these inequalities are not known for the universities. However, according to the participants, these inequalities will deeply and dramatically destroy the system of the universities.

Today, as one of the participants of the focus group has emphasized that conditions related to funding in the higher education are related to research funding. The government has provided support and incentives for to increase the technology-based activities and innovation. Therefore, universities' approach is to increase patent activities while improving their knowledge exchange strategies. The investment of the government as funding research is strategically important so that universities develop strategic policies in order to improve university-government-industry partnership. As the Interviewee I DA1 mentions:

> Competitiveness is important not only for the countries and for the private and public institutions, but also for the individuals. Because of increasing unemployment, the graduates of the universities have to be prepared properly for the market. Therefore, employability is remarkably important for the universities. By improving intellectual property rights and entrepreneurial activities, universities can increase their funding. Hence, techno-parks are taking into account as the places to develop strategies for different activities to increase income. The financial autonomy makes the universities aggressive in the market. The government is increasingly reducing the support for the higher education. So, universities by means of techno-parks at their campuses have become institutions as corporations. However, there are universities, like Wisconsin Madison, which have managing the universities without conflicts and inequalities. I strongly believe that the universities are the changing agents to redefine the boundaries in changing conditions. Consequently, the university can control and manage the conflicts and inequalities. For instance, there should be intellectual property rights to protect all the stakeholders, particularly those who do not have strong background, like the students (I DA1).

In the light of this evidence, it is clearly seen that the research projects have become the heart of the activities at the universities. The most significant challenge and obstacle, which create economic inequalities, are related to the research outcomes, patents and licensees. Who will use these privileges become important questions in the techno-parks and in the universities. As Clare and his friends have emphasized, “Whatever the economic climate, institutions should consider greater investment in knowledge transfer, including recognition and protection of the academics rights, even the students. In the short and long run, there would be an appropriate return to the institution” (Clare et al., 2010, p. 21). If not, the consequences and the drawbacks would be much more than it was thought. As the Interview DB4 points out:

> The private sector can have many different benefits by accepting highly qualified individuals at the techno-parks where they can improve opportunities and innovations, including new technologies. The students, particularly those PhD students and graduates have strong academic background, yet they learn other skills, like team working, emotional intelligence, project and strategic management, and communication. The techno-parks have become attractive not only for the industry but also for the new graduates where their talents and knowledge are misused (I DB4).

According to another participant, this situation is supported as follows:

> The management of the techno-parks tries to meet the needs on both sides. They try to attract qualified candidates. Their major goal is success in order to make the techno-park more attractive for innovating companies, particularly small companies. For that reason, they hire graduates and students who have been involved in collaborative research projects. However, student work with minimum income to support the projects. They use their innovative skills, but not technical skills through research projects in order to produce highly intellectual products and services.(I CB1).

Today, the government has decided to explore new opportunities by giving new incentives to the postdoctoral fellows program in order to attract the researchers in Turkey. The main goal is to increase research projects in Turkey. The students have been working without even earning money because in the long run they expect to earn money. The success stories of the graduates who established their own companies motivate them. However, the benefits are mainly taken by the big corporations. The number of the SMEs, which are successful, is limited. The university tries to increase the benefits of these activities, which create reputation for the university as well as the techno-park. Nevertheless, in the long run as Dale (2012) has mentioned, they are not going to be successful because they destroy the spirit of the universities. As it is seen clearly from the data gathered from the focus group, the universities have been changing because of the changing conditions. In order to survive sustain, the universities have developed a system to increase their income by means of their techno-parks. However, their approach can meet their needs only in the short run, and the effects of this new system would be more dramatic in the long run as creating educational and economic inequalities. In the long run, such inequalities might have create serious social injustices. As Level 4, the "Outcomes" of the techno-parks have been dramatically changing the main purpose of the higher education. In other words, the higher education will create inequalities and social injustices rather than equalities and social justices. The following title is discussing the inequalities and social injustices from different perspectives taking into account segregation related to gender and spaces as the analysis of Level 4, the "Outcomes" (Dale & Robertson, 2007). After discussing the inequalities created at the techno-parks, the segregation experienced at the techno-parks as another outcome.

Experiences related to Segregation at the Techno-parks

In the "Multi-Scalar Governance of Education" Analysis, Level 4 is about the "Outcomes" in order to analyze critically the educational phenomenon more systematically and critically. Hence, by asking sub research questions given in the Appendix D in Turkish and Appendix E in English, the data are collected from the focus group participants who are working at two different techno-parks. The main goal is to problematize deeply the research question “Do techno-parks create any segregation?” in order to understand critically whether the techno-parks have been creating any segregation in the university environment or not. Before the experiences related to the segregation at the techno-parks are given, it is important to give the background of the higher education from the perspective of the segregation. In Turkey, as Gök (2002) mentions that the education system has deeply created segregation in many different aspects of the society. The first one is about the spatial segregation, like going to school or not, going to public school or private school, going to private tutoring centers, called dersane or not, and going to university or not, pubic or private. Therefore, the same kind of segregation can be seen also in the departments (Gök, 2002). Most women cannot afford to go to the specific departments or majors because of the Turkish education system, particularly higher education system, which canalizes students at the university entrance exam. As the participants from the academic world have mentioned, women are largely underrepresented among scientific departments at Turkish universities, especially at top-level universities departments, like Electric and Electronic, Computer, Mechanical, Civil, and Industrial Engineering. At the level of the so-called in-stream of the scientific personnel, the situation is more satisfactory. Most women who were graduated from engineering departments preferred to stay at the universities as academics. But the follow-up on high-level positions is still problematic. However, most departments, which are related to the activities at the techno-parks are related to the scientific departments. For that reason, most departments, particularly in social sciences are not involved in the techno-parks activities. Additionally, most technology-based departments have used better opportunities of the universities comparing to other departments. In that sense, not only their inputs of these departments but also their outputs are more than those of the other departments. According to some participants, even though the difference is not big today, the coming problems will increase in the near future because of unbalanced developments in the universities. More importantly, although some universities take some precautions to balance the activities of all the departments in the universities, taking into account the needs in the communities, most universities have neither enough money nor awareness about the social issues and social justice.

Consequently, under the techno-parks and transformation of the higher education subject, the phenomenon of ‘segregation’ is generated based on the research question. Thus, how participants see techno-park environment as a place is identified. Also, this category enabled the researcher to understand what kind of segregation could be pointed out in the techno-parks. The point, which is frequently identified by the participants of this study, is gender segregation. However, the gender segregation is the result of other causes. For most participants, techno-parks are new working places, which provide them separately new opportunities to do research and development in their field, while earning extra money. Moreover, in participants’ view, techno-parks create free environments and atmosphere, which allows them to be flexible on their working schedule and working hours. Most academics leave their universities in order to work in the techno-parks or most firms use the laboratories of the universities. Thus, they point out that they have better chances to use the opportunities and facilities. However, the flexible working environment, conditions, and better financial opportunities are for specific departments, which have technologically high innovation in order to improve the firms in the techno-parks. Hence, the phenomenon of segregation is analyzed from three different perspective which are namely segregation of gender, segregation of field, and segregation of space. All these three segregation types make universities more unequal than ever before. Additionally, the social justice issue has become important. The following subjects are related to the gender segregation and field segregation in order to problematize critically how the techno-parks have transformed the higher education by means of the techno-parks and created social injustices and inequalities as the "outcomes" of Level 4. The segregation related to the space is discussed in the title related to the effects of the techno-parks on the urban development.

Segregation of Gender

According to TUIK Report (2012), even though the number of women researchers in Turkey has been increased after 1990s, the number of women who are in the field of engineering is significantly low. The number of female researchers cannot be taken equally for all the departments. As the Interviewee CC3 emphasizes:

> In the institutions of higher education, the proportion of the women has increased compared to 1990, but not in the field of industrial research. The social standing of research careers has gradually decreased over the past 15 years. Several talented research workers moved to other fields or abroad, and the government commitment in terms of R&D subsidies appeared to be indecisive. They also underline a strong correlation between feminized areas and lower earnings (I CC3).

Furthermore, the Interviewee DC 3 and Interviewee DD4 have pointed out that the same feature of university as an academic environment is the same in terms of gender segregation. As it is seen in Table 16 and Table 17, taken from the

Report of TUIK (2012), the number of women in the academia is still less than men although the number is increasing.

Table 16. The Number of the Women in the Academia between 2001-2011 (TUIK Report, 2012).

YEARS	Total	Prof.	Assoc .Prof.	Asst. Prof.	Instructor	Language Instructor	Research Assistant
2001-2002	36.7	24.7	31.5	29.5	36.1	56.6	40.9
2002-2003	37.1	24.9	32.5	29.8	35.8	56.8	41.9
2003-2004	37.9	25.6	32.8	30.2	38.2	56.4	43.1
2004-2005	38.3	26.5	31.7	31.1	37.4	56.7	44.3
2005-2006	38.8	26.7	31.4	32.1	37.6	57.6	44.9
2006-2007	39.3	27.1	30.9	33.1	37.8	57.9	45.8
2007-2008	40.3	27.5	31.7	34.2	38.6	59.1	47.1
2008-2009	40.7	27.4	31.6	34.8	38.5	59.9	47.5
2009-2010	40.9	27.7	31.9	35.3	38.8	60	47.8
2010-2011	40.9	27.6	32.2	35.5	39.1	60	48.1

Table 17. The Number of the Men in the Academia between 2001-2011 (TUIK Report, 2012).

YEARS	Total	Prof.	Assoc .Prof.	Asst. Prof.	Instructor	Language instructor	Research Assistant
2001-2002	63.3	75.3	68.5	70.5	63.9	43.4	59.1
2002-2003	62.9	75.1	67.5	70.2	64.2	43.2	58.1
2003-2004	62.1	74.4	67.2	69.8	61.8	43.6	56.9
2004-2005	61.7	73.5	68.3	68.9	62.6	43.3	55.7
2005-2006	61.2	73.3	68.6	67.9	62.4	42.4	55.1
2006-2007	60.7	72.9	69.1	66.9	62.2	42.1	54.2
2007-2008	59.7	72.5	68.3	65.8	61.4	40.9	52.9
2008-2009	59.3	72.6	68.4	65.2	61.5	40.1	52.5
2009-2010	59.1	72.3	68.1	64.7	61.2	40	52.2
2010-2011	59.1	72.4	67.8	64.5	60.9	40	51.9

Even though the female participants at this study point out that the significant difference between the number of male and female researchers in the departments of engineering which are involved in the activities of their techno-parks. However, none of the male participants have realized such a kind of significant difference. All the female participants in the research have mentioned the segregation between research and other professions. Since there is devaluation of the research, most of the academic positions at the universities are feminized. The Interviewee DA1 clearly problematizes the segregation from different perspective:

> In the universities, most of the female researchers are in the areas of humanities and social sciences. On the other hand, in the private sector, they are in the financial sector because they are paid less than men. More importantly, in the field of engineering and technology, men are more dominant than women because few women can be specialized on engineering and technology. In the other disciplines, the number of women is relatively high as in the private sector where they are specialized on business administration (I DA1).

This situation is even supported in the literature. According to Meulders (2010) analyses, the relationship between the number of women in a specific field and the level of expenditures in the science fields is critical. As Meulders explains:

> In the case of budgetary institutions, the proportion of women is the highest in the fields of medical sciences and humanities, and the expenditures are the lowest in natural sciences and humanities. In the higher education sector, women's percentage is low and the expenditures are high in engineering and technology, and we find the opposite to be true in the field of social sciences. The proportion of women is also high in medical sciences although the expenditures do not seem too low compared to other fields. The expenditures are the highest in agricultural sciences, however, the proportion of women is not exceptional there. In the research positions of the private sector, the proportion of women is high and the expenditures are at a low level in natural sciences. The proportion of women is the lowest in engineering and technology, which hold second place in terms of expenditures. The expenditures are the lowest in humanities, but the proportion of women is far from the highest. Both the proportion of women and the expenditures are highest in the field of medical sciences (2010, p. 104).

Additionally, the participants also show that vertical segregation worsened in the techno-parks environment and atmosphere. As the Interviewee DD2 highlights:

> The drastic fall of research in the techno-parks can be explained by several factors. Firstly, there were considerable cutbacks both in the academic sector and in the sector of research institutions after the change of regime and in addition to this most of the research institutions of large state enterprises were eliminated.

Secondly, the earnings of scientific researchers are low and the better earning conditions available in the private sector. Since the women cannot work as men, they are forced to work in the academia (Meulders et al., 2010). This situation is clarified by Meulders as follows:

> This process affects men more than women because women find it much harder to reconcile the work hours and intensity expected in the private sector with their family and household duties, i.e. with the so-called traditional female roles. Thus the decrease in the number of males in scientific research can be explained by the phenomenon [...] claiming that in our region men gather in the more profitable professions, and as the increasing number of researchers does not mean a simultaneous remarkable increase in the GDP -proportional R&D expenditures, it directly follows that men have not returned to these professions yet. Developments in the near future shall reveal whether this advancement proves stable or not (Meulder et al., 2010, p. 5).

Furthermore, according to the participants who are participated in this research, the career in science is getting worse than ever before. According to their experiences:

> Career in science is like scissors, which have been closing for five years. I am not sure that this trend will go and increase or decrease. I think that more men will come to the academic world since much money is invested in research. So, women will once again be kick out from this profession (I DC3).

Additionally, in the engineering career, women are less seen than men because there is a strong social belief that engineering career and success in this field belong to men. The approach of the society as well as the academic environment is basically male-centric. Therefore, in most techno-parks men are more dominant than women. More importantly, as Meulders and his friends (2010) point out that in many cases women themselves accept a male superiority. According to the participants, the real reason is that career progression is blocked by the female roles, like motherhood. Additionally, most of female students were successful in studying in the engineering departments, but they do not chose the engineering career.

Furthermore, nearly all interviewed women described the influence of male networks in their daily work. In this way, gender segregation intertwines with trust relations and emotions, which are central in service- oriented techno-park work. Gendered patterns of trust and recognition of competence are built within the segregated networks of experts, as one of the female interviewees explains:

> The managers of the techno-parks are coming from "old boys" club so that they have their own network. In this techno-park, most of the managers are men who come together and solve their problems in the same restaurant. Therefore, most of the women cannot participate in (I DB1).

More significantly, male bonding takes place on several layers from local and regional to national and global settings. The interviewed female experts told especially about the local male networks. One of the interviewed women described:

> There is a small circle, and we have learnt to know who plays with whom, those boys. (...) Here clearly certain people invite each other (I CD1)

There are various clubs where men meet, in sports, hunting, and club activities. Men have also often studied engineering together. It seemed common that all relevant people in science park work know each other and co-operate, while at the same time they "have brotherly competition" for resources, as one male top manager pointed out. The global competition tends to further intensify local co-operation and networks. Although there are certainly various bonding and networking processes going on simultaneously, even world-wide, as Connell and Messerschmidt (2005) suggest, the local old boys' networks seem to retain their utmost importance in science park work.

Finally, the data gathered from 12 participants explain that segregation of women is significant in the techno-parks where the equal career opportunities for women are limited. In other words, female researchers are significantly under-represented and they have not yet been considered seriously in the techno-parks because of the effects of neoliberalism and neo-conservatism. To conclude, the interviews suggest that gender segregation appears persistently at the interface between science, technology and innovation. It continues the old track of both vertical and horizontal segregation. The segregation is maintained and further strengthened by the numerous male networks, creating mutual trust and partnerships among the male members of the techno-parks.

As it was observed in other countries, Meulder and his friends clearly highlights that women are more participated and concentrated in different fields, particularly in "social sciences, psychology, medicine and biology. Moreover, the pay distribution reflects this segregation more openly" (2010, p. 6), However, the most obvious segregation is seen in the administrative departments where a few women have managerial positions as the participants have declared. As Meulders and his friend have emphasized, "The unequal treatments of women in science are also problematized as other aspects of the segregation (interest of women, the educational preconditions and the socialization)" (2010, p. 8). In addition to the women segregation, there is also the segregation of the fields at the techno-parks. The structure, the curricula, the administration and the relations of the universities have been redefined because of the segregation of the fields, which affect deeply the position of the women at the universities. This issue will gain importance in the coming decades as a social injustices and inequalities. As the "Outcomes" of Level 4, the techno-parks have been increasingly creating serious gender segregation. In the following title, the segregation of the field is problematized as another "Outcome" of Level 4 in order to show how the dynamics and the value systems of the universities have been changing since the development of the techno-parks.

Segregation of Fields

According to Meulders and his friends, the most investigated fields are related to "science, mathematics, and computing. However, in the techno-parks, the fields are related to "engineering, manufacturing, including industrial design, and construction" (2010, p. 11). As it is seen in the Figure 31, according to the report of the Ministry of the Industry (2012), the same kind of trend is seen in" Turkey as well in terms of the fields. Most of them are belonging to the areas of the engineering departments.

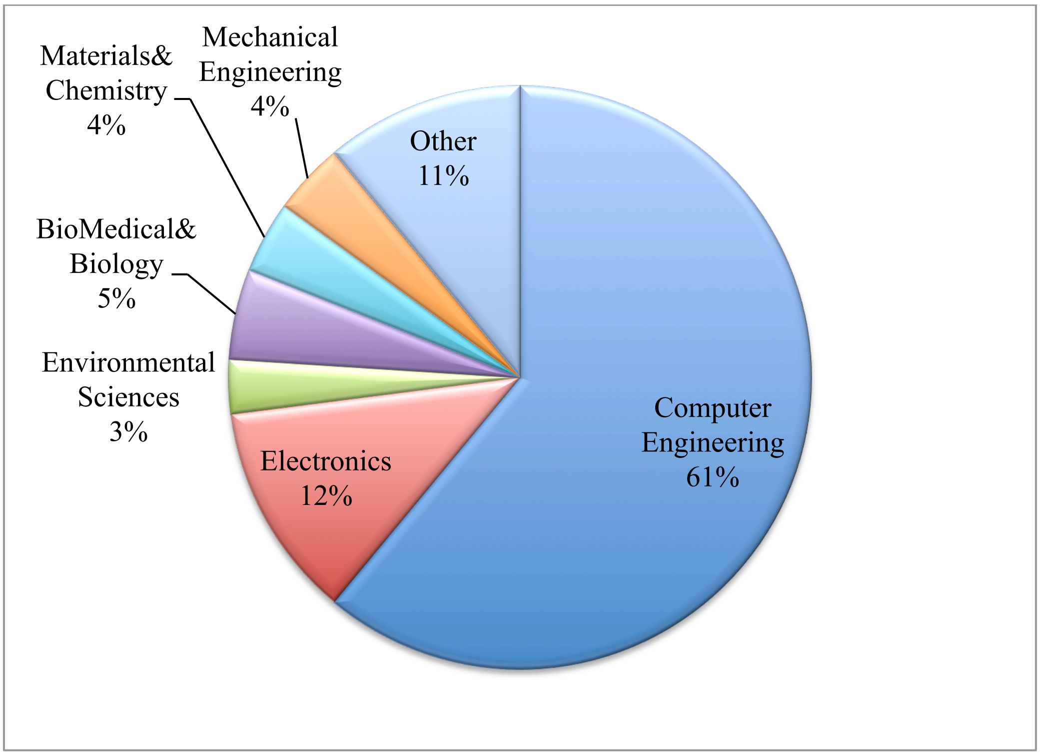


Figure 31. The Percentages of the Activities in the Techno-park in Turkey, in 2011 (The Ministry of the Industry Report, 2012).

More importantly, according to Meulders and his friends' studies, the less studied fields are related to "the social sciences, business and law. Humanities and arts are not studied fields" (2010, p. 13). As it is seen in the Figure 31, the activities are mainly related to the Engineering Departments. There are some academics or managers who are coming from Business Administration and related departments, but the rest are coming from the Engineering Departments. Among the social sciences, only the department of law plays important and crucial role, especially in order to protect intellectual properties and to arrange protocols and agreements. In this study, the people are coming from mainly the technical programs. The techno-parks define themselves related to their strategies in the global economy and their income earned in the past years. In that way, they encourage the private sector by making reputation related to their specialization areas, incentives, income and profit. Consequently, they can attract well-known firms and individuals, including incubators for their technology offices and laboratories. According to the participants, these techno-parks are attractive also for the academics who have potential to patents in their field. It is no doubt that, engineering departments have more potential to have patents than those departments in social sciences, humanities, and management. A few patents are not enough to develop a technology. Hence, according to the participants, universities choose strategically right firms in the techno-parks in which they need to increase the number of the patents. As a result, most fields, like Electric and Electronic Engineering, Computer Engineering, Chemical Engineering, Material Science, and Mechatronic are becoming important in the techno-parks in which they have more personnel, financial help, and scholarship opportunities than those in the social departments. As one of the participants, Interviewee CA1, mentions:

> The techno-parks are future-oriented. They define their work as the development of the new and highly technological products and services, which have not yet existing in the society. The basic aim of the techno-parks is to promote innovation by matching science actors with business actors. Thus, in transferring scientific knowledge into products and services, engineering, design and marketing are needed. Therefore, instead of social sciences, engineering and design departments, partially marketing and finance, will play important and crucial role in shaping the future.

The same situation is supported by one of the top manager interviewees, Interviewee DA1. He has described his organization as follows:

> A major part of our work comes from bringing different actors together, which means that we bring partners together or we collaborate in such a way that something new is discovered in the actual development processes... When we have brought researchers and companies together, we consider for a while and then see whether a new firm is needed or whether a particular technological competence needs to be strengthened. In our work, we need to recognize the opportunities and needs of different partners in these development processes. By bringing in something new or some new ideas, we try to improve the science, technology and business environment as a whole, which are studied mainly in the Engineering Departments, but not in the Social Sciences.

Additionally, according to the experienced of a female expert, Interviewee DB1:

> Being successful in this work is possible by taking the initiative. So, I see the importance the technological departments and leadership programs instead of social sciences. Of course, students should take humanity and social science courses while studying at the universities, but we do not need any people from social sciences, particularly in the production of the highly technological products and services.

Moreover, the top managers of the firm representatives have clarified that they need people who are fluent in two or even three different bodies of knowledge, know well the local researcher networks and have perhaps worked at university and earned a doctor's degree. Furthermore, their employees should have a business or industry background, ideally complemented by experience in funding mechanisms. They need to know well the local, as well as relevant national, European and international networks in all these areas. They need to know the business logic. They have to understand research to distinguish the most interesting scientific results and their potential in commercial value. They have to know how the collaboration between research and companies is financed. Furthermore, they have to know to deal with different experts' networks. They need personal relationships with research and business actors, which are necessary in the work. As a result, all the participants of the focus group agree that the fields of the studies are mainly the Engineering Departments in terms of improving the success of the techno-parks in the region as well as in the country. These fields are the core elements in order to make innovation and to have enough knowledge to develop any technology-based products or services. According to them, the tacit knowledge is more important than coded knowledge. The objectives of the technical field cannot be achieved outside of the laboratories so that these innovative laboratories should be established under the umbrella of the techno-parks by funding and allocating the sufficient resources. More significantly, they do not see any segregation in terms of the field, but they see that this division is part of the today's realities. They believe that the resources of the government as well as most of the resources of the universities should be channeled to the techno-parks in order to increase the reputation of the universities. According to the participants who are coming from the firms, they need to expand the production areas and product range. Therefore, they have to change their technological infrastructure and replace their old technologies with generic technologies. Generic technologies have the ability of changing financial fields and creating new economic activities and sectors. According to Dickens (1998), these technologies contain following categories: information technology (microelectronic, computer, telecommunication); flexible production and flexible automation technology; new organization technology (based on information technology); developed equipment technology (polymer, optical fibers, biomedical materials); biotechnology and genetic engineering; nuclear technology; and space and aviation technology, (Dicken, 1998).

As s result, all these areas are directly related to the Engineering Departments rather that Social Departments. According to them, the Department of Core mathematics and Physics have also gained importance. Additionally, the eight interviewees out of 12 agree that the needs of social sciences can be satisfied by the engineers themselves by doing different social projects together with the academic personnel in these departments, like increasing innovation, entrepreneurial ship, and leadership. For that reason, they see the department of Psychology and Education as their service department in order to increase their efficiency and effectiveness. This kind of approach has been creating significant inequalities and social injustices, particularly, in the long run. The main reason of this is that the techno-parks are becoming engines at the universities, especially in terms of the academic activities, like having the larger number of publications, patents, and personnel. This situation is explained by one of the interviewees as follows:

> Techno-parks present the same familiar patterns of gender segregation identified in academia and industry. The gendered division of work in techno-parks repeats the gender patterns in the closest research fields. Bio- sciences and medicine, as well as social sciences are female-dominated, while engineering and ICT are male-dominated. In addition to this horizontal segregation,

> techno-parks also present vertical segregation since managers are mostly men – because they are coming from the Engineering Departments (I DA1).

Additionally, the Engineering Departments are taking more support not only from the governments, the local governments, and the other national and international institutions, but also from the university management. In the short run, in the management it is possible to see more people from the science and engineering departments rather than social sciences. In other words, more men have been taking the managerial positions than women because of the departments. Consequently, some departments are becoming less important and they will lose their power in the management of the universities. In the light of this evidence, it is clearly analyzed that the techno-parks have been increasingly creating segregation of female and segregation of the field. The effects of these segregations will be even worse in the coming decades due to the fact that the gap is significantly opening among women and men and among the departments. The segregation of space is discussed in the following title under the issue of the urban redevelopment of the techno-parks. Due to the techno-parks, all these three segregations in gender, fields and space have been transforming the physical and intellectual structure of the universities. Additionally, the relationships, known as value systems, in the academic environment have been redefined, while creating significant injustices and inequalities. Besides the segregation in gender and in the fields, techno-parks have created also segregation in space in the system of the universities. The physical conditions and the structures of the campuses are changing which is explained as the transform the higher education. As the "Outcome" of Level 4, the ne redevelopment under the name of the techno-parks has significantly transforming the higher education, while creating the inequalities and social injustices. This situation is seen even as in urban redevelopment. In the following part, how the techno-parks have dramatically created and increased the inequalities and social injustices is critically discussed by creating segregation of space.

Experiences related to Urban Redevelopment of Techno-parks as Segregation of Space

According to the data collected from the focus group participants, the research question "What are the roles of techno-parks in urban redevelopment?" is critically answered under the "Outcomes" of Level 4 in the "Multi –Scalar Governance of Education" Analysis. While developing the techno-parks, the segregation related to the gender and the fields has net discussed yet. It is no doubt that techno-parks in the world as well in Turkey have created new urban development. The case of the Silicon Valley is the most famous one in terms of using the land of the university. Additionally, new architectural and interior design has been developed according to the needs of the stakeholders. Of course, not all the techno-parks have well-developed plans due to the limited financial resources. According to the participants, there are significant problems which have increased because of the development of the techno-parks. The most important one is related to allocation of resources in order to build the techno-parks. Most universities allocate their budget to build, develop, and manage techno-parks, while ignoring other investments at the university. In that way, the departments, particularly the Social Science departments are treated, like step children. Most of the investment related to the sustainability of the facilities such as dorms, laboratories and classes are denied. Furthermore, not all universities succeed in developing the proper techno-park in order to increase science, technology, and innovation so that the allocated resources have zero effects.

Hence, in this part, the transformation of the universities by establishing new techno-parks is critically studied from the perspective of "space" as Robertson has discussed. According to her, "Opening new spaces and allocating extra effort for these regions have changed even the regional urban development as well as in the universities. The innovation hubs are forms of enterprise zones" (Robertson, 2010, p. 16). Some of these zones are pure private sector real-estate efforts, but most are the products of cooperation between the public and private sectors. These hubs are characterized by the partnership of research institutions and companies with the common goal of generating the basic materials of the informational economy. Thus, the importance of university settings strategically within these hubs is quite considerable offer with their academic knowledge (Robertson, 2010). Additionally, the spaces are opening new social relations. According to Lefebvre, the situation is explained as follows:

> What exactly is the mode of existence of social relationships? ...The study of space offers an answer according to which the social relations of production have a social existence to the extent that they have a spatial existence; they project themselves into a space, becoming inscribed there, and in the process producing that space itself. (Lefebvre, 1991).

According to the Interviewee CB, "With the new "techno-parks" of the global context, the vision of a new social approach to the design of these settings both physically (architectural) and socially (communal) is needed." According to Robertson, another broad definition of techno-park is the planned centers for the promotion of high-technology industry whose main aim is to generate the basic materials of the informational economy. The term planned here, refers to a designing activities, in the perspective of both organizational and physical. If the physical dimension is taken in hand, then the fields of architectural and urban scaled design efforts are to be considered (Robertson, 2010). Thus, new aspects in creating the spaces for the activities of innovation appeared. The 'architecture of knowledge' brought into consideration and found its reflection in the physical setting such as; setting the motivational space for innovation, the social quality of spaces for the spatial performance. This spatial point of view forms a base with the socio-spatial analysis in the methodology of this study. With this perspective, the purpose is to get the findings of the needed spatial quality for the act of innovation. Some of the techno-parks are in the campuses of the universities, whereas some of them are outside of the campuses. Some of them are well organized, like METU Techno-polis and ITU Arı. However, some of them are not well established or they have space problems, such as Bogazici University. The Interviewee DB4 by showing clearly the webpage of the METU Techno-polis, explains the situation as follows:

> The functional formulation of METU-Techno-polis is stated as the settings that are oriented to increase the university-industry cooperation with its modern infrastructure and superstructure offered to the firms, researchers, and academics that produce technology for empowering the country within the international arena and contributes to a synergy between the actors. This formula is supported with the goals of: "contribution to Turkey's R&D (research and development) potentials and technology producing skills, to create skillful labor force and employment opportunities, to play a role in orienting Turkey's technology production and accumulation issues with its priorities of sectors, to perform the continuity of university-industry collaboration, to inhibit the process of the transformation of university's research infrastructure and knowledge accumulation into an economical value, to support the high-technology product and service constitution for the global market, to create the appropriate medium for technology transfer, and to be one of the essential component of regional development sustainability (I DB4).

Not all the techno-parks have well-developed innovative environments for the private sector as well for the research of the departments at the university. However, some techno-parks have provided a significantly well-developed environment for technological innovations as well as social, economic, or cultural innovations. On the other hand, new digital changes have taken into consideration as new economic and social space, like Facebook and Twitter. New economic, social, and political places have become important. Moreover, among all these spaces, technological hubs are becoming significant centers for the changes and innovation. As the Interviewee DC3 clarifies:

> We urgently need new and better research on ICT impacts on urban economic and social networks, as well as on the space where these changes are featured. At present, S&T parks are key elements for the dynamization of urban areas, while they originate qualified labor force, and innovative individuals It is important to produce technological actions on applications, advanced software systems, and network technologies: briefly, telecommunications technologies. These types of actions need not only traditional technological parks that concentrate large industrial installations: these innovation environments are more intelligence- intensive than building-intensive. The key issue is to search for articulation forms between the physical territory, and these much subtler social spatial, economic, cultural, innovation mechanisms, linked to the innovation dynamics, and particularly, to the innovation of small and medium enterprises (I DC3).

Civil society by developing social network has an important role in the development of innovative environments as Finqueliecvich (2002) points out:

> There is an intimate link between citizen's politics, and the development of the new economy, and new information technologies. It is developed the idea of local technology markets, information-intensive, based on civil and environmental policies, and in advances information processing, from the modernization of public services, to the creation of interactive citizens participation systems through the Internet. Not only these developments would improve local management, but they would also create local markets, for innovative small and medium enterprises, the basis of future development. (p. 8).

Additionally, massive use of the Internet creates a new style of living. Intensive technology use has been encouraged by public policies. Therefore, the techno-park will become more important because of the demand for new technological products and services. Besides all these changes, new important markets has become important while people think that the new technologies improve life quality and structure of social life. Consequently, these techno-parks will occupy the top of the global hierarchy, as seen in the case of Silicon Valley. As Finquelievich (2002) has mentioned, adopting to a knowledge- based perspective that has a great influence on knowledge creation and transfer, this change in spatial configuration is defined with the term despatialization. More specifically, despatialization –consequential to working with improved communication tools, such as internet, intranet, videophone, etc.– modifies the elements of the relations of "person-person, person-artifact, person-place, space-place-activity, space-artifacts" (Finquelievich , 2002, p. 8) within spaces of knowledge processing spaces. The change in space is generated mainly by the global networking organization especially driven by technological developments. And seen from the other side of the coin, the architecture that drives this spatial transformation is the essential generative force. The outcomes gathered throughout the study, indicate that the common spaces of the selected buildings of techno-parks provide the ground for creating social interaction in-between the workers (Finquelievich, 2002). According to him:

> Since this interaction is the generating force leading to the act of innovation, the architectural accordance to this purpose is essential. Most of the workers highlight the 'refreshing' effect of the mentioned common spaces in questionnaires, interviews, and space-behavior observations. It is important to specify the fact that these common spaces are the 'spaces of interaction', however, they are not especially designed for this purpose. The common spaces are the refreshment areas that provide opportunities of interaction, but are not designed for the purpose of creating innovative spaces. It is a fact that this generative quality of space, interaction, is strongly needed within the building of the Techno-park. (Finquelievich, 2002, p. 5).

In other words, the techno-parks have been creating new dimension in the regions, like in it is seen in the case of ITU. The new spaces at the techno-parks are being used by the corporations. The land of the universities is allocated for the development of the techno-parks. As the Interviewee DB 5 mentions the web page of the METU Techno-polis:

> The first step in architecture was taken with Technology Development Centre Building, which was put in complete service by 1992. Within the framework of the development plan, METU-Twins and METU-Halıcı Software House buildings were established by 1998 as the first stage, and got into full swing in 2000. SEM-2 Prefabricate Building of 800 m 2 together with the Silver Blocks which was put into complete service in October 2002, a total closed area of 25000 m 2 has been achieved. The construction of SATGEB and Milsoft R&D buildings was started by the end of 2003, and the total closed area has reached to 60.000 square meters with a multiple increase in 2004. In general, the firms pay 22 TL per square meter in the techno-parks. The rent prices are comparatively more economic than other office buildings. (METU-Technopolis, 2012).

After 2003, in the techno-parks, a rapid development has seen and the amount of the closed areas was increased dramatically. In the meantime, in the techno-park, a different physical environment and life style have created to increase creativity. From the architectural structure and environment arrangements perspective, these places are developed as the best models (METU-Technopolis, 2012). Major problem of techno-parks seem to be lack (or insufficiency of) financial aids, so that facilities of the techno-park, particularly those in the suburban areas are poor. Additionally, the participants agree that ineffective techno-park management is another aspect of the space usage, particularly related to the insufficient structure and lack of supporting services. On the other hand, there are some techno-parks, which are highly developed, but as the Interviewee DD2 mentions that these highly developed building are not benefitted for the benefit of the academic environment in the universities. They are mainly used for the benefit of the private sector, which create segregation and inequalities among the departments, academics, and the students. For instance, after the feasibility studies, ITU ARI Teknoekent Science Park in Ayazağa Maslak, with an area of 1,850,000 m2 was designated as ITU ARI Teknokent's first phase. Additionally, ITU ARI Teknoekent Science Park in Flora, with an area of 106,000 m2 was designated as the second phase and given to the service of the private sector. Furthermore, all these parks are in much better condition than the universities themselves. More importantly, in these techno-parks, different services are given by the management, such as restaurants, cafes, banks, and other places. They aim to provide a secure but accessible environment for all R&D office spaces 24/7. They are protected by security using CCTV systems. They are only accessible via card pass or biometric pass systems. Under constant supervision of technical personnel and with the use of automation systems, the buildings' infrastructure, electrical and mechanical systems are equipped to meet the needs of the SMEs. It is no doubt that university campuses are redeveloped in terms of architectural structure. As the Interviewee CD2 mentions:

> All buildings are designed to be environmentally friendly and they are managed within this vision. Architecturally, the buildings are planned with the use of maximum advantage of sunlight in office spaces and flexible interior designs. Consequently, it is possible to find office spaces in various sizes both for SMEs and larger companies. Each building is equipped with common social or cultural areas like restaurants, cafeterias, meeting rooms, seminar rooms and conference halls etc. The techno-park tenant companies can benefit from the meeting and conference halls, free of charge, via online reservation system. Health centers within buildings provide services and take first action for the companies demanding for health services for their personnel (I CD2).

According to Robertson (2009), the policy of 'decentralization' has changed education markets as a part of neoliberal policies. Therefore, the relocation of education activity is seen in institutionalized centers "to new reworked spaces of knowledge production with new geometries of social relations" (Robertson, 2009, p. 2) as it is seen in the techno-parks. The national state has chosen "rescaled selective functions to different nodes in the scalar architecture of the global order related to new sets of logics – around efficiency, choice, local partnership, self-management, responsibility". More importantly, new social relations has established for profit in education spaces (Robertson, 2009). The social spaces, which shape power and social relations are seen in the well-developed techno-parks in the world as well in Turkey. There are movements of responsibilities which go outward and upward. Robertson defines downward movements as follows:

> New sectors local development plans; partnership plans; sub-contracting/outsourcing; school development plans; local visions; markets anxieties over opportunities for choice; greater organizational responsibilities without power to affect necessary changes; surveillance; performativity. This kind of changes has redeveloped the regional and educational environment. Different geometries of governance relations that cut across scales; rescaling local development, social capital, community expertise, partnership; public/private; third sector differential choices; different inspection regimes; different feelings of involvement by wider community policy frameworks that operate at multiple nodes; competitiveness global discourses of choice, markets, self management, entrepreneurialism; neo- liberal political project desires of consumer; entrepreneur; flexible; anxiety about responsibility for one's future directions, as new nodes of power and rule are constructed or invigorated, struggled over and legitimated. (2009, p. 9).

In this new system, "division of the labor in education space" has changed. Positionality in the social relations is rearranged according to market-based relations in the spatial organization. Therefore, networks as it is seen in the techno-parks create exclusions and inclusion. As Robertson has clearly explained this situation as follows:

> Spatialising state projects, such as 'techno-parks' and 'markets' raise significant issues for the spatiality of the sociology of education – anchored as it has been in a deep methodological nationalism and statism. This is despite the fact that the sites, scales, strategies and subjectivities for re/constituting and governing of education have been highly dependent upon re/projecting and re/working education spatial and social relations. (2009, p. 13).

Consequently, according to Robertson (2009), the social relations at the education spaces, universities, and techno-parks are "constantly being strategically spatially recalibrated, reorganized and reconstituted to produce a very different geometry of power" (p. 14) as they are seen in the techno-parks. As a result of globalization and neoliberal policies, education spaces have been dramatically transformed, particularly at the universities and techno-parks. Finally, in spatializing, what Lefebvre calls 'another' space is emerging; an alternative, differently constituted, social space, constructed out of ideas about being and becoming, that might in turn mediate the full onslaught of the social relations of global capitalism (Robertson, 2009). Hence, techno-parks create spatial inequalities and segregation because the space is redefined, reorganized, rebuilt, and recalibrated with the help of the science and technology policies. The segregation of space has dramatically increased inequalities and social injustices within the university itself and in the region where the techno-park is established. As the participants have mentioned, the rent prices have significantly increased in the region. More importantly, inside of the border at the techno-parks, the SMEs use different incentives and financial supports, like tax incentives. Consequently, the space of the techno-parks, which have given privileges to the partners, creates dramatic social inequalities and social injustices, which are not deeply studied their effects on the higher education and on the public good. As one of the interviewees has pointed out, it is an ethical issue that each university has to solve since there is a strong pressure created by the government to produce highly technological products and services at low costs. Another ethical issue is about who is going to benefit from these privileges, the SMEs and/or the university. However, according to the experiences gathered from the focus group, the private sector has benefited significantly from these spaces. In the light of the interviews gathered from the focus group, it is no doubt that techno-parks have opened a new page in reshaping the structure and the system of the universities, while creating inequalities and social injustices within the system. Even though the participants do not see any inequality and social injustice, in the long run the these new urban redevelopment areas will have been created serious inequalities and social injustices, like in the bay area in Silicon Valley. While the space is redefined and taken into consideration as the urban redevelopment, the new dynamics have restructured the higher education. In this context, all the relations have reset. The effects of the techno-parks are the "Outcomes" of Level 4 and their effects will be serious in the long run. In the following title, the details regarding the relations are critically discussed as another aspects of Level 4. More importantly, in the transformation of the higher education, the role of the techno-parks is problematized from the economic, educational, cultural, and political perspectives.

Experiences Related to the Economic, Educational, Cultural and Political Transformation at the Techno-parks

The "Outcomes" of Level 4 again are studies from another perspective of the techno-parks in the transformation of the higher education taking into account economic, educational, cultural, and political transformation. Hence, according to the research question "Do techno-parks create economic, educational, political, and cultural transformation?" the data gathered from the focus group interviews from two different techno-parks.. As the participants have mentioned, the science and technology based techno-parks have better chances to reach resources which are channeled by the policies. Additionally, these techno-parks are the center of the regional development policies. According to Link and Scott, "The boom of these initiatives took place especially from 1990s, and their rapid expansion was accelerated by institutional changes (e.g. legislation regarding the appropriation of research output" (Link & Scott, 2007, p. 112). The policies were developed to create an environment for innovation and growth by providing “a perfect physical and social infrastructure which may attract high-tech firms” and “by means of the establishment and upgrading of local institutions and networks in order to stimulate new ideas and technologies” (Link & Scott, 2007, p. 121-122). The important role of the university is knowledge transfer so that techno-parks are established to improve connections to universities.

The number of the techno-parks in Turkey has increased since 2000, which have been officially supported by the national government. Since then, public action has supported science and technology parks as the main innovation policy by giving initiatives. All these changes, regarding particularly on policies have transformed the roles of the universities as well. Therefore, while studying the techno-parks and transformation of the higher education subject, the phenomenon of ‘radical policies’ is problematized based on the research question. All these policies have strategically developed for the development of the technology-based economies, which become benefits for the different parts, like benefits for the industry, benefits for the university, and benefits for the government. However, according the data collected and analyzed, the policies have not taken into consideration all the needs of each stakeholder. Additionally, there are some current policies whose effects can destroy the system and the structures. Or the implications of these policies are wrong. Additionally, in some cases, there are some policies, which protect only the benefits of one side while using the resources of the government.

Kogan (2007) points out that the universities are responsible to create and disseminate knowledge. However, according to him, “The challenge for the university managers, policy makers and head of academic departments is to discern the value of such knowledge, and to devise a policy that best realizes its value or assets" (Kogan, 2007, p. 34). Additionally, the policies are not only coming from outside but also inside in the techno-parks where institutions have determined their overall model. As one of the participants in the Techno-park D, the Interviewee CA1 has mentioned:

> We need policies to change the structure and to have the maximum benefits. While preparing policies, it is important to focus on the internal dynamics in order to make knowledge transfer. Most of the policies have been accepted by the universities and techno-parks. But, it depends on the mission and vision of the institution, which change from one institution to another related to the research areas and the potential of the techno-park (I CA1).

The culture of techno-parks is changing, and the institutional policies contribute significantly to that change. The polices support the knowledge creation by giving scholarships and improving learning. In one of the techno-parks, for instance, the implications of these policies are described by the participant taken from the webpage of the techno-park as follows:

> The implications of the policies are to encourage and support entrepreneurship and innovation; to assist in regional R&D and to be one of the elements of sustained regional development; to instigate and maintain the collaboration between industry-university; to assist in transforming the university's research infrastructure and information accumulation into economic value through spin-offs; to prepare a suitable environment for technology transfer and foreign direct investment; to create employment for qualified human resources; and to promote university based start-ups and spin-offs. (METU Techno-polis, 2012)

According to the ideas of the participants, in most techno-parks, an institution has responsibilities to focus on different policies to support R&D for the improvement of the technology-based economies. Therefore, policies have been developed for practical use to face the needs of the market not the university while generating opportunities mainly for the private sector rather than the students, the academics and the researchers. As the Interviewee DB5 mentions:

> In the techno-parks, the policies are related for commercial returns by commercialization of R&D, which creates benefits for the SMEs. More importantly, even though R&D has reputational, social, economic, and financial benefits and impacts, the political regulations have channeled these benefits to the private industry (I DB5).

It is no doubt that the polices are for different stakeholders in the system. According to Kogan (2007), it is important "to champion a policy in order to command the respect of different institutions which put a different emphasis on the voice of the student, research, academic or administrative communities in their policies, again demonstrating that a 'one size fits all' approach does not apply" (p. 17). In other words, the policies should be first for workers and students to support them properly in the innovation environment of the university. However, according to the information gathered from the focus group, the situation is not clear in the techno-parks of Turkey since they have just opened or they have been adapting to the system so quickly. Many parties have been ignored or not protected properly. As the Interviewee DB4 firmly clarifies:

> The policies should provide clear rules for staff and students, particularly regarding disclosure, confidentiality and ownership. The policy should also provide incentives to promote compliance and implementation. Students sign up to university regulations and these regulations need to be aligned and need to express the position clearly and unequivocally. In the same way, the policies need to be considered in the context of a suit of other policies and documents (for example contracts of employment in the techno-parks). For instance, IP ownership rules and policies for staff and students often differ considerably. The IP ownership is unknown. The rules related to collaboration are unknown. We do not know anything about patent applications. Furthermore, each university has a different policy on ownership of different types of IP. For example, a university may take ownership of inventions and arising patents but not of scholarly works covered by copyright, although it may retain the right to copy student works for its own purposes (I DB4).

Even though policies try to develop legality and equity, most of the time created inequalities. Many people are participated in different activities at the techno-parks and the borders are still not clear. Therefore, the borders of the rules should be redefined in the techno-parks according to the participants. Kogan (2007) supports this situation as follows:

> The legal rules are different for university employees and non-employees such as students, consultants, clinicians, honorary academics and employees of other bodies. It is an important responsibility to ensure that any arrangements, which researchers have with others, do not conflict with their obligations to the techno-park under the policy. This will apply in particular to consultancy agreements and sub-contracting arrangements with other institutions and to any arrangements that an institution makes with third party publishers. (p. 34).

However, many different problems are seen in the techno-parks as one of the mangers of the focus group mentions:

> Almost all universities, now techno-parks, claim ownership of IP. But, they are funded internally or by major public sources. However, according the current law, ownership rights are almost given to the private sector. It is a strong feature of academic life that researchers, for example doctoral students, have rights to at least publish their work. This is different than ownership rights. However, in some universities these rights are taken from the researchers (I CA1).

It is essential that contracts should be updated or reviewed to ensure that they are consistent with the policies of the university, which aims equality. In most cases, the R&D activities or IP rights are misused by the companies because they take the advantageous parts of these intellectual activities. They change intellectual knowledge to financial benefits. Particularly, the case of the students, which is more complex should be overviewed. As one of the interns has explained:

> Today, most of the undergraduate students are increasingly in the creative sector in which we generate significant products, such as software, digital designs, artworks, and writings. Further, a significant proportion of students are considering start-ups, so we are encouraged to play active roles in the

> entrepreneurial world. Most of the companies have preferred us because we ask less money. Most of the students who are coming from Engineering Department or Management Information Systems (MIS) find part-time jobs in the firms of the techno-parks. We need money to live in Istanbul. Even though we do not have any social security, we prefer to work in these companies in the techno-parks because we can earn much to private tutoring. More importantly, after the graduation most of the students can find better job opportunities in these firms. Some of them have participated in these techno-parks as incubators. Since some subjects in ICT are so new that nobody can handle properly. So, some of my friends earn much money than those managers in the multinational corporations. Of course, there are two different reasons why the firms choose us. First, we are more economic than those professionals. Second, we are better than those professionals in terms of solving complex structure in this changing technological environment. If today 25 billion apps are downloaded, believe that most of the young people, like us spent time to make them innovatively (I DC3).

Hence, the government as well as other non-governmental institutions, like Endeavor, which is a global nonprofit organization, support new entrepreneurs in the market. Even the Ministry of Science, Industry and Technology choose university students depending on their projects and support them giving a100 thousand Turkish Liras. If their projects work, they invest by giving them 500 thousand extra. Universities or techno-parks have no automatic system to generate new businesses by giving projects to the students. According to the participants' experiences, many universities do not provide conditions for IP ownership. They do not have any ideas about the IP policies and conditions. As the Interviewee DB1 point out:

> It is possible to distinguish between undergraduate and post-graduate students. It is possible to distinguish also which research can have patent or not. For instance, the ownership of IP is a particular problem in research projects sponsored by industry. We created, but they earn. Even they do not mention our names. The only advantage is that we create informal reputation related to the subject so that our price is increasing. Most of the students have developed many different products and sold to foreign firms, which took the patents We need

> policies in order to protect our rights and our university's rights (I DB1).

Another one has clarified this situation as follows:

> If this is the case then there should be policies and regulations to protect the intellectual property as well as our working conditions. Al these areas are blurred. Illegal working traffic is really high and neither the techno-parks managers nor the academic members of the universities can take radical precautions. In this case, even though students earn money, the firms at the techno-parks even the multinational corporations take the advantageous of the system. More importantly, registering for patent is extremely expensive for a student, which costs approximately a 100 thousand, which cannot be affordable for any student. As a result, most of the patents are taken by the firms, particularly by the foreign ones, and they are not seen in the list of the national patent institution (I DC3).

According to the participants, the new policies are giving priorities to the private sector. They need new arrangements and policies to protect the rights of the stakeholders and to manage properly the system.

Furthermore, Individual Property (IP) policies are a part of the long-term strategy and mission of the public research organization. IP is strategically important in the academic environment, for instance, in Turkey, where as Clare and his friends mention, "these policies provide clear rules for staff and students regarding in particular the disclosure of new ideas with potential commercial interest, the ownership of research results, record keeping, the management of conflicts of interest and engagement with third parties" (Clare et al., 2010, p. 7). In this study, the participants of the focus group have important ideas, particularly those who are managers, academics, and representative of the firms. As the Interviewee DA1 points out:

> The IP policies are not enough to promote the identification, exploitation and, protection of intellectual property. The strategy and mission of the universities are not enough to meet the needs of today's changes. Even though all the universities try to maximize socio-economic benefits, most of the technological improvements are not recorded in the system It is no doubt that the awareness particularly of

the academics has been increasing but comparing in the other countries, especially in the US, it is really very primitive (I DA1).

On the other hand, different strategies were tried to be adopted depending on the scientific and technical areas. According to the statistics, Turkey has a very limited number of triadic research which is a set of patents taken at various offices to protect a given invention (see Figure 32).

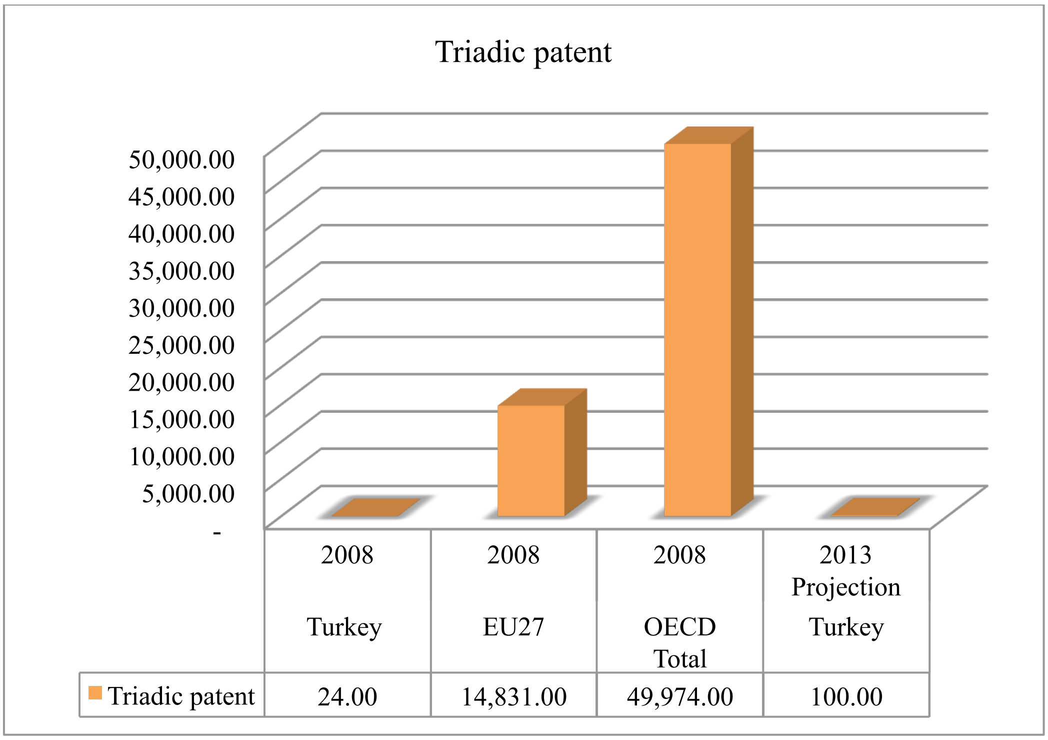


Figure 32. The Numbers of the Triadic Patent in Turkey, EU, and OECD countries (TUIK Report, 2012).

According to Clare and his friend (2007), it is triadic when the invention to which it refers has been the subject of a patent application at the European Patent Office (EPO) and the Japan Patent Office (JPO), and the subject of the issue of a title of ownership at the United States Patent and Trademark Office (USPTO). In other words, a triadic patent protects an invention on the U.S., European and Japanese markets simultaneously. Having a triadic patent is very expensive which cannot be affordable by the individuals. The manager of the Techno-park D, Interviewee DA1, mentions that the income of the techno-parks is being used in order to take patents, particularly those of the triadic ones. On the other hand, one of the interviewees strategically problematizes the support system of the techno-parks:

> Even though our techno-park is the best in Turkey, the institution has limited access to provide appropriate incentives for all the staff. The researchers play active roles in the implementation of the IP policy, but thy do not know the details. Such incentives should not only be of a financial, but they should also promote career progression. They should consider intellectual property rights, knowledge transfer, and procedures. Therefore, most of the individual properties, particularly those in software development for the ICT are ignored in Turkey. Most of the firms and incubators work for them without asking any individual property rights and they earn limited amount of money. I know many young PhD students who work for Blackberry, and even Apple. They have developed innovative software programs for these famous companies, which take the benefits of these innovations and technological developments (I DC3).

Compared to EU and OECD countries, Turkey has totally different profile in R&D expenditures. As can be seen in Table 18, Turkey is far away from the R&D expenditures. Particularly, the number of the people in R&D is really low. Additionally, the structure of the system is very weak and the number triadic patents are really very low. As Clare and his friends have highlighted, “the creation of coherent portfolios of intellectual property by the public research organization, particularly in specific technological areas, is not well organized in the techno-parks where the setting-up of patent/IP pools including intellectual property of other public research organizations are organized. This could ease exploitation, through critical mass and reduced transaction costs for third parties” (2010, p. 8).

Table 18. The Comparison of R&D among Turkey, EU, and OECD Countries.

	Turkey 2008	EU27 2008	OECD Total 2008	Turkey 2013 Projection
Total R&D Personnel	52,811.00	1,360,332.00	3,997,466.00	150,000.00
Researchers per 1000 total employment	2.50	6.00	7.40	5.00
Private Sector R&D expenditures (% of GDP)	44.20	63.40	69.60	60.00
Public Sector R&D expenditures (%)	12.00	13.70	11.10	14.00
Higher Education Sector R&D expenditures (%)	43.80	21.80	16.80	26.00
Triadic patent	24.00	14,831.00	49,974.00	100.00

According to the participant, the IP policies are wrong in Turkey. More importantly, they have limited implications in the techno-park:

> It should raise awareness about basic skills in intellectual property and knowledge transfer. Students and researchers should have training. The management should be responsible for the management of IP. In order to achieve these goals, it should develop a publication/dissemination policy to increase research and development. (I DC3).

Moreover, in order to increase the proper use of research which is publicly funded, research results would be used for the socio-economic purposes. As Clare and his friends (2010) mention:

> The science and technology policies consider all types of possible exploitation mechanisms (such as licensing or spin-off creation) and all possible exploitation partners (such as spin-offs or existing companies, other public research organizations, investors, or innovation support services or agencies), and select the most appropriate ones (2010, p. 9).

However, most academics and representatives of the firms in the focus group criticize individual property rights policies and their implications. The Interviewee CC3 argues:

> The private sector generates additional revenues from the public research. However, professional knowledge transfer services including legal, financial, commercial as well as intellectual property protection and enforcement advisors, are needed to protect researchers (I CC3).

According to Clare and his friends (2010), it is possible:

> to develop and publicize a licensing policy, in order to harmonize practices within the public research organization and ensure fairness in all deals. In particular, transfers of ownership of intellectual property owned by the public research organization and the granting of exclusive licenses, which should be carefully assessed, especially with respect to European third parties. Licenses for exploitation purposes should involve adequate compensation, financial or otherwise. (2010, p. 10).

On the other hand, the development of the incubators is the other aspect of the IP policies. The techno-parks try to develop and publicize a policy to improve spin-offs while encouraging the researchers and the academics at the universities to be part of the spin-offs companies. Therefore, the interns strongly claim that they should be supported in the system of the techno-parks organizations; however, they are not legally protected. Most of the hard work in the IP development, the PhD students work hard, but they are neither legally not financially protected. The Interviewee DD3 complains about the current system:

> The techno-parks organization should establish clear principles regarding the sharing of financial returns from knowledge transfer revenues between the public research organization, the department and the inventors. Most of us are working without any legal security. We finish the projects while earning minimum amount of money. Additionally, the management of the techno-parks or those who are responsible about intellectual property protection and knowledge transfer activities should control them regularly. The research results of the public research should be made more visible for the benefit of the academic personnel rather than the private sector, in order to promote R&D (I DD3).

Furthermore, universities have focused on individual property rights by increasing the number of patents. However, the private industry is more powerful than the universities in terms of protecting individual property rights for their own purposes, particularly in protecting tacit knowledge. The data of this study show that for universities, their individual property rights bring more revenue than does formal individual property licensing. However, if the patents were not formal, they would not bring long-term benefits. As the Interviewee I DC3 mentions:

> The government creates confidence in science and research by protecting its Higher Education Innovation Fund budget for 2011-15. This protection was given because a strong research structure is vital for our future as a nation in this global knowledge economy. Therefore, fundamental changes have happened to increase curiosity in research and research related projects in order to increase competitiveness of the private and public sectors. Public funding and incentives try to increase research and knowledge exchange more strongly than ever before because excellence is needed in research to improve strategically the benefits of the research for the economy and society. The policy makers take strategic actions for the incentives but not for the intellectual assets. However, protection of the intellectual assets is needed for long term benefit of the public. Both the government and the higher education institutions should take prevention to protect contributions of the researchers by protecting their rights since they have significant influence on the education, economy, society, public policy, culture and more importantly quality of life. Consequently, we would maximize the benefits by conducting excellent research, which are paid by the public taxes (I DC3).

According to Clare and his friends (2010), this situation is supported as follows:

> These changes have forced new policies on IP and R&D commercialization which has become more complex. Each institution has clear objectives in its IP strategy, and this aims to demonstrate how these objectives should be developed within an individual institution in order to gain the maximum overall benefit from its IP. However, the IP policies and strategies have tried to be applied across all institutions, particularly in the techno-parks and their business models which are individual and there is no "one size fits all" approach to IP management (p. 11).

As the Interviewee I DB4 has mentioned:

> The research must be for the public benefit. The subject of the research must be a useful subject for study. More importantly, the knowledge acquired from the research must be for the public within a reasonable time. However, the research at the universities has private benefits. For example, there is research for the benefits of the private sector to increase commercially the profit (I DB4).

In the universities, making research for the industry is difficult, particularly in terms of financial gaining because most of the time the members of the university as well the private sectors are complaining about high proportion of taxes. Therefore, in the last decade, the political decisions are related to the techno-parks are for increasing the partnership between the university and industry by decreasing taxes. In that way, it is possible to increase commercialization of research and individual property rights. This situation has been highlighted by Clare and his friends as follows:

> The first step in setting up a system for the management of IP within a higher education context is to recognize how IP fits within the specific institutional business model. Every institution have a different systems, but the different models have increase for commercializing IP, like publishing IP commercializing either software which is released under open source models or it is commercialized (Clare, 2010, p. 12).

In reality, these systems create conflicts as part of the globalization among the stakeholders, the techno-parks, the university, the departments and the firms. As in the Report of Intellectual Property, Clare and his friends mention:

> There are a number of reasons why universities need to worry about how the IP they generate should be used. First, much of the IP universities generate (in the broad sense as we must now consider it) supports their own teaching and research activities. As a consequence, universities must take care to protect their own freedom to operate. Secondly, universities have developed capabilities in supporting the process of translating knowledge with immediate application into the wider society and economy. Thirdly the research base (and indeed innovation in education) creates new knowledge and provides a broad foundation for innovation throughout academia and business, often communicated through scholarly conferences, publications or collaborative research, teaching, but also through technology transfer. This feeds into future (but not necessarily immediate) commercial and public applications. Arguably this is the highest impact activity, and must be preserved and encouraged. These key mechanisms for use of IP are all tied to revenue generating possibilities, either through the universities' core business (in the first case) or through a variety of non-core mechanisms. However, universities first goal is teaching and creating equality. (p. 15)

Each techno-park has different structures, activities, and even needs in order to take action in in the allocation of resources. Additionally, all these activities are interconnected and interdependent which create different kind of conflicts as a result of neo liberal policies. The universities have been critically changing with the applications and implications of the policies at the techno-parks. These changes have been challenging the universities in terms of the inequalities and social injustice. Additionally, they have been creating new system, structure, and new culture. Consequently, the effects of the political changes are directly seen on the educational and economic aspects of the universities which can be defined as the " Outcomes" of Level 4. All in all, techno-parks have been starting a new era in the universities, while changing the culture of the universities and creating inequalities and injustices. In the following part, the effects of the techno-parks on the transformation of the higher education are critically studied from the perspective of changing purpose of the higher education.

Experiences related to the Transformation of Higher Education as Purpose of Higher Education

Furthermore, as the "Outcomes" of Level 4, the transformation of the higher education is studies as the transformation of the purpose of the higher education. During the interviews of focus group members, the research question "In what ways do techno-parks create economic, educational, political, and cultural transformation while changing the purpose of higher education?" is answered. The participants have already mentioned that there are radical policies that they have transformed economic, educational, political and cultural conditions at the universities. In order to understand deeply the effects of these changes, it is asked the question of "In what ways do techno-parks transform the universities?" In that way, the educational aspect of the higher education is problematized by gathering data from the focus group participants in the two techno-parks.

As one of the participants have emphasized, the university ranking lists show the recognition of the university at the economic growth in the global competitiveness, which is increasingly driven by knowledge production. In most cases, techno-parks play important and crucial role in the development of the knowledge. This situation is supported by Salmi that the universities play a strategic role in economic changes by improving science and technology, particularly "in the areas from information and communication technologies (ICTs) to biotechnology to new materials provide great potential for countries to accelerate and strengthen their economic development" (2009, p. 2). The knowledge is needed to produce efficiently goods and services and distribute them more effectively at "lower costs to a greater number of people. Consequently, the economic transformation can be seen inside of these institutions which change the national economic power as well" (Salmi, 2009, p. 2). According to Salmi, the World Development Report on the Knowledge Economy (1999) is important to understand the analytical framework in the transition to a knowledge-based economy of the countries. This situation is explained by Salmi (2009) as follows:

> An appropriate economic and institutional regime, a strong human capital base, a dynamic information infrastructure and an efficient national innovation system. As a result, the higher education not only produces innovation but also a strong human capital which shape economic regime and national innovation system. This is exactly what neoliberal policies support for the transformation of the higher education that is defined by the interviewees in the focus group. Tertiary education is central to all four pillars of this framework, but its role is particularly crucial in support of building a strong human capital base and contributing to an efficient national innovation system. Tertiary education helps countries build globally competitive economies by developing a skilled, productive and flexible labor force and by creating, applying and spreading new ideas and technologies. A recent global study of patent generation has shown, for example, that universities and research institutes, rather than firms, drive scientific advances in biotechnology. Tertiary education institutions can also play a vital role in their local and regional economy. (Salmi, 2009, p. 2).

The experiences of the participants support these ideas as follows:

> The great advantage of partnership between industry and university is that they can combine their power, human and financial resources to capitalize the new synergies. However, there are unseen risks, like – research outputs can be used by the firms without mentioning the name of the researchers and the universities. I think that state universities will suffer more because they have weak financial resources, powerful controls by the government and bureaucracy. The private university have better opportunities in techno-park because they have ben established by the powerful corporations.

> So, they will transform their universities into more flexible and dynamic institutions. (I DA1).

Additionally, in the higher education system, research universities play a critical role in training the professionals, scientists and researchers. They are needed by the economy because they generate new knowledge to support the national innovation system. In this context, an increasingly pressing priority of many governments is to make sure that their top universities are actually operating at the cutting edge of intellectual and scientific development (Salmi, 2009, p. 2). As the Interviewee CA1 specifically mentions this case as follows:

> Universities are key institutions in social change and development. The have 'highly skilled labor and research output' to meet the needs of the neo liberal policies. But today, they play more important role than ever before to develop new technologies, to encourage and facilitate new cultural values, and to train and socialize new social elites" (I CA1).

The transformations–of both societies and universities–described in more macro and global processes. According to Brennan, these are "globalization; democratization; the rise of 'supra-statism' and the associated growth of modeling on a regional and worldwide scale; the increased economic importance of knowledge, at least in the more advanced economies, in securing national comparative advantage; liberalization (the introduction of markets, competition and choice); and the growth of formal, transparent, and often juridical regulatory systems, both nationally and internationally" (Brennan et al., 2004, p. 8) . In this context, the participants agree that universities are the center of this change by producing knowledge. As the Interviewee DB1 mentions:

> Education is becoming the third sector, particularly in the US and UK. They attract the best students in the world in order to use them in the development of research and innovation, while student pay high tuitions in the best universities. Most of our best undergraduate and graduate students left to study in the best universities in the world, mainly to the American, Canadian, and English universities. Some of them have scholarship in order to study there. It is really very interesting that Turkey has the highest number of the PhD students who study in the US. Some of them stay there, and they do not want

> to come back. However, we should do something to make them come back because these are the best students who can be involved in R&D to improve the economic level of the region (I DB1).

Additionally, according to the participants, in Turkey, the universities have not been played important role yet to transform economic power, especially in the newly established techno-parks, particularly in Anatolia where few academics are active in the partnership with industry. Another reason is that in these regions there are a few developed industries that they can collaborate with the university techno-parks. However, in some universities the situation is totally different ant they play significant role in the industry-university partnership so that they are selected one of the best universities in the world. As the Interviewee DA1 mentions:

> This public-private partnership offers a number of business assistance services and capital programs for business attraction and acceleration, entrepreneurship, strategic partnerships, and talent development. There are universities and they are "excellent" in research and education. This is really very important to convert the knowledge produced in the border of the university techno-parks to economic power. One important tool to do is being in the ranking list in the world. For instance METU Techno-polis is one of the best a hundred universities in the world. This is the first time happened in Turkey (I DA1).

As the Interviewee DA1 mentions, the METU Techno-polis is a good example to show the transformation in terms of economics. However, this transformation is not taken as a part of the neoliberal policies and most participants appreciate the success of METU. Most of the companies have preferred to be a part of this techno-park. As showing the webpage of the METU techno-polis, the participant has clarifies this issue as follows:

> METU is the first and the only Turkish university that is included in this list" is the motto on the web page. As you seen on the web "It is declared that the ratings are based on the evaluations of more than 17,000 academics from 6,000 universities in almost 150 countries selected by Times Higher Education (THE). The academics are selected on the basis of their experience (average of 16 years) and number of publications (average of 50 publications). The academics chosen for the survey are asked questions such as "Which university would you send your most successful graduates to for the best graduate education?" As

> in the previous years, universities from the developed countries such as United States, United Kingdom, Japan and Germany have the highest representation in the 2012 list. METU's inclusion in the "Top 100 Universities by Reputation" list is seen as a major source of prestige for Turkey as well as METU, because universities from only 19 countries are represented in the 2012 rankings. Many countries such as Russia, India, Spain, Austria, Italy and Ireland do not have universities in the top 100 list. The success of METU can be attributed to the success of our graduates in leading world universities, to the significant rise in research collaborations, scientific publications and citations of our faculty, as well as to the positive impressions of academics worldwide who have visited METU. http://www.metu.edu.tr/metu-is-in-the-top-100-universities-by-reputation-list

Furthermore, most of the time, economic dynamics have generally been forcing reforms in the higher education in order to have short-term and long-term changes and transformation in social, cultural, and economic environments. They are not always positive or beneficial for the public. As Salmi points out that it is also possible to see some universities work together with the private sectors, which create immediate economic changes. Therefore, they have external pressures rather than inside pressures to be involved in the economic activities (Salmi, 2009). As the Interviewee DB1 points out:

> Over the last several years, the techno-park of the university as other leading research universities has played a central role in innovation and entrepreneurship in society. We think to open even an office in Silicon Valley as a techno-park. Through both research and education, we are a vital source of ideas, and people, that have sparked the development of new products, new processes, and entirely new industries. In the face of global economic, social, and environmental challenges, the university together with the techno-park has amplified its commitment to stimulating economic growth and development of the region. Working with government, industry, and academic partners, we are developing new leaders for an unpredictable, changing world, and new ideas that will be critical, relevant contributions to society (I DB1).

It was envisaged that 'transformation' could begin first "economic" by means of the formation of human capital, then follows other dimensions. As the Interviewee DB4 emphasizes the ideas can be commercialized which create different opportunities for long-term change:

> Innovation is not an orderly process. New ideas can arise in unexpected places, and the path to the marketplace or to practice can take many twists and turns. The key to inspiring innovation is to provide an environment that nurtures the process, whatever path it may take. Innovation and entrepreneurship bring together the resources and relationships across campus and beyond to inspire the development and commercialization of ideas. There are many diverse opportunities for faculty, students, the business community, entrepreneurs, investors, and government to participate in the host of programs and activities that together make fertile ground for creativity (I DB4).

Finally, according the data gathered from the 12 interviewees, the different resources are used by the techno-parks in order to reach the goals, like financial, technological, personnel, space facilities, and professional development training. Among all these, the most effective resource that affected the economic transformation is the involvement of qualified personnel. Since these people have different activities, like producing patents, they are the engines of the economic transformation. On the other hand, resources that have been available from outside are government resources, private sector resources, and university resources. Among all these outside resources, the government help is the most effective one to transform economic background of the universities. As a result, the economic related transformation affects and transforms the criteria of the education in the higher education, but in terms of neoliberal context. Even though all these changes look like positive, they have been creating long term problem, like inequalities and social injustices.

Additionally, after the economic transformation, the policies are transformed by means of the state and civil institutions. Most of the time, the International Non-Governmental-Organizations force the political and social changes. Another aspect in transformation can be seen as the changes in the social structure as the mobility for different groups. As a result, the culture has been changed because of the production and ideas. Therefore, economic transformation is important in the techno-parks, which come out with the transformation of the education in genera, the higher education in particular.

More importantly, as Brennand his friends point out, the private industry invests in low-cost locations and locations where skilled labor is easy to find together with a physical infrastructure, suitable political regime, and well-develop market for products and services. It is no doubt that the governments affect competitiveness of the private sector by upgrading education and innovation by means of the university systems, R&D capacities and entrepreneurial opportunities (Brennan et al., 2004, p. 9). However, in the implications of the globalization, the government changes systems, including higher education systems by means of the techno-parks, in order to increase their power and competitiveness in the neoliberal policies discourses. The same kind of explanation is gathered also through the interviews. As the Interviewee DB5 agrees:

> This techno-park is a set for the political instruments. We ideally focus on reindustrialization and regional development. We want to increase the development of new high-tech businesses incubators. One of the most significant roles of the techno-park is to transform basic science at universities into commercial innovations (I DB5).

Thus, in the technology-based economies, as Brennan and his friends explain that the techno-parks together with the universities develop and create the fertile soil for independent political organization (Brennan et al., 2004). Most of the managers and academics support institutional autonomy at the universities in order to upgrade the innovation in the universities. They believe that universities have greater transformative potential in the technological development so that they could be politically independent. In this context, the Interviewee CA1 support the idea of autonomy saying:

> The more universities are powerful in terms of producing the innovation and transforming the economic power, the more they are independent. In the short run, the successful university techno-parks will change policies, particularly related to budget autonomy. Institutional autonomy is important particularly in academic freedom,

> including students' participation. The involvement of the students in the techno-parks is the new style of students' participation. These are the new management forms that can be seen in many techno-parks. The legislation will be adjusted to allow for these changes. If the government asks technological improvement, they would give freedom to the techno-parks (I CA1).

As Nyborg explains, according to the Magna Charta Universitatum, signed by University Rectors present at the 800 anniversary of the University of Bologna in 1988, "The university is an autonomous institution at the heart of societies" (Nyborg, 2003, p.1). Even though it does not explicitly say what autonomy means, it is very clearly that academic freedom is an integral part of an autonomous university. The situation is explained by Nyborg as follows:

> To meet the needs of the world around it, its research and teaching must be morally and intellectually independent of all political authority and economic power (2003, p. 2).

Institutional autonomy is formally defined by law, but the legal aspect is only a partial description of reality. According to Nyborg (2003):

> Autonomy may be described as the overall ability of the institution to act by its own choices in pursuit of its mission. It is the net result of the sum of its legal rights and duties and its financial and other resources. To find out how far a university enjoys autonomy in relation to the state, and whether the relationship departs from a proper balance of interests, we have to look at all dimensions of the state-institution relationship, such as: laws and regulations, budgets for teaching and research, responsibility for study programs, accountability, appointments, and informal political and administrative relations. (p. 2).

More importantly, nowadays, autonomy is part of the total picture of institutional freedom. According to Nyborg, universities are under "the pressure from other sources rather than the state, like market forces, competition for students and staff, the commercial interests in commissioned research. Therefore, for good and bad, this trend will reduce the traditional values of the state-institution relationship." (2003, p. 2)

According to Nyborg, laws related to higher education define “a university as a special type of state institution with a right to self-government and as a place where academic freedom would be respected” (Nyborg, 2003, p. 3). Additionally, self- government means an elected rector and an academic senate led the institution. The Interviewee DA1 supports this situation as follows:

> Freedom was mainly related to academic matters, not to economic and organizational matters. However in these days, the structure is changing in that sense. First of all the techno-parks are becoming an important subjects in the election of the rectors as well (I DA1).

In the two decades, as Nyborg claims that higher education institutions may now have great economic freedom. They are like public companies or foundations. However, in the best universities, they have Executive Board, which hires a Rector as a professional from outside. The academic community has its own autonomy which worth high values(Nyborg, 2003). According to the Interviewee DA1:

> We need independent system, like in the US. The techno-parks should be managed like corporations. Additionally, we must also be aware that autonomy implies accountability. Greater autonomy for higher education institutions means greater accountability relating to budgets, appointments, student intake, degrees awarded. It must also include accountability relating to the quality of teaching and research (I DA1).

Additionally, student participation in higher education is seen as the autonomy in the Bologna Process. According to Nyborg, even though the universities try to give great importance to the students’ representation, the participation is significantly low because of the lack of the students’ motivation (Nyborg, 2003, p. 3). The interviewee DD3 clearly defines this situation as follows:

> Most of the students are not interested in the student representation because they do not believe that the university administration does not take their representation sincerely. However, we feel better in the techno-parks. We feel a part of

> the success story. The professors, the managers, and the representatives of the firms listen to us. We feel that we are the members of the team (I DD3).

On the other hand, in the traditional model of institutional governance, the academic community elects its own officers (rector, deans, university and faculty senates) with little or no outside interference. However, in recent years, many higher education institutions have accepted external representatives on their governing bodies, as Nyborg mentions:

> In some cases, institutions have also hired institutional leaders from outside the academic community, to replace the elected rector still found at the vast majority of higher education institutions. These developments also have consequences for the relative influence of different groups within the governing bodies, where the majority of members has traditionally been made up of academic staff in permanent positions. Where external representatives are in a minority on the governing body, their presence may still ensure that no single group is in a majority position. In some cases, external representatives are in majority. A situation in which the permanent academic staff no longer holds the majority of votes on the governing body is a significant departure from the traditional European practice with considerable implications for higher education governance. (2003, p. 3).

The same kind of ideas is accepted by the managers of the techno-parks, the interns, the firms' representatives. Only one professor disagrees and highlights the disadvantageous as follows:

> These policies are exactly whatever we asked twenty years. These are exactly our words, which we can see in the reports of Higher Education Council and TUSIAD. There should be something wrong. This is the part of the neo-capitalism. They need universities because of the highly educated labor force. They do not need anymore blue color labors, but they need highly intellectual white color labors in the laboratories (I CC3).

Additionally, in the last decade, the governments as well as the universities have tried to increase their income from different because the state cannot face the growing expenses of the universities. Therefore, the government motivates the universities to make co-operation with the industry as well with the international research institutions. In that way, they try to achieve academic and financial prioritization by making reforms in the managerial structure of the universities, by strengthening management and by increase efficiency. According to Nyborg, "As a consequence, legislation in a number of countries are being changed, allowing for new management forms, usually taking in managerial principles from the business world" (Nyborg 2003, p. 4). The same managerial understanding is accepted by the managers of the techno-parks and this situation is explained as follows:

> Managing the techno-parks is different than managing universities. The universities should hire professionals from the professional world rather than academia. In that sense, the accountability is strategically important. They should have budgets as well as strategic planning as well as development plan and regulations. In that way, this system can be efficient and the academic freedom can be achievable (I DA1).

On the other hand, while introducing new management forms in higher education, the management tries to introduce new legislation. As Nyborg highlights, "Management, steering, independent ownership and deregulation are code-words for the new order" (2003, p. 4). Additionally, fast radical change is not good for the universities, especially "in the countries where more traditional management models are retained, adjustment and general simplification of the legislation are being carried out. However, in the Bologna Process, changes in legislation are requested. Nyborg clarifies the changes in legislation as follows:

- Concerning autonomy, the law must delegate the necessary decision power to the institution – for changes in curricula and teaching methods, for internal self- governance, for interaction with other organizations nationally and internationally and for economic transactions.
- Accountability must follow autonomy. In all fields where the institution has been given the responsibility to make its own

decisions, the decision process should be transparent and results should be made public.

- For universities to be responsible partners, the university leadership must be in charge of institutional activity and in control of the economy. Faculties within universities should not be legally independent persons relating directly to the Ministry of Education. Only the university leadership should relate directly to the Ministry.
- The Bologna Process assumes that students are full members of the higher education community. They should participate in the organization and content of education. Student participation in institutional governance should be prescribed by law.
- Quality assurance systems will be important cornerstones in each national system of higher education. The quality assurance system must be independent of political and institutional interaction and it must have a basis in the legislation. The Bologna Process will build on the co-operation of national quality assurance systems. (2003, p. 4-5).

In conclusion, whatever in the Bologna process has mentioned, the needs of the managers, the representatives of the firms, the students, and even the academics are similar in terms of the political transformation in the universities. All these new changes have forced the universities in terms of their ideals. These results can be defined as the "Outcomes" of Level 4. In the following title, how these changes have pushed the universities to make transformation is discussed under the name of the changing the purposes of the higher education as another significant "outcome" of these transformations.

Changing the Purpose of Higher Education

Under Level 4, the "Outcomes" of the transformation of the higher education are systematically and critically studies to understand the real effects of the techno-parks on the higher education. By asking questions to the focus group, the transformation of the higher education by means of the techno-parks is systematically problematized. The participants of this study agree that the structure of the universities is changing since new places, like techno-parks, are opening. Most academics have become to work in two different places while they are taking different responsibilities. This situation is highlighted as follows:

> Universities try to find external relationships to conduct research because we need specific knowledge for our research and financial value of that knowledge. Therefore, our roles at the universities have changed. We should have connections with the industry in order to improve our field. Secondly, we need funding for the expensive and complicated research, but we cannot find enough grants so that techno-parks are the new name of the engineering departments in which logistically the industry and the university come together to solve their problems" (I CC3).

Additionally, the universities are becoming economically independent, particularly in finding their own funds. As another academic has mentioned:

> The government expects to earn your own money. Therefore, the salaries are limited. However, there are some academics that they make fortune in these techno-parks. Hence, techno-parks are the new arena for the researchers as well as for the academics to increase their income (I CC3).

In the mean time, academic missions have affected because of the techno-parks. Most participants agree that the techno-parks are needed to improve the quality of teaching and learning because they help knowledge flow. Therefore, they see that they need to have these relationships. As one of the participants has clarified:

> Our techno-park is a benchmark for our planned activities. We can improve our studies by upgrading knowledge regarding practical experiences. Engineering departments need applied explore. These departments need real cases. But how we can stimulate at the universities because we have limited budgets. So, our academic competencies are increasing as well by funding from our partners in the industry (I DC3).

Besides the changes in the structure of the campuses, the relationship of the academics and managers of the techno-parks are changing in the environment of the techno-park in which the managers try to control the research according to the demands of the industry. The techno-park managers suggest that the techno-park phenomenon is helpful for the improvement of the field by decreasing the cost of the departments so that the head of the departments are the ones who manage the relationship between the university and the techno-park. According to one of the participants:

> The rise of the techno-park competencies will affect the development in the departments so that we ask from the academics, researchers, particularly from the head of the departments to channel their research to the needs of the firms in the techno-parks. Therefore, we attend their meetings too or the academics and researchers attend to our meetings and we ask from them to conduct specific research. Consequently, the techno-park is a new logistic place for the academics to improve their social network while improving their knowledge (I DB4).

Additionally, according to the managers of the techno-parks, the growth of the techno-parks will be more than today because the university administrators can deal with their budget problems by increasing collaborative research with the industry. As the interviewee points out:

> The nature of the structure is changing also in organizational structure of the universities because the techno-park plays important and crucial role in the budgets. Not only in terms of increasing amount of rent income but also finding money for the research" (I CA1).

The firm representatives, on the other hand, agree that the universities can increase their efficiencies if they work together with the industry. This situation is explained by the participant as follows:

> The techno-park environment creates formal relationship rather than informal. What I mean is that the academics conduct research for learning and teaching, which is not well-organized or planned to conduct a real research which has a specific goal. They are just assignments for final papers of the courses. However, in the techno-park they develop formal relationship with the industry. The students as well as the professors who have involved in the important research gain important skills in their techno-park. When the relationship is formal, as it happens in the techno-park, specific effects are seen clearly as research

> output, like more academic publications in the internationally accepted journals and patents. In that way, the capacity of funding is increasing as well as improvements in hiring and placement capabilities. We are going to have a place in Silicon Valley in coming years. We managed to do this because our success in our research conducted according to the needs of the industry (I DA1).

Another effect of the techno-parks on the academic mission is related to new income resources for the academics, particularly those who are in the engineering departments and life sciences. According to one of the participants:

> The techno-park changes the activities at the university by changing the university's academic mission. The more they get funding, the better they are taken into consideration by the administration of the universities. The academics, researchers and even students have found better employment because a techno-park is located very close to the university campus. Most of the doctoral students work here. As a result, they have greater employment opportunities (I CA1).

More importantly, the critical effects of the techno-parks are seen also in the curricula. Since the projects are more applied research oriented, the curricula of the courses are becoming more applied rather than theoretical. This issue is discussed by one of the participants as follows:

> More doctoral students are interested in working in the techno-park. The number of the students in graduate studies is increasing. Most of these graduate students are more interested in applied research because they have better employment chances after the graduation. So they demand applied oriented knowledge rather than theoretical. This has an impact on curricular development, which is a more applied research curriculum (I CC3).

Furthermore, the departments, particularly technical ones are becoming more active in R&D; however, the other departments related to social sciences, humanities and education are losing their importance and the participants are not aware about these changes. As the participants has explained:

> The universities, like ours are active in technology and science related subjects. These departments are positively affected by

> the techno-park organizations because of R&D. I do not have any idea about the other departments. They are not involved in the activities in the techno-pars. There are some professors from the Business Administration and Management Departments. However, I strong believe that the members of these departments cannot help us because they do not have enough background related to engineering. Therefore, we prefer the professors and researchers from the Industrial Engineering Department since they snow how to establish the systems (I DA1).

In the light of the evidence gathered from the participants, another changes related to the academic missions and purposes are the rights related to patents and licensees. This issue is discussed by the participant as follows:

> The researchers are less likely to report the benefits that they have because of the techno-parks related to the funding activity. Therefore, the funding institutions in the techno-parks are mainly members of the industry so that they use the right of patents and licensees. That is the main reason why the number of the patents is so low. They are registered by the industry rather than the university. Particularly, there are famous firms, like Apple and Blackberry, that they work with software development companies in the techno-park in which the professors and researchers work for them with affordable prices, but the companies have taken the rights of the patents and the licensees. I see this kind of activities as another dimension in brain-drain. The economic human force, in this case, highly intellectual human power is used by the industry (I CC3).

The student and interns agree about the dimension of affordable "human resources" because they have been conducting research for the industry without gaining money or incentives. In the last two years, there are direct incentives given by the government. In the most competitive techno-parks in Turkey, the firms hire the most intellectual students of the universities together with their professors, but they pay significantly less money than the other people in the global market. According to the participant:

> Most of the firms, especially those foreign ones are aware about the potential of the highly intellectual personnel. They send projects and they accept the cheapest one. Therefore, we as students work days and nights to finish them on time. At the

> end, since we accepted as part of our research and thesis, we do earn neither money nor reputation. Some of our friends, on the other hand, need to work to survive, so they gain minimum amount of money. Some of my friends do not mention even their name, particularly those who are girl. They use nicknames to earn more. However, in the global software development market, developing software is really expensive. Hence, the global firms chose our researchers because we are not expensive (I CD1).

After collecting all the data, it is clear that the percentage of faculty who are engaged in research with techno-park organizations is not clear and measured. As Nelson (2003) mentions, the commercialization of university is done by means of R&D which has strong impact on "public science." Stephan (2001) observes that university and industry partnerships have a negative effect on the university's basic research curriculum. They have only one clear and positive effect, which is related to publications and citations. According to one of the participants:

> It is clear that most of the contemporary subjects are studied in the techno-park so that the academics as well as the researchers have much more publications that those of the researchers from social sciences. As a result, they can have much more citations than the others. In a short time of period, the researchers from the science and technology departments have better performances and academic positions. They are gaining more power in the administration as well. Instead of the old academics in the management of the universities, we see young professors in their thirties and forties" (I DC3).

The influence of the techno-parks looks small, but according to the participants interactions may change more deeply in coming years. Even though at the beginning the impacts of the techno-parks are on hidden academic missions, like choosing research and projects related to the industry, in the coming years the impacts will be more structural and value added activities, like changing curricula, giving extra space and academic personnel for the specific departments in which they have more of patenting activity. According to the interviewee:

> In the long run, the reputation of the techno-parks will increase and become more important than the university so that the mangers play more important and crucial role in the decision making process of the universities. They hire more people from the university. ın that way, the industry will manipulate the universities. Even though the universities will have more independence financially, they lose their independence in teaching and learning. More importantly, they will lose social aspects of the universities as serving and cultivating the humanity. Therefore, the balance within the university should be protected. ıf not, in the long run, the universities can work for the industry and the profit of the industry. If you ask me, everything begins with the changes of the curriculum (I DC3).

As noted previously by Nelson, universities take on commercial activities by developing partnership with industry; therefore, "their commitment to the public science may be endangered" (Nelson, 2001, p. 3). It is no doubt that the knowledge transfer is done for the good of the public, which can be indirectly done by means of the industry. However, in the case of the techno-parks, the knowledge transfer is done only for the industry. As a result, the university and industry partnership in the techno-park diverts faculty away from students and curriculum and towards commercial activities because of research funding, which comes from mainly from the industry. Even though there is funding, which is supported by the government, these resources are very limited comparing to the funding from the industry. As Nelson mention, "If such funding comes from industrial firms, then it is reasonable to be concerned that commercial influences will spill over to influence the character of the university's research and hence its research curriculum" (2001, p. 4). As the participants explains:

> I believe that the university can control R&D activity so that the techno-parks cannot have direct effects on the curriculum. However, I strongly believe that R&D activities are the right instruments to guide the students properly. Additionally, it is

> very easy to make students understand the subject by giving the real examples and cases. Don't forget it that most of the best universities are so successful and well-known because they explain theories by giving real cases, like Harvard. I do not see any danger in terms of curricula which are becoming more research oriented (I CC3).

Other participants, especially those who are coming from the industry as well the management of the techno-parks do not see any problem. The situation is emphasized by one of the participants as follows:

> Having strong values related to research is significantly important to create research- oriented culture at the university. Therefore, the activities and the qualities of the R&D activities develop academic reputation related to the university. However, it is a vicious circle. Most of the research can be conducted under the umbrella of the techno-parks in which the university has strong relationships with the industry. Therefore, the academics empower their research background as well their students by modifying the academic curriculum from basic research toward applied research. I do not see any problem. Actually, the curricula should be according to the demands of the industry. In that way, our students can have better job opportunities (I CA1).

Additionally, the students of the engineering department agree that the techno-parks open new dimension in their learning. According to the interviewee:

> There are many details to be learned in techno-parks, since the effects are crucial on university activities. Firstly, they are the new learning spaces about current science and development. Secondly, we have become ready for the business world (I CD2).

However, the hidden effects of the techno-parks on the academic missions are not realized by the participants. The innovation of the modern sciences has affected the curricula of the universities. The rise of the incentives related to the R&D tax reduction and joint venture activities between the industry and the university encourages the activities so the curricula and the content of the courses are changing. As one of the participants has clarified:

> Public policy is changing toward techno-parks because we are in

> a new era of growth in the formation of techno-parks. It is no doubt that the outside forces have manipulated the growth of the techno-park. We know sources of growth, which are new knowledge, financial, and real estate resources, technological developments. Therefore, these changes do affect not only the policies inside of the techno-parks but also outside of the techno-parks by changing public policies related to the technology and techno-parks (DB5).

The funding potential has affected publications, patents, and licensees so that universities hire the best academic researchers and people and open doctoral programs to accept doctoral graduates, which have direct connection with the techno-parks. As the interviewees mention the techno-park itself helps to find better research funding. Therefore, some universities will have better chances than those universities which do not have techno-parks or very limited conditions. ın the long run, the differences between the universities will increase. According to the participant from the focus group:

> I think that we can find better funding from the government as well from the industry because we have techno-parks. Most of the time, we are chosen because of our facilities related to the techno-parks. As it is seen in our techno-park, the entrepreneurial groups establish a building in o-order to increase the impacts in the market by developing innovation within the limited time (I DA1).

Additionally, the participants agree that the performance and the success of the universities are related to the techno-parks. Since the large number of the research, which can be basic or applied, is conducted in the techno-parks, the number of patents, licensees, publications and citations will be higher than the number in the other universities. In the long run, these universities will gain more reputation and authority to attract the best students as well as the best academics and researchers. They have better ranking of their programs in science and engineering, so they will open their graduate programs in these majors. A strong patent law is needed to protect the rights of the researchers under the competitive environment of the global business world. There will some differences between public and private universities because again those which have well-organized techno-parks will have better conditions. ın some cases, the relations between the university and industry is so complicated that it is difficult to categorize, as the interviewee CA1 mentions:

> Most faculty members have strong relationship with the techno-park as consultants or they are partially owners of the start-up companies. If a professor develops a product in a science park that derives from basic research performed at the university, the patent rights belongs to the firm, but in some cases it belongs to the university. The research students of the professors at the university get generally involved in their techno-park activities (I CA1).

Furthermore, the effects of the techno-parks would be serious because there is not any systematic structure to control the activities, which are blurred in most of the cases. Developing projects with the research partners is not open. In some universities, there are very strong relationships between the university and the industry. The techno-parks are coming new places for land development corporations. Additionally, the developments in research will be limited in other universities, which do not have techno-parks. Regarding the specific questions related to the transformation of the universities by means of the techno-parks, the participants point out different aspect of the changes. According to the changes, the impacts related to the "research development" on the techno-parks and the universities are asked specifically. The participants, particularly those who are the managers 88% agree that the research conducted at the techno-parks is better for the development of the innovation because knowledge management as knowledge transition is especially easy in highly technical industries. As one of the participants has highlighted:

> The research development is much easier in the techno-parks

> because of two important factors. The first one is related to funding which is more affordable in the techno-parks. On the other hand, the second factor is related to the applied research, which is directly used in the industry. Whatever is gathered as knowledge from the research can be directly adopted and used for the development of the industry as innovation" (I CA1).

The participants, who are academic emphasize that research conducted at the techno-parks have better impact than these projects at the university. 6 academics out of 8 agree that they prefer to conduct research at the techno-park with the cooperation of the industry. According to the participant:

> Most of the basic research at the universities is only for the academic publications, but the number of citation is limited. Additionally, most of the basic research has not been accepted by the best journals because they are not so valid. However, the impact of the applied research related to the contemporary subjects is more significant (I DB5).

The half of the academics agrees that the techno-parks have better opportunities in many different aspects. According to one of these participants explains:

> While earning money, we find better opportunities academically. The research projects conducted at the techno-parks are more serious and more complex because we are controlled. The research environment is the real environment in which we adapt to the real conditions in the industry. More people, particularly experts in the field come together to develop strategically the project (I DB4).

Additionally, they claim that the research projects are more efficient and effective because they are used from all the parties in the project.

> Finally, accumulation of knowledge is much better at the techno-parks since the research projects are interrelated so that they develop not only knowledge transmission but also knowledge accumulation. In other words, the projects are done systematically interconnected which create synergism. Consequently, the impacts are multidimensional and multi-purpose. All the parties use properly the results for their own benefits and interests. Therefore, these projects are more affordable and accessible for the all parties (I CB1).

On the other hand, all the firm representatives support research and research development at the techno-parks rather than at the university. They are not happy with the cooperation or partnership that they conducted at the university so that they are much happier to conduct research under their control. As the participant has clarified:

> In the university, bureaucracy and formalities prevent effective research environment. Most of the time we cannot get professional results or they do not follow due dates. However, at the techno-parks, we are the ones who control the research so that the concentration is high to produce innovation. The research results can be used immediately by the industry (I CB1).

Furthermore, the firm representatives agree that the technology transfer is more complicated at the techno-parks rather than in the universities the research results are practically applied to the products and services. According to the interviewee from the focus group:

> The research projects conducted at the techno-parks increase the quality and standards of products and production methods, which improve the development in innovation and competitiveness in industry (I DB4).

The firm representatives point out also the effects of the research on the SMEs because they do not have enough financial background to have access in highly advanced technologies. As one of the participants has discussed:

> The research at the techno-park help small and medium scale companies to reach and use to new and advanced technologies. In that way, most startup companies can develop and increase their profit and competencies in their sectors. Additionally, they have better social network to cooperate and create different partnership (I CA1).

Finally, the student interns clarify that the research opportunities in the techno-parks are more sophisticated that the environment in the universities. The majority of the students say that they find better job opportunities after their graduation. According to the interviewee:

> The research that we are involved in the techno-parks is practical and applicable for the real world. After the project or during the project we can find better job opportunities. Our friends earn a large amount of money as students. The research experiences improve our adaptability and knowledge related to the current subjects. Most of our friends have patents, which are great especially during the applications for a job or PhD programs (I DD3).

As a result, the 90 % of the participants agree that the research oriented projects at the techno-parks create value for all the stakeholders while creating better territories and investment opportunities in technology intensive fields. In a short time of period, the participants agree that research results have facilitated the development of interregional innovation networks.

Regarding the question of “educational development” the participants point out that the techno-parks help the universities improve the quality of education in many different aspects. All the managers of the techno-park emphasize that the science and research environment of the techno-park help the department develop the quality of the curricula. As one of the participants has critically explained:

> The universities and firms at the techno-parks are interconnected so that they develop together important sources for new scientific knowledge. University professors can gain access related to the contemporary knowledge or resources, which are developed formally through research projects and informal links with the well known national and international firms (I DA1).

Therefore, the common impression related to the techno-parks is that the encouraged innovation and production environment of the techno-park helps the development of higher education institutes. According to the interviewee at the focus group:

> The department has direct link with highly important institutions, like the government, the ministry and the firms which help us to develop wealth creation and job generation

> since academic knowledge and expertise have become finally important (I CC3).

Additionally, the academics have some concerns related to the educational quality and focus of the higher education. 25 % of the academics believe that the knowledge has two aspects, which are theoretical and practical. Therefore, they critically criticize the transformation in the higher education. This situation is explained by the participant as follows:

> Even though applied research is fine for the development of the products and services, it kills the curiosity for the major developments. As you know, the main motivation in the basic research is to expand man's knowledge. It is not to create or invent something. More importantly, there is no obvious commercial value of the discoveries because we ask "How did the universe begin?" and "What are protons, neutrons, and electrons composed of?" The results of these types of research cannot be sold but they are needed for all areas of science in order to see the progress (I DC3).

Moreover, another academic who has strong background in Turkey as well in the US mentions that the basic research is long-term investments. However, the applied research is for the current problems. According to the participant:

> In other words, basic research is the foundation of the applied science. If basic research is done first, then applied research can be conducted. Therefore, the university cannot conduct only basic research. Actually, the universities should conduct minimum 80% of their research on basic rather than applied. 20 % of the research can be applied ones. Hence, the techno-parks are the right places to conduct applied research and the universities are the right places to conducts basic research. Their activities could be interconnected, but the universities cannot change their research understandings. If the universities preferred to use applied research, they would lose their fundamental purpose which is creating knowledge (I CC3).

The rest of the academics agree that applied research is needed to solve practical problems in the world today. There are many different problems today that they should be solves as soon as possible to improve the human condition, like to find a specific medicine for the disease, to improve the energy efficiency, or to decrease the impacts of pollution on global warming. As one of the participants points out:

> I feel that there should be a shift from purely basic research to applied science since the problems and obstacles are really very critical and severe. We do not have luxury of spending time, money, and energy for the issues, which do not serve and help directly the humans. The trend is changing because of necessitates such as global warming, scarcity of energy, pollution, and different diseases (I DC3).

All the managers of the techno-parks agree that there should be a balance between applied research and basic research. According to their experiences, there should be a gray zone where the basic and applies research should be balanced. As the participant clarifies:

> There were many research projects in the world that they were basic research at the beginning, but then the outcomes were used as applied research. Or there are some research subjects, like fusion reactors that they can be neither basic nor applied research. So, there should be macro projects, which encourage both applied and basic research related to the different subjects so that the higher education should be developed according to the needs of the current research subjects (I DA1).

On the other hand, all the students agree that they need high level of education related to the areas that they work academically or professionally. They confirm that they chose this type of universities, which have strong connections with the applied research. Related to the data gathered from the participants, the situation is explained as follows:

> After the undergraduate programs, we became more aware about the quality of education. In the two years of the undergraduate studies, we had knowledge in basic science. Then, we became specialized on our areas. The quality of educations depends on the professors who channel and encourage their students by empowering their knowledge. Most of these professors have really good academic background, which can be seen at their academic publishing as well. Since they conducted many different research projects, they had enough knowledge and social network in the science communities. They opened many different opportunities for the students, like us, for their

> universities, for the industry, and for the community. I appreciate them and I strongly believe that if the best professors taught at the university, you would have the best education level. Not the research but the professors calibrate and upgrade the education level. We chose this university because they have best professors who help us to improve ourselves in many different aspects as they prepare us for the market (I DD1 and I DD2).

In the light of this evidence, the education curricula, particularly in the graduate studies are becoming more applied research oriented because the research projects at the techno-parks have forced the academics to meet the needs of these projects by advising their students on the current issues. On the other hand, the demands of the students and the firms are from this perspective as well. Another aspect of the transformation of the curricula is directly related to the funding for the applied research. As the interviewee has highlighted:

> Today, the government supports mainly the projects, which are directly related to the current issues, like energy, technology, and medicine. We open courses with credits and we ask assignments which are directly related to the current subjects. Even though we have theoretical courses that the students should take, we have special topics courses with credits that are mainly on the current issues. These courses are more chosen by the students because they believe that they learn more and they make them ready for the market (I DC3).

The academics emphasize also the effects of the Bologna Agreement on their curricula. This situation is discussed as follows:

> I see same kind of changes in the Bologna Process and in the protocols of the techno-parks. Whatever we have to change in the programs because of the Bologna Process is beneficial for the techno-parks (I CC3).

Consequently, the transformation of the curricula in the higher education is in process because of the different dynamics at the techno-parks. The transformation is expected more radical in the coming decades since the changes are so rapid and the stakeholders of this transformation see this transformation as must.

Most of the transformations are expected in the departments of engineering and science rather than in the other departments of the universities. The academics explain the danger of unbalanced development at the fields. The most critical aspect is that the humanities and social sciences are becoming less important which help to decrease conflicts by decreasing inequalities. The two academics out of six mention their concern regarding the other departments. According to the interviewee:

> Today, the agenda of the government as well as the universities are related to the technology and technology-based economies, so most of the incentives are for the technology. In the long run, the color of the universities will change. The engineering and science departments will be more dominant. I told to my students that the social science would die (I CC3).

However, the rest believe strongly that the importance of social sciences will increase comparing to the past years. Since technological changes challenge new boundaries in the communities, there would be new research areas in social sciences in order to see the transformation. This situation is clarified as follows:

> The new information technologies change the dynamics in the societies. In the meantime, the technological developments increase markedly the information in social sciences so that new approach is needed to understand and analyze many social problems. In the coming future, management of data, statistical methodology, and research ethics and policy will change. Therefore, I totally disagree that the social science could die. There would be new social problems, conflicts and obstacles that the social researchers will be involved in (I DC3).

Another researcher as an academic mentions that the dynamics of the social sciences cannot be decreased, but the interests of the policy makers and the management of the top management at the universities could not give enough importance of the social sciences. According to the participant:

> In the engineering departments, the benefits can be seen directly at the universities. The techno-parks help universities in terms finding financial resources, opening new spaces for R&D, having patents and licensees. At the end, the number of academic publications, citations and the performance charts are massively high. However, in the social sciences you cannot have direct and rapid effects as seen in the technology-based research. Today, the universities are going to be categorized. Some universities will be A level universities because of their activities in R&D and in patents and licensees. So, automatically, there would be a shift from the social sciences to natural sciences and engineering (I CC3).

As the managers as well as the academics point out that what the social science future is not predictable. There are enormous data than ever before because of large digital information related to people's connections in computer technology. The access of the data is so easy that the new research will be conducted easily, which have direct impact on the transformation of social sciences as well. On the other hand, the industry-university-government partnership will first force the development of the technology-based economies so that the social sciences will be minimized under the shadow of the engineering and natural sciences.

All these changes have been transforming the educational and managerial aspects of the universities, while the technological and financial background are becoming stronger much than ever before. In some universities, the legal activities related to the protection of intellectual rights are becoming significant. As it is seen that the universities have been transforming since their techno-parks were established. The more the techno-park is strong, the fastest the transformation is seen. Consequently, the system and the structure of the universities are changing. But, more importantly, the main purpose of the higher education as cultivating and education public equally as a given social justice is changing. The universities are becoming a part of the competitive global markets in order to improve the competitiveness of the regions as well as the nations. In this transformation, techno-parks are the changing agents at the universities where the private industry can be deeply involved in the system of the universities with the help of the government policies, regulations, and incentives.

In the light of the “Multi-Scalar Governance of Education” Analysis the four levels of the “Education Questions” are systematically analyzed under the ten research questions in order to understand the role of the techno-parks on the transformation of the higher education. In the last chapter of this study, Chapter V, the conclusion and final remarks are given and articulated in order to understand, explain, and problematize the effects of the techno-parks on the transformation and even transcend the higher education in Turkey.

CHAPTER V

CONCLUSION AND FINAL REMARKS

This study aims to explore the roles the techno-parks play in the ongoing transformation of Turkish universities, using “innovation” as both their raison d’être and strategy. This study critically and systematically reviewed the literature related to this subject, and then analyzed the changing form and scope of higher education by examining specifically the techno-parks in Turkey. This transformative effect of techno-parks on the dynamics of higher education is studied by using the four levels of the “Education Questions” in the “Multi-Scalar Governance of Education” Analysis (Dale & Robertson, 2008, p.2), as explained in the literature review. Hence, in this study, the transformation of the higher education connected to the techno-parks are critically understood, explained, and problematized in the context of Turkey using these four levels of the “Education Questions” which are the “Educational Practices, Educational Politics, Politics of Education, and their Outcomes” (Dale & Robertson, 2008, p. 9). These four levels help to study the social issues step by step, or level by level, in order to critically understand, examine, and explain the phenomenon of this transformation.

Furthermore, while collecting and analyzing the data for each level mentioned above, a phenomenological research analysis is preferred because the issue has increased in complexity and become known as a social phenomenon. For this reason, the two approaches of the phenomenological research analysis are used in order to gather and analyze data for each level of the “Education Questions” (Dale & Robertson, 2008). In order to comprehend this social phenomenon, the findings of the research analysis are divided in two parts. In the first part, the hermeneutics research approach of the phenomenological research analysis is preferred in order to analyze the three levels of “Education Questions” in the “Multi-Scalar Governance of Education” Analysis. These three levels of the “Education Questions” are the “Educational Practices, Educational Politics, and the Politics of Education” (Dale & Robertson, 2008, p.9). In this part, the data is collected and analyzed by reading the related texts, and the intent and meaning behind the surface of the techno-parks and higher education world’s transformation is understood, explained, and problematized.

In the second part, however, the empirical approach of the phenomenological research analysis is used to gain comprehensive descriptions of these transformations. The four levels of the “Education Questions” in the Multi-Scalar Governance of Education” Analysis, which are “Educational Practices, Educational Politics, the Politics of Education, and the Outcomes” (Dale & Robertson, 2008, p.9), are explained by conducting both single and focus group interviews. The descriptions gathered and analyzed from these interviews provide the essence of the people’s experiences relating to the insight and dynamics of techno-parks. The thirty-five participants have been gathered from four different techno-parks in Turkey. They are managers, academics, directors of the techno-parks, and student interns. Twelve of these participants participated in the focus group interviews. Consequently, after gathering data from these interviews and focus group, the phenomenon of higher education’s transformation due to the techno parks is better understood, explained, and problematized. The study aims to understand this transformation in better detail by studying the conceptualization and implications of techno-parks, critically analyzing them with these two different research approaches. Consequently, in the following parts, the final remarks and discussions of each research question are given in details after the in-depth analysis.

After analyzing the related documents and experiences about the reasons behind the transformation of higher education, particularly those related to the techno-parks, it is clear that the reasons are not only national but also supranational, where innovation and knowledge are considered the primary drivers of national economic competitiveness and growth. Therefore, the Turkish government has taken specific actions under the auspices of guaranteeing "the future prosperity and welfare of the nation," which depend on the ability of its citizens, companies and institutions to generate, access, and utilize knowledge and information. Because of financial crisis and lack of the infrastructure in terms of competitiveness, Turkey has risk of falling behind, like other countries and competitors.

The data collected from different government documents clearly mention that the government institutions have challenged and organized the innovation policy to achieve specific goals, by empowering private sectors to maintain economic and political stability. While reorganizing the public sector, neoliberal policies have enforced the governments and allowed them to empower the private sector for long-term competitiveness. However, the structure for innovation is not seen as sufficient in the private sector, especially for new start-up companies. The number of the new businesses is significantly lower in the suburban areas. Therefore, the government has developed different incentives, like the Incentives 2012 program to increase the investments in the regions. Yet, international trade is becoming increasingly dependent on high-tech products that require high skill-levels to manufacture, and as a result industries have become intensively technology-based where highly intellectual skills are increasingly needed. So, Turkey, in the neoliberal economy, aims to create stronger enterprises, a constructive and transparent public-private sector, and collaboration and innovation for foreign direct investment.

With these new technologies, highly improved skills are needed to make changes organizationally by improving science and technology. In that way, sources of capital have been used to fuel the growth of the private sector first and foremost. Hence, the political approach in Turkey is related to increasing the competitive advantage in the knowledge-based economy by stimulating investment and encouraging innovation. In the mean time, investment in and commercialization of technology are expected to grow, but are still not well organized because of high fixed costs and risks in the global markets. Because Turkey tries to reduce its dependency on imported intermediate goods and its current account deficit, the structural reforms performed in the industrial sectors mirror the same important effect the universities have on the economy, by playing an important and crucial role in balancing and improving the development and infrastructure of the country. Therefore, highly intellectual and well-organized individuals and companies are expected to replace the traditional system and sectors by modernizing or innovating labor productivity and economic growth. Consequently, the enlargement of the technology-based developments in the universities is set as a national development target.

On the other hand, the data collected by interviews show that the development of the techno-parks is still linked to the development of the other techno-parks in the world. These connections, as well as the new global economy, empower partnerships and interactions between the universities and industry. These relations are expected to become more complex in the coming decades. The main reasons of the partnership are related to the costs, and therefore the new policies try to increase benefits of the corporations by decreasing research time and costs. On the other hand, the effects of the new policies have direct commercial interests at the techno-parks, but they do not have significant benefits for public interest. Voices of the participants highlight that techno-parks cannot be denied in the economic development of the countries, but those who are coming from the academic environment think that the effects of the techno-parks of the economic development would be less than expected, since these techno-parks are behind the technological developments and the techno-parks in the state universities need to take action to overcome the drawbacks related to receiving help from the government.

Thus, the commercialization of science and technology as well as the development and implementation of new ideas more generally is seen in the form of organizational change by increasing R&D investment and commercialization, networks and clustering, business environment, technology upgrading, foreign direct investment, education, number of patents, science and technology graduates, attitudes and social capital. Universities have become the new arena to manifest and realize all these goals, which affect innovation and compatibility. The last decisions taken by the government, such as upgrading of years in schooling, relevant skills in the work force, organizational change, entrepreneurship, incremental innovation, position of women, and decreasing unemployment rates are seen possible with the involvement of the universities and in their techno-parks are to change and improve the standards. As a final remark, the transformation in the higher education is seen as the marketization of the universities by means of generating technological knowledge, which is commodified in the global market economy, and the integration of the universities into this system has been enforced by the government and by the private industry. As Uzunyayla, Ercan and Kurt Korkusuz (2011) mention, the benefits are mainly taken by the political stakeholders and private sector because the unemployment rate and the country's current account deficit can be decreased, while the competitiveness in the knowledge economy is increased. All in all, the effects of the techno-parks have increasingly become serious on the academic missions of universities, while changing the innovation system. More importantly, the national science policies have markedly increased the rate of these changes.

According to the document analysis under the principles of the phenomenological concept analysis, the main challenges related to the university education are related to the process of privatization. The national, regional, local, and even international dynamics like globalization have a direct impact on higher education system in Turkey, and the very missions of the universities themselves are re-defined. This liberalization process has affected the governments' approach towards universities, where knowledge begins to be produced for the sake of business and industry. Particularly, those people's roles in the academia are taken into account as counselors and marketers, so that the environment of the universities generates a dilemma, particularly in the techno-parks, which are governed as if they are large corporations. As a result, knowledge as a commodity can be sold in the market (Ercan & Kurt Korkusuz,

2011) and techno-parks and universities have become the headquarters of corporations.

In the analysis, the documents have clarified that the government itself has encouraged this new order, as they are trying to decrease the allocation of money for higher education for several reasons. First and foremost, governments world-wide are undergoing hard times, and have less money to allocate for education. Secondly, their priorities have shifted from education to other infrastructure. Finally, the idea that higher education is both a 'private' and 'public' good has changed. In other words, the benefits are becoming private rather than public. Hence in Turkey, the government supports the growing demand in higher education, but do not want to take on the increased financial responsibilities, and so privatization in higher education has been encouraged as a result. A partial result of this is the tremendous increase in the number of private universities in Turkey, which is also considered to be a result of globalization and the new neoliberal world order.

The document analyses show that as a phenomenon, public universities are not capable of absorbing the increasing demand for higher education. As a result, students who are not able to get high enough scores to study at the top public universities prefer to attend private universities. This is one of the very foremost reasons for the increase in the number of private universities in Turkey, especially after the 1990s. Such an increase in the number of private universities inevitably causes a sharp increase in the number of academics working in private universities._Another important reason for the increase in the number of private universities is the support by the government. Recent developments have shown that universities cannot be managed only with the budget allocated to them by the government. Students are taken into account to pay money so that the universities can become independent. Hence, the universities are forced to plan more carefully when opening a department or hiring new faculty. As a result, some of the departments in the humanities have been closed. In Ercan's words, "the commercialization process of education has gained a momentum in the 1980s from the state itself" (Ercan & Kurt Korkusuz, 2011, p. 24).

Even though the primary money resource of private higher education institutions is students' tuitions, the income from the techno-parks has also started to make up a more significant part of their budget. This is especially true for the public universities since 2000. According to the private sector institutions and research groups like TUSIAD, on the other hand, Turkey must overcome its deficiencies in vocational education in order to have a qualified labor force. The production of high-quality products that will ensure high productivity requires constant research and development. Therefore, companies should be encouraged and supported in their research and development efforts. Cooperation between research institutions and the industry should be maximized to improve company innovation capacity. Reduction of the current account deficit requires not only the local production of essential import items, but also an increase in exports. Consequently, industry-university partnership in Turkey has been encouraged.

Turkey's capability in technology was strongly linked with its science capacity, as it is a source of enhanced technology. However, this relation was not one-sided. It was necessary to improve technology increasing the scientific knowledge. Therefore, "interaction between science and technological development became one of the main goals of science and technology policy. This tendency increased the strategically importance of technology and science in the economic development and social welfare. Thus, the new strategy, “Vision 2023: Science and Technology Strategies”, was declared to develop many possibilities for SMEs and research institutions, such as constant collaboration between member countries, presentation and spreading information, which derived from research, using in practice, finding new research areas, university- industry collaboration, education of technical staff (Baysal, 2007, p. 15). However, in Turkey, there are some obstacles, which cause problems for the academics, like intellectual property rights.

The collected documents show that the structure of the relations and collaborations has changed after the establishment of the techno-parks. However, the collaborations are becoming more company-focused and oriented. The main motivation of the companies is to respond to the real needs of the companies with new knowledge and technology approaches to increase competitiveness and profit in the global knowledge based economies. For that reason, the private industry and the government support education-focused collaboration by supporting the investments in education through the techno-parks. In that way, the techno-parks become the companies’ place to attract researchers, academics, the students’ research and other technology-based innovation. Most of the demands in the techno-parks are related to need-focused collaborations in which the researchers meet the urgent needs of the companies. The participants agree that the academics act as consultants. In this collaboration, the advantages are mainly for the companies, which decrease their cost of highly intellectual human power, while increasing their needs related to the R&D. In that way, their profits increase, while a large number of the researchers and the students have access to the companies’ facilities. The disadvantages of this collaboration are transferred to the universities. Some of the projects developed in the techno-parks have been taken to the production and commercialization stages. Job offers have been made by the companies to those students and the researchers they have worked with.

As a result, the transformation of the higher education has become easier with the techno-parks. Turkish Law for the Implementation of “Technology Development Zones” converts innovations to commercial products or processes by utilizing the capabilities of a university or research center. Hence, they support the regional developments. The most important role of a techno-park is to provide an environment to transform basic science to the commercially profitable innovations. The main expectation of the universities as well as the governments is that, in return for the commercialization of research projects, the techno-parks will increase funds for future studies. The private sector, particularly those high-tech startups that ask for highly qualified knowledge because of the close relations with the university, collaborate with other businesses on the techno-park and the managerial, financial, and legal services. The multinational corporations, on the other hand, are involved in the activities in the techno-parks because of the flexible and short-term projects. The local governments motivate the techno-parks to support the regional growth. More importantly, the national governments expect the nations’ competitiveness in the global market to rise as a result of this partnership between private industry and the universities through the techno-parks.

Thus, each stakeholder of the techno-park concept has its own reason to have a techno-park. However one reason is common: to transform the scientific research of university into industrial applications. The linkage between university and the companies could be formed in many ways, such as transfer of people, transfer of knowledge, companies sponsoring the research and access to the university facilities to improve new technology-based enterprises for economic growth, to turn research and development activities into investments, to encourage entrepreneurship, to increase the number and types of economic activities of the region, to promote technology transfer, to commercialize the university's inventions and know-hows, and to increase the education capabilities. While doing all these activities, they try to generate employment opportunities for the university graduates who stay in the region, to take profit from the park, to create employment opportunities which pay higher salaries for the academic personnel, but low salaries comparing to the salaries in the related market; and to develop chances and capabilities for workers.

As a result, the rationale behind the techno-park application in Turkey as seen in law 4691 (2001) which regulates the establishment, operation, management and control of Technology Development Zone, and authority and responsibility of the related people. The aim of this law is to create collaboration between research institutes and industry, in order to help the country in "economy, international competition and export trading, production of technological knowledge, develop innovations in products and services, improve the products' quality and standards, improve the efficiency, diminish the production cost, commercialize the knowledge, support the technology based production, leadership and entrepreneurship" (p. 12), encourage small and medium sized enterprises for highly new technology investments, invest intensively in technology areas with the permission of the Scientific and Technical Research Council of Turkey, develop employment opportunities for most young researchers and scientists, encourage technology and knowledge transfer, and develop well-developed technological structure in order to attract foreign investments (Saritas, Taymaz & Tumer, 2006).

In the light of this evidence, the transformation of the higher education has already been completed with the new rules, regulations, and implications at the techno-parks, which force universities to adapt to all these changes. In other words, techno-parks have become the engine of the system instead of the universities where higher education is only limited activity. The transformation towards entrepreneurialization has profoundly produced different problems, which are denied by the system.

The government, with the help and manipulation of international organizations like the World Bank and OECD, supports the idea of the “human capital” in order to define the labor resources in neoliberal terms and policies. The private sector and academic institutions develop partnership with the government’s initiatives to support innovation in the Turkish economy. Additionally, one of the government’s purposes is to decrease the unemployment rate by increasing the small and medium-sized enterprises (SMEs). As a result, another purpose of the higher education is to decrease the unemployment rate, not only by training the well-educated “human capital” but also by supporting directly the SMEs. Promoting innovation and internationalization on a firm-wide level affects the demand from the universities. Not only the profile of the graduates has changed, but also the demand of the corporations has increased.

Turkey has significantly low numbers in patents and business researchers in their investment levels. Therefore, the international organizations suggest that Turkey have collaborations between the public and private sectors. In this partnership, the data shows that universities have played an important role in the economy and are even subject to the “marketization of higher education” (Bok, 2007). The academics in the different departments can see this effect by having better job opportunities and well-paid salaries. The effects of privatization, particularly with the involvements of the techno-parks at universities may lead to many problems. For instance, the inclusion of private sector elements may cause an erosion in academic standards. Moreover, relations among the academics can be badly destroyed. Privatization by means of university-industry-government partnership in an academic context is undermining colleague friendship and trust. Unfortunately, this brings along tension and separation among academics. While some of them spend their time for education, other academics will spend most of their professional time a consultant for various companies, neglecting their students. Academics whose expertise area is in the humanities can begin to think they are not valued enough, since their research is not as easily patentable and patent rights increase the position of the academics in the academics and in the administration. Academic freedom is limited by this corporate sponsorship and involvement as well. Some universities are signing contracts with corporations in order to meet all the research funding of a whole department, which then becomes over-sensitive to the demands of these companies and can give importance to the company’s needs rather than to those of the students or of academia. Even though this trend is new in Turkey, these negative effects can affect increasingly academic profession.

After the phenomenological analysis, it is clear that massification is the most important aspect of the new state of higher education, where the number of students has increased dramatically. Even though, on a positive note, a student can enroll regardless of “his or her socio-economic background, in line with the talent s/he has the opportunity to enter university,” the additional effect of globalization has changed the dynamics in higher education. “Massification” leads to privatization of public post-secondary institutions, while the governments reduce their support education. Hence, privatization of public universities is becoming a new trend. Instead of facing the needs of the universities, the governments force the universities to find their own funding through higher tuition fees, generation of income through consultancies, and university-industry partnerships as it is seen in the techno-parks in Turkey. Massification can also cause a decline in overall academic standards. In Turkey, the changes are seen at the universities from a “collegial university” into a “market model university” (Ercan & Kurt Korkusuz, 2011). Therefore, these changes have enforced the transformation in the academic environment and academic content. The main reason behind “the market-oriented policies are to decrease the cost of higher education by increasing the demand of higher education on university autonomy and freedom” (Ercan & Kurt Korkusuz, 2011, p. 123). Consequently, certain conditions in the university environment and culture have changed. Market-oriented understanding have affected the structure of the universities, particularly in “the loss of academic freedom for academic staff, more difficult working conditions, increased workload, contract based employment, greater accountability, reduced participation in the decision making process, and increased competition to fund research programs” (Ercan & Kurt Korkusuz, 2011; Dale & Robertson, 2007).

Accountability and performance criteria are the latest pressure of the academic personnel, particularly in the private universities in which the number of publications is less important than those of patents. However, in some departments, particularly those in the social sciences, there have been fewer patent opportunities compared to the engineering departments, like in ICT and Life Sciences. Consequently, the importance of the Social Sciences is relatively decreasing in higher education, and most academics who come from technology-based departments are taking an increasingly larger majority share of the important positions within the administrative and organizational hierarchy. These changes are seen especially in the new universities, which have just established their techno-parks. Most of the engineering and secondly business administration departments have become involved in the projects. The aim is to repeatedly educate successful engineering entrepreneurs and managers to provide principles of entrepreneurship throughout the curricula. (Demircan, 2006)

Additionally, the administrational and educational problems related to Graduate programs that can arise include lack of support for research, problems of research assistants and lecturers, inadequate physical conditions, problems related to staff hiring- assignments, scientific culture-justice and objectiveness problems, and promotion of foreign language criteria problems. Academics agree that private universities can create employment opportunities; keep the successful students in the country; and ease the financial burden of the state because they provide higher education for students who are not able to study at the top public universities. Despite these positive effects, academics criticize private universities. They believe that private universities offer only popular programs with high job prospects to attract students. The differentiation in qualifications between public and private university graduates is not clear. In the private universities, there is low job security and high turnover in some departments. Additionally, the interventions of founders and board members are considered to hamper the process of institutionalization and autonomy. On the other hand, in order to attract the attention of the target students, the private universities need to satisfy their needs and demands. The relationship between academics and the management is like in the corporations in which satisfaction should be accepted as a university policy and the academics should adopt this policy. The pressure on the academics is high and the academics complain about the performance that they conduct in a year.

The documents clearly show that there is a positive correlation between the numbers of the academics in the universities and the numbers of the techno-parks and the people who work there. The number of the companies has increased dramatically in ten years, when the number of the personnel has reached from 2,543 to 15,822 people in nine years. Most of the academic personnel work in the techno-parks as managers, clients, academics, and student interns who are the "human capital" of this university-industry-government partnership. The changes have improved the demand in vocationalization in the universities in the age of "human capital" and the utilitarian conceptions of education, while increasing inequality between the different faculties and majors. Additionally, teaching and learning are becoming a part of marketization and consumerism (Ercan & Kurt Korkusuz, 2011). "Human and material investment" has become important in the education system in the universities, where the government develops policies to "meet the challenges of the younger students in the area of research and development (R&D)". The main purpose of these decisions is to ensure that "the academic labor market works efficiently in order to maintain a balance between the imperatives of social protection and employment flexibility for businesses in the techno-parks, so the techno-parks are the new work places to manifest such a kind of the collaboration. Hence, the expectations from the academic personnel have changed. In other words, commodifying teaching is seen in the context of the projects developed for the SMEs in the techno-parks.

In addition, the SMEs need training, which is much more expensive than their budgets, so vocational training is given by the academics who are in the techno-parks by means of government support through scholarships or incubation loans. As a result, academics from different departments have begun participating in various activities in the techno-parks, particularly in giving training and consulting for the SMEs in the techno-parks for a low cost. However, not all the academic personnel have the same opportunities to be involved in these activities. (Remember that some departments are seen as more "valuable" in terms of patentability and practicality than others.) Therefore, there is a remarkably unbalanced income in terms of salaries among the academics in the universities.

Commercialization of the universities is increasing, especially in universities that boast of highly regarded techno-parks with qualified academic personnel and students. Particularly after the last changes in Turkish Law, known as "Torba Yasa" and Incentives 2012, making profit from the techno-parks has increased by decreasing the high cost of qualified labor (Ercan & Kurt Korkusuz, 2011; Demircan, 2006). Some of the participants with an academic background, as well as the student interns, have negative experiences. The managers and the firms' representatives, on the other hand, strongly and regularly support this partnership. Most of the time, researchers think that industry involvement improves the number of publishing papers. However, actual number of published articles is less than expected. The benefits for the academic publishing are academic mobility and financial income, which is secondary. Finding funds for research and projects are critical. However, the industry partnerships, which are highly involved, negatively affect research productivity because they do not give permission to academic publishing. Therefore, the existence of industry partners is positive, but the intensity of industry collaboration is negative. Additionally, the student interns who have been involved in the industry and university partnership emphasize that this kind of partnership improves their relationships with the people in the market and business environment, but academically they could not even take advantage of their own research. Even though great investments were done at the university, the outcomes of the research projects were in the warehouses or on the self of the libraries without publishing. Today, however, those which possess great investments and know-how are able to take the patents, but not from the university or the researchers. The academics believe that they are the ones who can control the technology, but do not want to become technocrats of the system. Furthermore, academics have also mentioned the danger of focusing on specific subjects dictated by the industry, rather than focusing on other subjects, which may be more strategically important for long-term progress.

As a final remark, the techno-parks are the new arena where the relationship between the industry and the university is becoming more complicated. In the university campuses, the best companies in the country as well in the world can be seen, and they actively work using the resources of the universities. The university techno-parks make money as a landlord of the techno-parks while they channel grants and fund received from the government. The mutual benefit of this partnership is not clear and is questionable, particularly in terms of humans' benefits, which is materialized and called "human capital" in neoliberal policies.

After the Turkish law for implementation of "Technology Development Zones," the techno-parks become as a zone where new technologies and innovations are converted to commercial products or processes by utilizing the capabilities of a university or research center, and hence they support the regional developments. The aims of this law are to create collaboration between research institutes and industry in order to help the country's economy, increase international competition, export trading, and production of technological knowledge, develop innovations in products and procedures, increase the quality and standard of products, increase production efficiency, lower production cost, commercialize information, support technology-dense production and entrepreneurship, adapt small and middle-scale enterprises to new technology, generate investment capabilities in technology-dense sectors with the guidance of the Scientific and Technical Research Council of Turkey, create more employment opportunities to researchers and scientists, help the transfer of technology, and finally create a technological infrastructure which helps attract foreign capital (TUBITAK, 2010, p. 17).

In the report called "Vision 2023 :Turkish National Technology Foresight Program", TUBITAK writes, "Techno-parks create a synergy between firms and academic institutions so that the exchange of knowledge, information and even technology between the partners is stimulated and improved", giving the techno-parks of METU (Middle East Technical University) and ITU (Istanbul Technical Univeristy) as examples. Additionally, firms can understand the links established between university and industry much better. Moreover, universities transfer the scientific knowledge and expertise to companies in the techno-parks, which provide an important resource network for firms. In that way, proximity between firms and universities promotes the natural exchange of ideas through both formal and informal networks.

According to university administrators and policy makers in Turkey, techno-parks create different benefits. Universities receive financial funds from the governments, which have financial difficulties. Additionally, the universities' research agenda is becoming related to companies' science and technology demands in the techno-parks where they transfer research finding in science and technology to the private sector to increase their contribution in the innovative ability and capacity. In this way, the competitive performance of the private sector can increase.

The techno-parks are considered by the local governments and other organizations as the economic drivers of the region. These local entities deal with industrial and technical development, and try to create physical environments that will encourage economic development in their regions by increasing employment opportunities, like the techno-parks in Istanbul. As a result, techno-parks can increase the income level of citizens who live around them, as is seen in the case of Istanbul Technical University's techno-park, ARI Kent. Moreover, re-industrialization takes place in areas where the techno-parks are established, particularly in the smaller regions. This can result in Turkey greatly increasing its current export capacity, reaching up to US$ 500 million by

2023 (Saritas et al., 2006).

The number of the techno-parks has increased dramatically in a decade, particularly after 2006 (TUBITAK, 2011). More importantly, 15 of them are in the most industrialized regions of Turkey, while 38 of them are established in different cities all over Turkey (TUBTAK, 2011). Additionally there is now at least one techno-park in every single region of Turkey, but the activities of these techno-parks are certainly not all equal to the ones located in Ankara, Istanbul, and Kocaeli. Additionally, most of these techno-park are public rather that private, particularly the ones located outside of these 3 main cities. Three are only 5 private techno-parks, located in Bilkent University, TOBB University, Sabanci University, and Istanbul Commerce University. There are also other reasons why the private techno-parks are few in number. The first is related to the cost of the investments; the second is related to the capacity of academic support, which is not enough to support all the companies in techno-parks (Ministry of Science, Technology and Industry, 2012). The aim of these institutions is to create technological information through the cooperation of universities, research institutions and the productive sector. In the techno-parks, knowledge-based activities, such as R&D intensity, "human capital" and specialization in high-tech activities, are expected by the government in order to increase regional economic power and competitiveness.

In most of these companies, highly specialized personnel have been working for the software exporting industry, including small/medium entrepreneurs and individuals working in the related areas, because they are comparatively cheaper and more economic to establish, whereas the profit rate is high; in other words, most entrepreneurs invest a minimum amount of money, yet take in a large profit in a short amount of time. This is also very easy for the incubation in the techno-parks. In the research and development-oriented techno parks, the main goal is to develop and innovate the technologies that are mostly related to industry, or to promote industrial upgrading.

Additionally, the study's participants all agree on the importance of funding the researchers as is seen elsewhere in the world. They support TUBITAK's programs aimed at encouraging Turkish scientists to come back to Turkey in order to conduct their research here. Since 2004, TUBITAK has played a bridging role among the public agencies, the universities, and the industry in TARAL in order to achieve the goals prescribed in the "Vision 2023" plan. The interview participants mentioned the policies, which have been directly affecting the use of human resources in Turkey, like guiding and encouraging young people to become scientists. According to the techno-park managers, there are not enough researchers studying technological improvement in Turkey. There are no firms performing in specific subjects and improvements. On the other hand, according to one professor who is actively involved in the techno-park policies, there are significant decisions that will impact the development of the industry-university partnership by supporting applied and industrial researches until 2018; this professor's team decided to undertake industrial development activities between 2008 and 2017. Moreover, there are also regulations to develop R&D infrastructure to support start-up companies in the techno-parks by supporting their R&D projects until 2013. In that way, it is expected to have significant changes in some highly technological areas, like biotechnology. In order to develop the field, there would be controlled projects support until 2018. Of course, there are also policies regarding human resources in order to achieve the 2023 goals. Today, instead of mutual relations between the government and the university or the industry and the university, we see all three parties - the university, the industry, and the government - at the same table, because innovation and new technologies increase the importance of the universities in the world, especially in those industrialized and industrializing countries.

Therefore, there will be more pressure on universities to play an important and crucial role in emerging technologies, which have significant effects on the industry, the economy, the society and the environment. According to the participants who are actively engaged in implementing these science and technology policies, government spending and budgeting is another reason why the state demands so much from the universities. For various reasons, including increased public spending, the government has limited resources. In order to balance their budget they need technology-based economic development. However, the budgets for research and development are also limited. Thus, they need to conduct economic R&D for the industry, which can be done in the universities as it is seen exactly in other countries. On the other hand, there is another significant reason why the industry as well as the government needs the help of the universities, which is changing nature of knowledge production. In other word, the emerging technologies are increasing the importance of the particular research and technology areas. The researchers and other academic members together with the students in the universities are not really aware about the changes. Those who have good connections with the Higher Education Council and TUBITAK have better ideas about the new science and technology policies.

On the other hand, the firm representatives are not happy with the science and technology policies. All of them agree that they are not enough to develop R&D. They need more strategic planning and action rewarding to the university and industry partnership. They believe that bureaucratic formalities in the university diminish the collaboration. Additionally, some professors and academics are not ready to collaborate with the industry. They are slow or inefficient. The management of the techno-parks should take radical decisions to increase efficiency. The most important benefit of these science and technology policies is related to the young researchers. They are seen as bright people who solve many critical problems easily and economically. The wages of these researchers are cheap comparing to the wages of the market. Some of them are working just to conduct their research, and as a result do not pay taxes towards social security. They are under the coverage of the university. The most significant advantage related to the science and technology policies and national strategies taken by the firms is tax reduction. In the techno-parks, the SMEs enjoy many tax advantages. The firms' representatives are of course very pleased with this, and the tax breaks are the main attraction of the techno-parks.

As a result, representatives of the industries, private firms, banks, and other private sector organizations are among the least common partners with the smallest shares, which are supported by these science and technology parks. As the manager of the techno-park emphasizes that these policies, particularly those related to the tax reduction, have specific goals to upgrade R&D. The tax reduction policies have three main goals, which are mainly: increasing the university-industry collaboration, increased commercialization in the global economy, and supporting information and technology based entrepreneurship

(Ercan, 1998). Companies, which can employ over a hundred researchers, do not pay any tax in this area. The true income and profit of these firms remain unknown.

From the data gathered from the participants, it is clear that the firms and the managers of the techno-parks have intensively benefitted from these science and technology policies. However, the benefits for the universities are questionable. Most of the facilities and services provided by the universities are commercialized and given to the service of the industry in order to improve the economic level of the country and decrease the unemployment rate. Opportunities to work with the techno-parks are given mainly for the benefit of the important SMEs and startups by using direct financial supports of the national policies. Thus, increasing the importance of techno-parks for Turkey's economic development has profoundly affected the main purpose of the universities so that universities will transform and become more focused on entrepreneurial aspects of the activities rather than improving the quality of education.

The implications of the policies are organized into three main sections, namely long-term visions, strategies and targets for STI-driven growth, major instruments in the STI policy mix, and achievements for the advancement of society towards the Republic of Turkey's 100th anniversary and beyond. The Turkish government developed a specific SME policy and created SEGEM (Industrial Training and Development Centre) and KOSGET (Small Industry Development Organization), which, later on, were united under the umbrella of KOSGEB (Small and Medium Industry Development Organization) in 1990, as a major instrument for the execution of these policies. A very important step was the creation of the Customs Union with the European Union in 1996, which strongly intensified the influence of international competition on Turkish industry, especially SMEs. The first SME Action Plan was introduced at that time, but was not implemented due to a lack of funding. Following the acceptance of Turkeys application for membership in the European Union, the policy of support for SMEs was coordinated with that of the EU in order to enable Turkish SMEs, inter alia, to sustain competition with their counterparts in the EU and in other applicant countries. Creating a business environment conducive to entrepreneurship and the development of innovative SMEs has been high on the European Union policy agenda, and stressed in the Lisbon European summit in 2000 as part of a broader strategy for economic growth (OECD, 2010, p.11). The Turkish government signed the European Charter for Small Enterprises in 2002 and agreed to take concrete steps to develop policies and programs for SMEs. Turkey participates in the multi-annual Program for Enterprise and Entrepreneurship, in addition to the BEST (Business Environment Simplification Taskforce) Program. Along these lines, the Turkish government also adopted the Bologna Charter in 2000, together with other OECD and non-OECD countries, to promote bilateral and multilateral initiatives to foster global SME partnerships (OECD, 2010, p.12).

Empowering the overall business environment is the highest priority of the government; by creating suitable economic climate for the long-term development of the SMEs, by optimizing markets, and by correcting their dysfunctions and enhancing efficiency. They have changed existing laws and regulations, particularly in “consolidation of public finance, and more particularly of the central government budget, as well as sound management of public debt in order to ease the pressure on capital markets and reduce private-sector eviction" (OECD, 2010, p.14). Most of the reforms are directly related to the universities and the techno-parks to empower the SMEs. Therefore, the name of the Ministry of Industry and Trade was changed, and KOSGEB was increasingly supported. The last incentives in 2012 are related to the structural reforms aimed at decreasing political, sociological and bureaucratic rigidities in the regions by mobilizing the necessary political support for the private sector with the help of the universities and the techno-parks. All these strategies also explain why the techno-parks are under the control of the Ministry of Science, Technology and Industry.

In the policies, the establishment of long-term visions, strategies, and targets is targeted to increase S&T and innovation system as a "motor of change" for sustainable growth by increasing S&T awareness in society and improving STI culture; advancing the quality and quantity of human resources for S&T; supporting high quality, result-oriented research; enhancing the effectiveness of STI governance; Boosting the S&T performance of the private sector; Improving the research climate and research infrastructure by improving the effectiveness of national and international network" (TUBITAK, 2010, p. 2).Additionally, the programs related to the human resources for science and technology (HRST) and science and society is directly related to the policies at the university and the techno-parks. Defense and space research programs and HRST were put under the auspices of the Prime Minister. The main goals of TARAL are to:

> (i) Increase GERD as a percentage of GDP to 2% and (ii) raise the number of full-time equivalent (FTE) R&D personnel to 150,000 by 2013. The combined effect of this initial set of triggers effectively acted as a "motor of

> change"4 to propel the functions of the STI system and instigate an STI impetus. The second implementation plan with regards to Vision 2023, namely the National Science, Technology and Innovation Policies Implementation Plan (BTYP-UP) for 2011-2016, is in preparation. (TUBITAK, 2010, 2-18).

The "motor of change" is used to improve innovation systems and to strengthen the other functions of system The promotion of entrepreneurship and technological or innovation-driven research is aimed so that the increasing number of innovating firms is supported in order to increase technological innovation in the manufacturing sector and in the services sector by empowering the private sector. Another aspect is to increase the total number of R&D personnel. There are new funding programs to raise the number of SMEs in innovation, to empower the development of technology-based firms, and to encourage existing firms to work in RDI by developing innovative business ideas, increasing the number of entrepreneurs and creating high value-added enterprises. Networks in the cooperation is established by the Funding Program "Initiatives to Establish Scientific and Technological Cooperation Networks and Platforms (ISBAP), which was designed as a competitive, matching funds program where TUBITAK matches the contribution of the network or platform members" (p. 21). The Program develops the funding mechanism of the technology platforms in the most export and import oriented sectors. Therefore, ISBAP aims to:

> (i) Encourage mutual policy learning and networking between policy-making at local, national and international levels, (ii) intensify co-operation among public or higher education research organizations and/or enterprises on R&D activities, (iii) facilitate the development of collaboration between enterprises and other actors with a view to joint innovation activities and knowledge exchange, (iv) increase the rate of commercialization of the results of innovation activity in enterprises. (TUBITAK, 2010, p. 4-24).

While encouraging the private sector, the utilization of R&D and cooperation in the networks to increase knowledge circulation, Turkish law is also changed to promote R&D activities, such as “R&D tax allowance, income tax withholding incentive, insurance premium support, stamp duty exemption, and techno-preneurship capital subsidies.” Infrastructure is critical to R&D, so establishing, maintaining and updating high quality research infrastructure is assigned as a task of the universities. “DPT funds research infrastructures of higher education and public research institutes on a project basis” (p. 14) to meet the needs of public and private sectors by making “applied and multi- disciplinary R&D activities.” However, the qualified research environment and collaboration are also important as “laboratories, thematic expertise centers which are funded in prioritized technology fields, including nanotechnology, ICT, food security, innovative food processing, hybrid vehicles, biotechnology, and clean technologies.”

The participants agree that the new arrangements in the techno-parks are not enough to face the needs of the R&D. The spaces are limited. More importantly, they expect to have more intensive policies to improve the partnership with the universities. The general impression regarding this partnership is that the firms and the managers of the techno-parks see the universities as service-supplier institutions. In other words, the universities are the ones who have to develop technology, and they then have to transfer this latest knowledge to the firms. The first concern of the firms is economic. They need well-organized and well-developed techno-parks in order to increase economic competitiveness. They need a high-level of education in order to solve their “human resource” problems. They need the help of the government in order to decrease their costs and develop incentives regarding their economic competitiveness. The techno-park management, on the other hand, strongly suggests the policies regarding the improvement of the social network. On the other hand, the managers see the techno-park as the best place for business incubator because they have been inspiring the young talents to establish their own companies. Some of the techno-parks are growing so fast because they have good students from the best engineering departments, while the private businesses are also interested in investing in these techno-parks. Most of the best companies in Turkey have opened offices in a techno-park. The firms' representatives and the managers of the techno-park agree that some universities are so good that they are pioneers in using the advancements in the different fields, and because they are known as leaders in the ranking list they bring economic prosperity to the nation and state. However, these techno-parks are considered as business institutions rather than educational institutions. However, the academics and the students take the techno-parks as the new arena for R&D rather than entrepreneur development places. They think that funding and conducting research are easier in terms of the practical implications in the techno-parks. The academics say that these are the best places, particularly for those talented ones. From this context, it is clear that the participants see the techno-parks as for the economic development by improving technological development. The purpose of the higher education is changed ; instead of its primary focus being the education and cultivation of people, it is considered as means to achieve the economic goals related to prosperity. However, the participants agree that the more the education level increases, the more prosperity the country will enjoy. In this way, it is possible to diminish inequalities in the society, which is defined in many different communities as the motto of the neoliberal policies. As a result, rationalization of the system has been developed with the help of the implications of the policies related to science and technology policies. Hence, the increasing transformation of the techno-parks has enforced the radical changes in the universities as well.

According the data collected in focus group interviews and analyzed under the phenomenon concept analysis, segregation can be seen also in the departments. Many Turkish women cannot afford to go to the specific departments or study the specific majors because of the Turkish education system. Women are largely underrepresented among scientific departments at Turkish universities, especially at top-level universities' departments, such as Electric and Electronic, Computer, Mechanical, Civil, and Industrial Engineering. (Of course this under-representation in Engineering and the sciences can be seen in other countries as well.) However, most of the departments at the techno-parks are scientific departments, not those in social sciences. Most of the technology-based departments have enjoyed better opportunities of the universities, compared to the other departments.

Even though the number of women researchers in Turkey has increased after 1990, the number of women who are in the field of engineering remains significantly low. The number of female researchers is not equal in all of the departments. They also underline a strong correlation between "feminized" sectors and areas and lower earnings. All female interview participants mentioned the segregation between research and other professions, since there is devaluation of the research in the areas of humanities and social sciences. More importantly, in the field of engineering and technology, men are more dominant than women because few women are currently specialized in engineering and technology. Additionally, the participants also show that vertical segregation worsened in the techno-parks' environment and atmosphere. They do not have better positions at the top of the academic and managerial hierarchy and may even be "crowded out" from the profession. The approach of the general Turkish society, as well as in these realms of the academic environment, is basically male-centric. Men likewise take up the majority of the top techno-park positions. In other words, female researchers are significantly under-represented and they have not yet been considered seriously in the techno-parks.

From the perspective of fields' segregation, however, the most chosen fields are related to engineering, manufacturing, including industrial design, and construction. The less studied fields are related to the social sciences, business and law. Unsurprisingly, humanities and the arts are not studied at all in these techno-parks. According to this perspective, the tacit knowledge is more important than coded knowledge. The objectives of the technical field cannot be achieved outside of laboratories, and so these innovative laboratories should be established under the umbrella of the science parks by funding and allocating the sufficient resources. More significantly, some of the researchers sharing this perspective do not see any segregation in terms of the field, but simply see this division as a reflection of today today's realities. Generic technologies have the ability of changing economical fields and creating new economic activities and sectors, such as information technology, flexible automation technology; new organization technology, developed equipment technology, biotechnology and genetic engineering, nuclear technology; and space and aviation technology.

Eight interviewees out of the twelve agree that the needs of social sciences can be satisfied by the engineers themselves by doing different social projects together with the academic personnel in these departments, like increasing innovation, entrepreneurialship, and leadership. For that reason, they see the departments of Psychology and Education as their "service department" in order to increase their own efficiency and effectiveness. This kind of approach has been creating significant inequalities, particularly in the long run since the techno-parks are becoming increasingly important at the universities, especially in terms of academic activities, like having a larger number of publications, patents, and personnel. In the short run, in the management it is possible to see more people from the science and engineering departments. Consequently, some departments are becoming less important and they will lose their power in the management of the universities. De-valuation of the field and an under-representation of women are totally against the very purpose of higher education.

The number of the techno-parks in Turkey has increased since 2000, which have been officially supported by the national government. Since then, public action has supported science and technology parks as the main innovation policy by giving them initiatives. All of these changes, particularly regarding encouragement policies, have transformed the roles of the universities as well. However, according the data collected and analyzed, not all the policies have taken into consideration by analyzing the real needs, or the implications are wrong. Additionally, in some cases, there are some policies, which protect only for the advantageous for some parts while using the resources wrongly.

The participants agree that they need policies to change the structure and to have the maximum benefits, like to encourage and support entrepreneurship and innovation, to instigate and maintain the collaboration between industry-university, to prepare a suitable environment for technology transfer and foreign direct investment, to create employment for qualified human resources; and to promote university based start-ups and spin-offs (METU Techno-polis, 2012).

However, the perception of the participants show that policies have been developed for practical use to face the needs of the market while generating opportunities for institutions as well as for the students, the academics and the researchers. In other words, the policies are related for commercial returns by commercialization of R&D. However, in the techno-parks of Turkey, since they have just opened or they have to adapt so quickly to the changes, many parties have been ignored or not protected properly, particularly regarding disclosure and confidentiality and ownership. For instance, individual property (IP) ownership rules and policies for staff and students often differ considerably. Furthermore, an individual university may have a different policy on ownership of different types of IP. Even though policies try to develop legality and equity, most of the time they created inequalities.

In most cases, the R&D activities or IP rights are misused by the companies because they take the advantageous parts of these intellectual activities by using them for their own financial benefits. For instance, students do not have any social security, so they are more affordable to use than normal full-time professionals. Even the Ministry of Science, Industry and Technology chooses university students depending on their projects, giving them research grants for up to 100,000 Turkish Liras. If their projects work, they are invested with a further 500,000 lira. Universities or techno-parks have no automatic system to generate new businesses by giving projects to the students that they are not employees. But, there is a particular problem in research projects sponsored by industry. The students create, while the firms profit by taking the patent rights. The students cannot even publish academically. Illegal working traffic is high, and neither the techno-parks managers nor the academic members of the universities can take radical precautions against this. In this case, even though students earn money, the firms at the techno-parks and the multinational corporations take advantage of the system. More importantly, registering a patent is extremely expensive for a student, which can costs up to 100,000 lira ; certainly not affordable for any student. As a result, most of the patents are taken by the firms, particularly by the foreign ones, and they are not seen in the list of the national patent institution. The new policies are needed in order to arrange all these activities, which come from the inside dynamics of the techno-parks. According to the statistics, Turkey has a very limited number of triadic research patents because they are very expensive. These changes have forced new policies on IP and R&D where commercialization has become more complex at the universities since the research is not for the public benefit anymore. However, the research at the universities has private benefits. For example, there is research for the benefits of the private sector to increase commercially the profit. However, universities' first goal is teaching and creating equality. Additionally, all these activities are interconnected and interdependent which create different kind of conflicts as a result of neo-liberal policies. As a result, universities in the structure of the techno-park policies have become more market-oriented, whereby they commercialize the knowledge by using the highly intellectual capacities of the researchers without protecting their rights. The benefits are mainly taken by the private sector, since the legal and financial systems are not enough to protect the researchers with IP rights. Universities as entrepreneurial institutions work for the market ,while commercializing and commodifying (illegally) the knowledge and devaluate the studies of the researchers. All in all, universities at their techno-parks have become much more dependent on the dynamics of the market economy thane ever before.

Opening new spaces and allocating extra effort for these regions have changed even the regional urban development as well as in the universities. The innovation hubs are forms of enterprise zones. Some of these zones are purely private sector real-estate efforts, but most are the products of cooperation between the public and private sectors. These hubs are characterized by the partnership of research institutions and companies with the common goal of generating the basic materials of the informational economy. Thus, the importance of university settings, with their wealth of knowledge, strategically within these hubs is quite considerable (Robertson, 2010).

According to the interviewees, the new “techno-parks” need the planned design both physically (architectural) and socially (communal) in order to promote high-technology industry and synergy between the actors. Not all the techno-parks have well-developed, innovative environments for the sectors as well for the research of the departments at the university. However, some techno-parks have provided significantly well-developed environment for technological innovations as well as social, economic, or cultural innovations, like in Silicon Valley where Facebook, Intel, and Apple have been creating new economic, social, cultural, and educational spaces. These innovation environments are more intelligence- intensive than building-intensive. The key issue is to search for articulation forms between the physical territory, and these much subtler social spatial, economic, cultural, innovation mechanisms, linked to the innovation dynamics, and particularly, to the innovation of small and medium enterprises.

Besides all these changes, new important markets have become important while people think that the new technologies improve the quality of life and the structure of social life. Consequently, these techno-parks will become at the top of the global hierarchy, as it is seen in Silicon Valley. Adopting to a knowledge- based perspective that has a great influence on knowledge creation and transfer; this change in spatial configuration is defined with the term despatialization. More specifically, despatialization –consequential to working with improved communication tools, such as internet, intranet, videophone, etc.– modifies the elements of the relations of "person-person, person-artifact, person-place, space-place-activity, space-artifacts" within spaces of knowledge processing spaces. The change in space is generated mainly by the global networking organization especially driven by technological developments. In other words, the techno-parks have been creating new dimension in the regions, like it is seen in the case of ITU. The new spaces at the techno-parks are being used by the corporations. The land of the universities is allocated for the development of the techno-parks.

After 2003, in the techno-parks, a rapid development was seen and the amount of the closed areas was increased dramatically. In the meantime, in the techno-park, a different physical environment and life style were created to increase creativity. According to Robertson (2009), the policy of 'decentralization' has changed education markets as a part of neoliberal policies. Therefore, the relocation of education activity is seen in institutionalized centers "to new reworked spaces of knowledge production with new geometries of social relations" (p. 2) as it is seen in the techno-parks. The national state has chosen "rescaled selective functions to different nodes in the scalar architecture of the global order related to new sets of logics – around efficiency, choice, local partnership, self-management, responsibility". More importantly, new social relations were established for-profit connections and environments in education spaces (Robertson, 2009). The social spaces, which shape power and social relations, are seen in the well-developed techno-parks around the world as in Turkey. There are movements of responsibilities which go outward and upward. Robertson defines downward movements as follows:

> New sectors local development plans; partnership plans; sub-contracting/outsourcing; school development plans; local visions; markets anxieties over opportunities for choice; greater organizational responsibilities without power to affect necessary changes; surveillance; performativity. This kind of changes has redeveloped the regional and educational environment. Different geometries of governance relations that cut across scales; rescaling local development, social capital, community expertise, partnership; public/private; third sector differential choices; different inspection regimes; different feelings of involvement by wider community policy frameworks that operate at multiple nodes; competitiveness global discourses of choice, markets, self management, entrepreneurialism; neo- liberal political project desires of consumer; entrepreneur; flexible; anxiety about responsibility for one's future directions, as new nodes of power and rule are constructed or invigorated, struggled over and legitimated. (2009, p. 9).

In this new system, "division of the labor in education space" has changed. Positionality in the social relations is rearranged according to market-based relations and spatial organization. Therefore, networks as it is seen in the techno-parks create exclusions and inclusion. Consequently, the social relations at the education spaces, universities, and techno-parks are "constantly being strategically spatially recalibrated, reorganized and reconstituted to produce a very different geometry of power" (p. 14). As a result of globalization, education spaces have been dramatically transformed, particularly at the universities and techno-parks. Finally, areas that Lefebvre named 'another space' are emerging; these are an alternative, differently constituted social space, constructed out of ideas about being and becoming, that might in turn mediate the full onslaught of the social relations of global capitalism. Therefore, techno-parks overall can contribute to spatial inequalities and segregation.

The markets and economic changes force the universities to make changes in the curricula. Some competitive universities have followed the trends by designing innovative programs and curricula to meet the needs of the market. While changing their curricula, they take into consideration the need of their students who are taken into account as customers. Some courses as well as some programs, which are easily replicable, are taken and used by the other universities. However, there are some highly technology based courses and programs that are not replicable, so these programs increase the reputation of the universities, for instance in Nano-technology. On the other hand, some universities are very careful in managing and controlling the teaching of courses and their materials. Such managerial policies create discussions, yet the university managements take them seriously because they indicate that in the increasingly marketized environment, they need to protect their students, their position, their reputation, and their freedom to operate efficiently and effectively while doing the correct and necessary investments. Research projects have changed when private and government sponsors are involved. The biggest challenge in creating effective teaching, particularly in engineering, is how to ensure knowledge accumulation in the sciences. However, some lessons have been developed related to the research so that the university's freedom is limited in conducting and publishing research outputs. Most of the elective courses and senior year courses are more oriented towards research subjects, which are a result of the techno-park. The content of the lessons are based on the research. Most of the assignments are related to the research questions raised by the techno-park firms.

The best universities are playing strategically to protect their individual property rights. In the knowledge transfer, besides teaching students, the patents and licensing rights are strategically protected and controlled from one center. However, not all universities are financially strong enough to protect the rights. Additionally, in many universities, academics are involved in consultancy activities while spending their time in the techno-parks rather than in their departments. Moreover, the conflicts of interests are seen between the private industry and the universities since common activities can lead to misunderstandings and expensive litigations. Universities have policies to ensure first the responsibilities related to R&D for the public interest; however, private consultancy creates conflict because of the commercialization of the activities. The borders are not clear, so whether the academics advise properly or not is not controlled. In these days, the private consultancy has turned to commodification of knowledge rather than knowledge transfer. Nowadays, universities are not organized for the purpose of making a student study to earn a degree, but rather developing and increasing income with this "knowledge transfer." Therefore, they have specific management strategies to protect their know-how. It is no doubt that universities are consistently creating new knowledge, which is seen as research output for the public interest through publication in journals and free dissemination, including through institutional repositories and theses of students. In this context, universities need to help postgraduate students have their rights to publish their thesis to develop their research careers. Additionally, these studies are critically important for the university research. However, some projects are conducted under the thesis of the PhD students with the industrial partnership. In many universities, there are potential conflicts between the university and the industry. Furthermore, in some cases the benefits are taken by the firms in the techno-parks. This can be seen also in the numbers of the patents as well. The techno-parks in Turkey have generated only 1,481 patents in eight years, which are a small part of the iceberg. While all these changes are happening, the climate of education is transformed.

Most of the students and academics of the universities in the engineering department have the chance to take better advantage of the university budget, while the other faculties related to education and social sciences lose their importance and have a limited amount of academic publishing because of funding problems. Most of the funds of the universities are channeled into activities in the techno-parks, but not for the other departments. Even though the inequalities in the higher education begins at enrollment, with the gender imbalance in the engineering departments and the economic background of the families who cannot support their children during the university entrance exam, they get worse during the universities when this kind of imbalance in those participating in these kind of research activities occur.

Universities are creating economic inequalities. Transparency, accountability, equity, and affordability are important for the future of universities and public interests. If not, the universities and their facilities will be used for individual and private sector interests. Funding in the autonomous institutions will manipulate and change the decisions and responsibilities related to the public benefit. They do not have strategies for reducing the inequalities by transferring knowledge; the university tries to increase direct income from commercial activity, whereas the private sector has increased income from knowledge transfer. In that way, the activities in the techno-parks generate direct profits and economic benefits partially for all the stakeholders who are firm members, academics, researchers and students in the universities, but these same stakeholders are hurt when the university abandons or neglects its "social mission".

Despite the great advantage of partnership between industry and university, which combines power, and human and financial resources to capitalize the new synergies, there are unseen risks. State universities suffer more because they have weak financial resources, and their dependence on public financing puts them under tight control by the government and bureaucracy. The private universities have better opportunities in techno-park because they have ben established by the powerful corporations. Universities are key institutions in social change and development. The have highly skilled labor and research output to meet the needs of neo-liberal policies. But today, they play more important role than ever before to develop new technologies, to encourage and facilitate new cultural values, and to train and socialize new social elites. The transformations are globalization; democratization; the rise of 'supra-statism' and the associated growth of modeling on a regional and worldwide scale; the increased economic importance of knowledge, at least in the more advanced economies, in securing national comparative advantage; liberalization (the introduction of markets, competition and choice); and the growth of formal, transparent, and often juridical regulatory systems, both nationally and internationally" (Brennan et al., 2004, p. 8) . In this context, the participants agree that universities are the center of this change by producing knowledge.

In Turkey, the universities have not yet played an overly important role in transforming economic power, especially in the newly established techno-parks in Anatolia where few academics are active in the partnerships with industry. Another reason is that in these regions there are few developed industries that can collaborate with the university techno-parks., a problem of regional inequality and imbalance that is also a developmental one. However, in some universities the situation is different , and academics play a significant role in the industry-university partnership in an effort to make their universities some of the most highly-regarded ones in the world. Most of the time, economic dynamics have generally been forcing reforms in the higher education in order to have short-term and long-term changes and transformation in social, cultural, and economic environments. Therefore, they have external pressures rather than inside pressures to be involved in the economic activities. The techno-park of the university as other leading research universities has played a central role in innovation and entrepreneurship in society. Both research and education are a vital source of ideas. However, innovation and entrepreneurship bring together the resources and relationships in the campus and commercialize ideas and creativity.

According to the answers from the 12 interviewees, the different resources are used by the techno-parks in order to reach these goals, like financial, technological, personnel, space facilities, and professional development training. Among all these, the most effective resource that affected the economic transformation is the involvement of qualified personnel. As a result, the economic related transformation affects and transforms the criteria of the education in the higher education.

After the economic transformation, the policies are further modified by the state and civil institutions. Most of the time, International Non-Governmental=Organizations force the political and social changes. Another aspect of transformation can be seen as the changes in social structure as the mobility for different groups: As a result, the culture has also been changed because of the production and ideas. Therefore, economic transformation is important in the techno-parks, which come out with the transformation of the education.

More importantly, nowadays, autonomy is part of the total picture of institutional freedom. Universities are under “the pressure from other sources rather than the state, like market forces, competition for students and staff, the commercial interests in commissioned research. Therefore, this trend will reduce the traditional values of the state-institution relationship. In the last decade, the governments as well as the universities have tried to increase their income from different because the state cannot face the growing expenses of the universities. Therefore, the government motivates the universities to cooperate with the industry as well with the international research institutions. In this way, they try to achieve academic and financial prioritization by making reforms in the managerial structure of the universities, by strengthening management and by increasing efficiency. So, new management forms are taken from the business world. On the other hand, while introducing new management forms in higher education, the administration tries to introduce new legislation. “Management, steering, independent ownership and deregulation are code-words for the new order” De Sousa Santos, 2012, p. 11) by concerning autonomy, accountability, leadership, participation of the students, and quality assurance systems. In conclusion, whatever in the Bologna process has mentioned, the needs of the managers, the representatives of the firms, the students, and even the academics are similar in terms of the political transformation in the universities.

From the data collected, it is clearly seen that the nation-states, corporations, the public and the private sectors, and even the individuals, have been competing under the pressure of the new knowledge economy, a result in part of neoliberal economic changes. In this competitive environment, innovation and technology have generated privileges so that the new structure is needed, and the universities have become more and more important. The research and development conducted at the universities is directly used by the industry, and so new regulations and rules are needed. In this context, the government has become to play important and crucial role in regulating all these challenges and obstacles by increasing their dominance and position in innovation and by converting knowledge to commercialization. In that way, knowledge is commodified and becomes more important than ever before. These changes have transformed first the purpose and the structure of education, particularly the higher education where new institutions called “techno-parks” or “techno-poles” are established specifically as science and technology development zones. These new zones have markedly increased in the last decade in all over the world where the industry and the university come together under the protection of the nations states. However, the subject is extremely complicated to understand the dynamics, particularly in the universities, which have transformed and gained new roles in the emerging markets like Turkey. Hence, they have new dimensions which have defines as entrepreneurial university, the enterprise university under the academic capitalism, while universities are coming more profit-oriented, like corporations. In other words, an ideological shift has seen in which education and training is governed by consumer orientation and activities geared to consumer satisfaction so that major structural and cultural changes have seen in practices and academic labor process. Higher education is now between academic labor and student-customers and industry-customers since the governments do not want to take anymore the financial responsibilities. As a result, the governments support the universities in order to increase innovation and technology-based economies while decreasing their shares and responsibilities in the universities because of the budget concerns. In that way, the universities are becoming more autonomous in financial issues, but they are becoming more market oriented so that they generate research for the needs of the private or public industry but not for the public good. All in all, privatization, commodification, marketization and even entrepreneurialization do not explain the situation at the universities and in the techno-parks. The situation is all combined and interrelated within the current system that the transformation is beyond that ever seen before. Universities, due in part to these partnerships with the techno-parks, have become new actors in generating hegemony in the neoliberal world order.

As a result, higher education has become increasingly marginalized because of the techno-park, and the transformation might net enough to describe the changes so that the higher education system transcend dramatically while creating inequalities and social injustices. More importantly, not all the techno-parks will be successful, as in the case of Silicon Valley, but the dream of the success could distract the higher education fundamentally. The foresight consequence of this transformation would the inequalities and social injustices that explained above.

Additionally, the main principles of the higher education as solidarity, cultural social, and economic diversity, and internationalism will have been dramatically underestimated because of the efficiency in the university market and competition. The weak universities, particularly those the developing countries and regions, will fail. In other words, only the private universities and those public ones, which have direct contact to the private sector can survive. Hence, the universities will serve the needs of the private sector rather than the public in general. This is another side to the commercialization of the higher education, which develops radical inequalities and social injustices between the poor and the rich.

The techno-parks have increasingly affected the activities at the universities, so that those universities will have better positions in the ranking lists. As a result they can find better funding from the government as well from the private sectors. However, the other side of the coin is that most of those universities which do not have enough input will lose their positions. As a result, many universities, particularly in Anatolia, will be forced to adapt and increase their partnerships and activities, or otherwise can even be in danger of being shut down.

More importantly, the rich students could go to the best universities since they can afford to study there. However, the poor students can go only those universities where the education is not as qualified as at the higher-ranked ones. Therefore the inequalities among the classes in the communities will be dramatically increased, especially in the job markets. On the other hand, the internal impact will be changed and even transcend in terms of the relation between research and teaching. Most of the funding will be allocated for the research projects instead of teaching and learning; therefore, some departments will gain much more importance than those of the social departments where social problems are highlighted. As a result, teaching and researching will become like a 'privilege' for the top universities. However, in the poor ones, simply teaching the masses will gain importance from relatively less-skilled instructors. In other words, while this commodification will increase the value of the higher education and some majors, it will decrease the value of other majors and even some universities. In other words, universities and majors will become evaluated according to their market price.

More critically, the new science and technology policies ask the new arrangements and mechanism in the universities where the performance criteria have systematically become important. Consequently, these new arrangements will force the administrators of the universities to channel their resources to the engineering and technology-based departments. For that reason, in the coming years the administrators will be dominantly coming from the engineering and technology departments rather than social sciences. Those administrations will become more interested in income and profit from the students as well as from the private industry. This situation will deepen the inequalities among the departments and may even become gender-based, since the number of the female academic staff and students is higher in the social sciences than those in the engineering departments, and thus if administrators become more heavily drawn from Engineering this proportional imbalance will be replicated on a larger scale.

Another aspect of the techno-parks on the transformation of the higher education can be seen on the faculty. The new system and arrangements will increasingly destroy university creativity and diversity. The new standardization and evaluation systems will decrease the diversity of the faculty and their intellectual and educational production. Those who are coming from the engineering and technology departments will have better standards in their career compared to those social departments so they will accept low positions in most situations. For the younger faculty, and the faculty outside of engineering, academic freedom may become very elusive. They may become increasingly beholden to set assignments and rules, and will follow only the instructions for the rest of their careers. Most of them who do have access to the research funds, through techno-parks, will earn less and they will have to accept their positions; otherwise, they may face professional unemployment. In that way, the higher education, particularly in Turkey will be finally liberalized and commercialized according to the rules of the World Trade Organization. More importantly, before the new arrangements and mechanisms, especially those related to the higher education, the techno-parks help transform the universities. Most of the new arrangements and mechanism will follow the realities in the universities of Turkey. This situation creates specifically moral and ethical problems while creating inequalities and social injustices. At the end, the main purpose of the university will change, transform, and be even be supplanted by the will of industry and corporations.

Furthermore, the pressure of the global market conditions prevents the innovation, creativity, and even reform efforts of most of the activities defined under the umbrella of the techno-parks. Those which have better opportunities have better chances. Most of the higher education institutions are challenged to perform their main activities. More authoritarian managers and administrators can run these institutions in a top-to-bottom, hierarchical style using new management methods. Under the name of 'social networking', better opportunities are given especially those who are close to the management. In other words, most research funds and projects are channeled to firms with personal and political connections, using the financial incentives set aside for the techno-parks. More importantly, those firms enjoy legal privileges such as tax breaks. Consequently, specific subjects are studies and analyzed which directly and indirectly affect academic freedom and the quality of the research by empowering applied and action research. As a result, one of the main missions of the universities - being reformers and increasing social responsibility - will be confused in the global market demands, and the universities with these new policies can neglect the problems of civil society or the community. In this process, the universities are becoming more focused on the techno-parks in order to survive under ‘market conditions’, while ignoring their other responsibilities. In the light of this evidence, the universities may actually contribute to social injustices and inequalities rather than decreasing them and develop better conditions in the communities. Among all these groups, the most vulnerable ones at risk include women, ethnic minorities, immigrants, the young, the elderly, people with disabilities, and the working class who do not have access to attend the best universities and to have positions in those techno-parks.

However, new transformations, which have increased with the proliferation of techno-parks, change the universities, which are centers of production of knowledge in the broadest possible sense. Instead of developing cultural diversity, “heterodoxy and critical engagement in the best liberal tradition,” techno-parks have been forcing the universities to create knowledge with market value. In that way, universities have been losing “internal scientific pluralism and, most importantly, granted equal dignity and importance to and knowledge with no possible market value” (De Sousa Santos, 2012, p. 11). Furthermore, this profit-oriented approach distracts universities from innovation and human-centered activities.

The new transformation has forced the universities to leave their responsibilities about caring for all human beings and citizens behind. However, they have increasingly become a center to cultivate just human capital and to produce highly intellectual products and services in the global markets. Therefore, the public universities have been markedly losing their power in the higher education where the private ones, particularly those that have planned urban redevelopment, like in Silicon Valley and are engaged in the industry and university partnership in other ways will blossom. The techno-parks at the universities where commercialization and commodification of knowledge is high will gain importance. As a result, higher education is under threat of losing its traditional role and identity, such as cultivating intellectual freedom, social, cultural, economic diversity, responsibility, equality, and social justice. This is due not entirely, but in part, to the techno-parks, which change the institutional balances and dynamics . If they were not redefined and restructured, they would create significant segregation, inequalities, discrimination, and social injustices particularly among women, youth, elderly, people with disabilities, minorities, and the working classes in the communities. Consequently, the techno-parks have been forcing changes, directly and indirectly, in the universities, which are starting to drift away from their core, original mission.

APPENDIX A

CONSENT FORM

KATILIMCI BİLGİ VE OLUR FORMU

Proje yürütücüsü: Gamze Sart

Proje başlığı: Yüksek Öğrenimin Değişimi: Teknoparklar

Proje konusu:

Bu çalışmada Türkiye'deki teknoparkların gelişiminin nedenleri ve gelişimin tarihsel süreci ile birlikte teknoparkların yüksek öğrenimine olan etkisi araştırılmaktadır. Değişimin süreçleri ilk önce doküman analizi yapılarak, 5 ayrı konu üzerinden irdelenmektedir. Bu çerçevede, Türkiye'deki teknoparkların bilgi ve teknoloji odaklı ekonomik gelişim ne kadar etkili olduğuna, üniversitelerin nasıl üniversite-sanayi-devlet işbirliği içinde yeni roller üstlendiğine bakılmaktadır. Bu süreçte üniversitelerde ve teknoparklarda yer alan kurum, kuruluş ve bireylerin üstlendiği roller analiz edilmektedir. Tüm bu değişime neden olan bilim ve teknoloji ile ilgi politikalar üzerinde durulurken bu yeni politikaların uygulamaların üzerinde durulmaktadır. İkinci kısımda ise nitel araştırma yapılarak teknoparkların neden olabileceği değişimlere bakılacaktır. Bu perspektifte teknoparkların belli alanlara, şehir planlamasına, sosyolojik ve ekonomik değişikliklere neden olup olmadığına bakılacaktır. Nitel çalışmalar Boğaziçi Üniversitesi etik kurulu onayı ile Eğitim Fakültesi Eğitim Bilimleri Doktora öğrencisi tarafından yapılacaktır.

Onay: (Türkiye'deki teknoparkların açılması ile birlikte görülen değişiklikler ve yenilikler üzerine yapmak istediğimiz nitel araştırmaya katılmaya sizi davet ediyoruz. Bu çalışma kapsamında teknoparklar ve üniversiteler ile ilgili değişimleri ve gelişimleri tespit etmeyi umuyoruz.

Araştırmaya katılmayı kabul ettiğiniz takdirde size açık uçlu sorular sorulacak ve ses kaydınız yapılacaktır. Ayrıca, ekteki formda istenen bilgileri de sağlamanızı rica ediyoruz. İsminiz ve bu bilgiler tamamen gizli tutulacaktır. Çalışmaya katılmanız tamamen isteğe bağlıdır. Sizden ücret talep etmiyoruz ve size herhangi bir ödeme yapmayacağız.

Sizden alınan bilgiler isminiz saklı kalmak kaydıyla başka çalışmalar için de kullanılabilir. İstediğiniz zaman çalışmaya katılmaktan vazgeçebilirsiniz. Bu durumda sizden almış olduğumuz bilgi imha edilecektir.

Yapmak istediğimiz araştırmanın size risk getirmesi beklenmemektedir. Araştırmanın ileride başka araştırmalara de yarar sağlaması muhtemeldir. Teknoparklar ve üniversiteler ile ilgili yapılacak çalışmanın problemleri anlamamıza katkıda bulunarak eğitime yarar sağlamasını beklemekteyiz.

Bu formu imzalamadan önce, çalışmayla ilgili sorularınız varsa lütfen sorun. Daha sonra sorunuz olursa, Gamze Sart (Telefon:0532 296 8612) sorabilirsiniz. Araştırmayla ilgili haklarınız konusunda yerel etik kurullarına da danışabilirsiniz.

Adres ve telefon numaranız değişirse, bize haber vermenizi rica ederiz.

Bana anlatılanları ve yukarıda yazılanları anladım. Bu formun bir kopyasını aldım.

Çalışmaya katılmayı kabul ediyorum.

Katılımcı ismi ve imzası Tarih

APPENDIX B

DEMOGRAPHIC FORM AND QUESTIONS FOR INTERVIEWS IN TURKISH

Mülakat Tarihi:

Teknopark:

İsim Soyadı/Titri:

İletişim Telefonu: E-mail:

Doğum Tarihi: Cinsiyet:

Eğitim Durumu: Branş/Çalıştığı Alan:

Teknoparktaki Pozisyonu:

Çalıştığı Yıl:

Çalıştığı Kurumdaki Kişi Sayısı:

Organizasyonun İsmi: Kuruluş Yılı:

SORULAR

1. Teknoparklarla ilgili ne tür deneyiminiz var? (1)
   Lütfen açıklayın…

2. Türkiye'deki teknoparkların gelişimi ile ilgili ne söyleyebilirsiniz ? (1)
   Lütfen açıklayın…

3. Türkiye'deki teknoparkların nasıl çalıştığı hakkında ne söyleyebilirsiniz? (1)
   Lütfen açıklayın…

4. Türkiye'deki teknoparkların kurulması ile ilgili olarak ne tür bir süreç yaşandı ve teknoparkların nasıl geliştiği konusunda neler söyleyebilirsiniz? (1)
   Lütfen açıklayın…

5. Üniversite-sanayi-devlet işbirliği konusunda neler söyleyebilirsiniz? (1, 2)
   Lütfen açıklayın…

6. Teknoparkların üniversitelerde kurulması için ne tür bir strateji uygulandığı konusunda neler söyleyebilirsiniz? (1-2-4-5)
   Lütfen açıklayın…

7. Teknoparkların iş dünyasına yeni girişimciler oluşturma sürecinde ne tür kaynakların kullanıldığı konusunda neler söyleyebilirsiniz? (4-5) Lütfen açıklayın…

8. Teknoparklara ne tür fon ve finansal kaynakların kullanıldığı konusunda neler söyleyebilirsiniz? (1, 2, 4, 5)
   Lütfen açıklayın…

9. Bu fonlar nasıl bulunuyor ve kullanılıyor? (1, 2, 4, 5)
   Lütfen açıklayın…

10. Ülkenin ekonomik kalkınmasında üniversitelerin ne tür rolleri olduğu konusunda neler söyleyebilirsiniz? (1, 2, 4, 5)
    Lütfen açıklayın…

11. Yüksek öğrenimin asıl amacı olan eğitim ve araştırmanın değiştiğini düşünüyor musunuz? Neden? Neden değil? (2)
    Lütfen açıklayın…

12. Üniversitelerin teknoparklar ile piyasalaşması konusunda neler söyleyebilirsiniz? (2) Lütfen açıklayın…

13. Teknoparklarda uygulanan yeni uygulamalar ve mekanizmalar sayesinde inovasyonun geliştirildiği konusunda neler söyleyebilirsiniz? (5)
    Lütfen açıklayın…

14. Devletin yeni uygulamaları ve mekanizmaları sayesinde inovasyonun geliştirildiği konusunda neler söyleyebilirsiniz? (5) Lütfen açıklayın…

15. Teknoparklarda akademik dünyanın işbirliği ve ortak çalışmaları sayesinde inovasyonun geliştirildiği konusunda neler söyleyebilirsiniz? (3)
    Lütfen açıklayın…

16. Teknoparklarda nasıl yer bulunuyor konusunda neler söyleyebilirsiniz? (1, 2)
    Lütfen açıklayın…

17. Teknoparklarda nasıl iş bulunuyor konusunda neler söyleyebilirsiniz? (3)
    Lütfen açıklayın…

18. Teknoparklardaki personel politikaları konusunda neler söyleyebilirsiniz? (3)
    Lütfen açıklayın…

19. Teknoparklardaki çalışma koşulları konusunda neler söyleyebilirsiniz? (3)
    Lütfen açıklayın…

20. Teknoparklarda kullanılan bütçelerin yüzde kaçının aşağıda detayı verilen şekilde personele dağıtıldığı konusunda neler söyleyebilirsiniz? (3)
    Fiziksel donanımın bakımını sağlayan personel %
    Teknoparkta çalışan personel (profesyonel olmayan) %

Yöneticiler %
Akademik personel %
Akademik kadroda yer alan Profesyonel Danışmanlar %
Profesyonel Danışmanlar %
Öğrenci Stajyerler %
Diğer %

21. Teknopark yönetimleri tarafından teknoparklarda çalışan yöneticiler, müşteriler, akademik personel, öğrenci stajyer ve diğer çalışanlar için ne tür ayrıcalıklar sağlandığı konusunda neler söyleyebilirsiniz? (3) Lütfen açıklayın…

22. Devlet tarafından teknoparklarda çalışan yöneticiler, müşteriler, akademik personel, öğrenci stajyer ve diğer çalışanlar için ne tür ayrıcalıklar sağlandığı konusunda neler söyleyebilirsiniz? (3) Lütfen açıklayın…

23. Sanayi ve özel sektör tarafından teknoparklarda çalışan yöneticiler, müşteriler, akademik personel, öğrenci stajyer ve diğer çalışanlar için ne tür ayrıcalıklar sağlandığı konusunda neler söyleyebilirsiniz? (3) Lütfen açıklayın…

24. Teknoparklarda çalışacak doğru kişilerin seçilmesi ile ilgili ne tür bir süreç izlendiği konusunda neler söyleyebilirsiniz? (3) Lütfen açıklayın…

25. Teknoparklarda çalışan yöneticiler, müşteriler, akademik personel, öğrenci stajyer ve diğer çalışanlar için sağlanan bu ayrıcalıklar nasıl kullanıldığı konusunda neler söyleyebilirsiniz? (3) Lütfen açıklayın…

26. Yeni sanayi ve teknoloji politikalarının teknoparkları nasıl şekillendirdi ve organize ettiği konusunda neler söyleyebilirsiniz? (4) Lütfen açıklayın…

27. Ulusal strateji ve hedeflerin teknoparkları nasıl şekillendirdiği ve organize ettiği konusunda neler söyleyebilirsiniz? (4) Lütfen açıklayın…

28. Sanayi ve teknoloji politikaları ile birlikte ulusal strateji ve hedeflerin teknoparklara ve üniversitelere ne tür etkileri vardır? (4) Lütfen açıklayın…

29. Sanayi ve teknoloji politikaları ile birlikte ulusal strateji ve hedeflerin teknoparklara ve üniversitelere ne tür zararları vardır? (4-5) Lütfen açıklayın…

30. Devletin yeni uygulamaları ile teknoparklar vasıtasıyla sanayi-üniversite-devlet işbirliğini nasıl şekillendirdiği konusunda neler söyleyebilirsiniz? (4-5)
Lütfen açıklayın…

31. Sanayi ve özel sektörün teknoparklardan beklentileri konusunda neler söyleyebilirsiniz? (4-5)Lütfen açıklayın…

32. Sanayi ve özel sektörün üniversite-sanayi-devlet işbirliğinden neler beklediği konusunda neler söyleyebilirsiniz? (4-5) Lütfen açıklayın…

33. Devletin teknoparklardan beklentileri konusunda neler söyleyebilirsiniz? (4-5)
    Lütfen açıklayın…

34. Devletin üniversite-sanayi-devlet işbirliğinden neler beklediği konusunda neler söyleyebilirsiniz? (4-5) Lütfen açıklayın…

35. Üniversitelerin teknoparklardan beklentileri konusunda neler söyleyebilirsiniz? (4-5) Lütfen açıklayın…

36. Üniversitelerin üniversite-sanayi-devlet işbirliğinden neler beklediği konusunda neler söyleyebilirsiniz? (4-5) Lütfen açıklayın…

37. Teknoparklarda ya da teknoparklarla ilgili alınan kararlar konusunda neler söyleyebilirsiniz? Yeterli midir? Neden? Neden değil? Ne önerirsiniz? (1-2-3-4-5)
    Lütfen açıklayın…

38. Aşağıda detayı verilen kategorilerde teknoparkların etkileri konusunda neler söyleyebilirsiniz? (1-2-3-4-5)
    a. Araştırmaların gelişmesi Lütfen örnek(ler) verin...
    b. Eğitimin gelişmesi Lütfen örnek(ler) verin...
    c. Çalışılan alaların gelişmesi Lütfen örnek(ler) verin...
    d. Toplumsal cinsiyet açısından imkanların gelişmesi Lütfen örnek(ler) verin...
    e. Mekansal imkanların gelişmesi (laboratuvarlar) Lütfen örnek(ler) verin...
    f. Üniversitenin imkanlarının gelişmesi Lütfen örnek(ler) verin...
    g. Akademik personelin imkanlarının gelişmesi Lütfen örnek(ler) verin...
    h. Öğrencilerin imkanlarının gelişmesi Lütfen örnek(ler) verin...
    i. Üniversite bütçesine yardım Lütfen örnek(ler) verin...
    j. Yerel ekonomiye olan faydası Lütfen örnek(ler) verin...

k. Teknolojik inovasyonun gelişmesi (patent) Lütfen örnek(ler) verin...
l. Devlet/İş dünyasın mali yardımlarının artması Lütfen örnek(ler) verin...
m. Bağışların artması Lütfen örnek(ler) verin...
n. Diğer Faydalar Lütfen örnek(ler) verin...

39. Teknoparkların üniversiteler olan etkileri konusunda neler söyleyebilirsiniz? (1-2-3-4-5)

Eğitimsel…	Lütfen açıklayın…
Teknolojik	Lütfen açıklayın…
Yönetimsel	Lütfen açıklayın…
Ekonomik	Lütfen açıklayın…
Diğer…	Lütfen açıklayın…

40. Teknoparkların burada yer alan şirketler ve inkubatörler vasıtasıyla sanayi ve özel sektöre olan etkileri konusunda neler söyleyebilirsiniz? (1-2-3-4-5)

Eğitimsel…	Lütfen açıklayın…
Teknolojik	Lütfen açıklayın…
Yönetimsel	Lütfen açıklayın…
Ekonomik	Lütfen açıklayın…
Diğer…	Lütfen açıklayın…

41. Teknoparklar ve üniversitelerdeki değişimler konusunda neler söyleyebilirsiniz? (1-2-3-4-5)

a. Ticarileşme	b. Özelleşme
c. Uluslarasılaşma	d. Rasyonelleşme
e. Piyasalaşma	f. Yeniden mekanlaşma
e. Metalaşma	f. Serbestleşme
g. Tekrardan değerlenme	h. Değersizleşme
i. Performanslaşma and Fabrikasyonlaşma	j. Rekabet
k. Profesyonelleşme ve Profesyonel Eğitim	l. Meslekileşme
m Finansallaşma	n. Yönetimselleşme
o. Realizasyonlaşma	p. Dönüştürenleşme
r. Girişimcileştirme	

Lütfen açıklayın …

APPENDIX C

DEMOGRAPHIC FORM AND QUESTIONS FOR INTERVIEWS IN ENGLISH

Interview Date:

Techno-park:

Contact's Name/Title:

Contact Telephone: Contact E-mail:

Date of Birth: Gender:

Education Level: Major/Area of Study:

Position in the Techno-park

Year of Work:

Number of People that work:

Organization: What is the establishment year of the organization:

QUESTIONS

1. What kind of experience do you have in techno-parks? (1)
   Please explain…

2. What could you say about the developments of techno-parks in Turkey? (1)
   Please explain…

3. What could you say about how the techno-parks work in Turkey? (1)
   Please explain…

4. What would you describe the periodic or progressive changes that were made since the techno-park started? (1) Please explain…

5. What could you say about the university-industry-government partnership? (1-2) Please explain…

6. What strategy was used to implement this techno-park at the university? (1-2-4-Please explain…

7. What sources are used to advertise this techno-park to the prospective business entrepreneurs? (4-5) Please explain…

8. What could you say about the funds allocated for the techno-parks? (1, 2, 4, 5)Please explain…

9. How do you find and use these funds? (1, 2, 4, 5) Please explain…

10. What could you say about the roles of the universities for the economic development of the country? (1, 2, 4, 5) Please explain…

11. Do you think that the purposes, education and research, of the higher education are changing? Why? Why not? (2) Please explain…

12. What would you say about the marketization of the universities? (2, 4, 5) Please explain…

13. What would you say about the arrangements and mechanisms of the techno-parks that promote innovation? (5) Please explain…

14. What would you say abut the arrangements and mechanisms of the government that promote innovation? (5) Please explain…

15. What would you say about the collaborations and cooperation of the academia in the techno-parks that promote innovation? (3) Please explain…

16. What would you say about finding space in techno-parks? (1, 2) Please explain…

17. What would you say about how people find jobs? (3) Please explain…

18. What would you say about the personnel policies in techno-parks? (3) Please explain…

19. What would do say about working conditions in techno-parks? (3) Please explain…

20. What would you say about the annual budget, which is used for the following personnel in percentages? (3)
    Physical Facility maintenance people %
    Techno-park personnel (non professional) %
    Managers %
    Academics %
    Professional Consulting personnel from academics %
    Professional Consulting personnel %
    Student Interns %
    Other %

21. What would say about the incentives that have been provided by the techno-parks for the members, managers, clients, academics, and student interns in the techno-parks? (3) Please explain…

22. What would you say about the incentives that have been provided by the government for the members, managers, clients, academics, and student interns in the techno-parks? (3,4, 5) Please explain…

23. What would you say about the incentives that have been provided by the industry for the members, managers, clients, academics, and student interns in the techno-parks? (2, 3, 4, 5) Please explain…

24. What would you say about the process used to select right people in the techno-parks? Please explain… (3)

25. What would you say about the incentives that have been used by the managers, clients, academics, and student interns in the techno-parks? (2, 3) Please explain…

26. What would say about the science and technology policies that shape and organize the techno-parks? (4) Please explain…

27. What would say about the national strategies that shape and organize the techno-parks? (4) Please explain…

28. What are the impacts of these science and technology policies and national strategies to the techno-parks and universities? (4) Please explain…

29. What are the disadvantages of these science and technology policies and national strategies to the techno-parks and universities? (4-5) Please explain…

30. What would say about the arrangements of the government that shape and organize the techno-parks as university-government industry partnership? (4-5)
Please explain…

31. What would say about the expectation of the industry from techno-parks? (4-5)
Please explain…

32. What would say about the expectation of the industry from university-government industry partnership? (4-5) Please explain…

33. What would say about the expectation of the government from techno-parks? (4-5)
Please explain…

34. What would say about the expectation of the government from university-government industry partnership? (4-5) Please explain…

35. What would say about the expectation of the university from techno-parks? (4-5)
Please explain…
36. What would say about the expectation of the university from university-government industry partnership? (4-5) Please explain…

37. What would you say about the decision that are taken in the techno-parks or related to techno-parks? Are they enough? Why? Why not? What do you suggest? (1-2-3-4-5) Please explain…

38. What would you say about the impacts of the techno-parks from the categories listed below? (1-2-3-4-5)

a. Research development	Please give example(s)
b. Educational development	Please give example(s)
c. Areas of study	Please give example(s)
d. Gender opportunities	Please give example(s)
e. Space opportunities (laboratories)	Please give example(s)
f. University development	Please give example(s)
g. Academics opportunities	Please give example(s)
h. Students opportunities	Please give example(s)
i. University budget	Please give example(s)
j. Local economy	Please give example(s)
k. Technology innovation (patent)	Please give example(s)
l. Government/Business grant funding	Please give example(s)
m. Donations	Please give example(s)
o. Other impact areas	Please give example(s)

39. What would you say about the impacts of techno-parks to the university? (1-2-3-4-5)

Educational…	Please explain
Technologic	Please explain
Managerial	Please explain
Economic…	Please explain
Other…	Please explain

40. What would you say about the impacts of techno-parks to the industry by means of incubators and companies? (1-2-3-4-5)

Educational…	Please explain
Technologic	Please explain
Managerial	Please explain
Economic…	Please explain
Other…	Please explain

41. What would say about the new changes in the techno-parks and the universities? (1-2-3-4-5)

a. Commercialization
b. Privatization
c. Internalization
d. Rationalization
e. Marketization
f. Reterritorialization
g. Commodification
h. Liberalization
i. Revaluation
j. Devaluation
i. Performativities and Fabrication
j. Competition
k. Professionalism and Professional Learning
l. Vocationalization
m. Financing process
n. Managerialization
o. Realization
p.Transformationalization
r. Entrepreneurilization

Please explain

APPENDIX D

QUESTIONS FOR FOCUS GROUP IN TURKISH

1. Bu teknoparkta bulunduğunuz sürece hiç bir eşitsizlikle karşı karşıya kaldığınız olaylar ya da gözlemler konusunda neler söyleyebilirsiniz? (1) Lütfen açıklayın…

2. Hiç kişisel olarak karşı karşıya kaldığınız ya da gözlemlediğiniz bir ayrımcılık oldu mu? Nasıl bir ayrımdı tarif eder misiniz? (1) Lütfen açıklayın…

3. Teknoparkta çalışmanın faydaları hakkında neler söyleyebilirsiniz? (1-2) Lütfen açıklayın…

4. Teknoparkta çalışmanın dezavantajları hakkında neler söyleyebilirsiniz? (1-2) Lütfen açıklayın…

5. Teknopark yönetimi tarafından alınan radikal politikalar ya da uygulamalar hakkında neler söyleyebilirsiniz? (2) Lütfen açıklayın…

6. Teknoparklarda aktivitelerin nasıl kontrol edildiği konusunda neler söyleyebilirsiniz? (2) Lütfen açıklayın…

7. Mesela, teknopark yönetimi tarafından verilen bir hedef var mı? (2) Lütfen açıklayın …

8. Teknoparkların kentsel/mekânsal bir dönüşüme neden olduğu konusunda neler söyleyebilirsiniz? (3) Lütfen açıklayın …

9. Teknoparkların sizin yapmış olduğunuz çalışmalara nasıl bir imkan sağladığı konusunda neler söyleyebilirsiniz? Faydaları ve dezavantajları? (3) Lütfen açıklayın …

10. Teknoparkların inovasyon ve teknoloji üretimi konusunda neler söyleyebilirsiniz? Yeterli midir? Neden? Neden değil? (3) Lütfen açıklayın…

11. Teknoparkların ekonomik eşitsizlik oluşturduğu konusunda neler söyleyebilirsiniz? (4) Lütfen açıklayın …

12. Teknoparkların kentsel/mekansal eşitsizlik oluşturduğu konusunda neler söyleyebilirsiniz? (4) Lütfen açıklayın …

13. Teknoparkların ekonomik dönüşüme sebep olduğu konusunda neler söyleyebilirsiniz? (5) Lütfen açıklayın …

14. Teknoparkların ekonomik dönüşümü yönettiği ve kontrol ettiği konusunda neler söyleyebilirsiniz? (5) Lütfen açıklayın…

15. Teknoparkların politik dönüşüme sebep olduğu konusunda neler söyleyebilirsiniz? (5)
    Lütfen açıklayın…

16. Teknoparkların politik dönüşümü yönettiği ve kontrol ettiği konusunda neler söyleyebilirsiniz? (5) Lütfen açıklayın…

17. Teknoparkların seçim konusu olduğu veya seçimlerde kişilerin seçilmesinde önemli rol oynadığı konusunda hiç gözleminiz ya da deneyiminiz oldu mu? (5) Lütfen açıklayın…

18. Müşteri olarak özel sektörün sanayi üniversite işbirliği süreçleri konusunda neler söyleyebilirsiniz (5) Lütfen açıklayın …

19. Yerel devlet ve devlet size bu teknoparkta yer almanız için ne tür avantajlar sağladı? (1-2-3-4-5) Lütfen açıklayın…

20. Bu teknoparkta aşağıda yer alan kaynaklardan hangilerinden yararlanmaktasınız? (1-2-3-4-5)
    a. Finansal b. Teknolojik c. Personel d. Mekansal imkan
    e. Profesyonel gelişim imkanları f. Diğer kaynaklar
    Lütfen açıklayın …

21. Bu teknoparkta aşağıda yer alan kaynaklardan hangisinden dışarıdan sunulan imkanlar olarak yararlanmaktasınız ? (1-2-3-4-5)
    a. Devletin sunduğu kaynaklar b. Özel sektörün sunduğu kaynaklar
    c. Üniversitenin sunduğu kaynaklar d. Diğer kaynaklar
    Lütfen açıklayın …

APPENDIX E

QUESTIONS FOR FOCUS GROUP IN ENGLISH

1. What would you say about inequalities that you have experiences since you were here in this techno-park? (1) Please explain…

2. Do you have any personal experience or observation that you felt segregation? What kind of segregation was this? (1) Please explain?

3. What would you say about benefits of working in techno-parks? (2) Please explain…

4. What would you say about disadvantageous of working in techno-parks? (2) Please explain…

5. What would you say about the radical policies developed by the techno-parks administration? (2) Please explain…

6. What would you say about techno-parks, which create urban redevelopment? (3) Please explain…

7. What would you say about how the techno-park opens space for your activities? Benefits and disadvantageous? (3) Please explain…

8. What would you say about developing innovation and technology? Are they enough? Why? Why not? (3) Please explain…

9. What would you say about techno-parks, which can create any exacerbation of economic inequality? (4) Please explain…

10. What would you say about techno-parks, which can create any exacerbation of spatial inequality? (4) Please explain…

11. What would you say about techno-parks that create any economic transformation? (5) Please explain…

12. What would you say about techno-parks that manage and control economic transformation? (5) Please explain…

13. What would you say about techno-parks that create any political transformation? (5) Please explain…

14. What would you say about techno-parks that manage and control political transformation? (5) Please explain…

15. What would you say about how the techno-parks control the activities? (2)
    For instance do you have any target, which is given by the administration of the techno-park? (2) Please explain…

16. Do you have any experience or observation related to electoral politics within the institution? (5) Please explain…

17. What would you say about the formal process business and university partnership as clients (5) Please explain…

18. What advantages do that local government and the state provide you in locating your business there in this techno-park? (1-2-3-4-5) Please explain…

19. What resources listed below have been provided to you in this techno-park? (1-2-3-4-5)

a. Financial
b. Technological
c. Personnel
d. Facility Space
e. Professional development training
f. Other resources

20. What types of resources have been available to you from outside sources? (1-2-3-4-5)

a. Government resources   b. Business resources
c. University resources   d. Other resources
Please explain

BIBLIOGRAPHY

Achtenhagen, F., & Grubb, W. N. (2001). *Vocational and Occupational Education: Pedagogical Complexity, Institutional Indifference* in V. Richardson (ed.), Handbook of Research on Teaching, 4th edn. (Washington, DC: American Educational Research Association), 176 206.

Akerlof G. A., & R. E. Kranton (2000). "Economics and Identity", The Quarterly Journal of Economics, August, pp.715-53.

Allen, T. J. (1977), Managing the Flow of Technology. Cambridge, MA: MIT Press.

Altbach, P. G., (2007). *Higher education in the new century: Global challenges and innovative ideas.* In, P. G. Altbach& P. M. Peterson (Eds.), Rotterdam: Sense Publisher.

_____(2007).*Tradition and transition: The International imperative in higher education.* Rotterdam: Sense Publishers.

Anker R. (1997). "Theories and occupational segregation by sex: An overview", International Labour Review, Vol.136, No. 3, pp.315-339.

Anker R. (1998). Gender and jobs : sex segregation of occupations in the world, International Labour Office, Geneva.

Appadurai, A. (1996). *Modernity at Large: Cultural Dimensions of Globalization.* Minneapolis: University of Minnesota Press.

Apple, M. W. (2006). Educating the "right" way: Markets, standards, god, and inequality. (2nd ed., p. 470). New York: Routledge.

Apple, M. W. (2010). Global crisis, social justice, and education. (Vol. 14, pp. 6-7). New York: Routledge.

Arnold, Z.(2009). Case Studies in American Innovation, Breakthrough Institution. California: Oakland.

Arnold, Z., Aki, H., Bennett, G., Knight, C., Lin, A., Norris, T., Walton, T., & Zemel, A. (2010). Where good technologies come from. (p. 12). Oakland, CA: BreakthroughInstitute.

Aytaç, M., Aytaç S., Fırat Z., Bayram, N., Keser, A. (2001). Akademisyenlerin çalışma yaşamı ve kariyer sorunları.Uludağ Üniversitesi: Bursa

Balkan Ö. (2006). Architectural spaces of innovation the case: Metu technopolis. (Master's thesis, METU, Ankara, Turkey).

Balkan, E. M. & Rutz H. J. (2009). *Reproducing class, education, neoliberalism and the rise of the new middle class in Istanbul.* Berghahn Books: New York.

Ball, S. J. (1990). *Introducing Monsieur Foucault*. London: Routledge.

Bauman, Z. (2002). *Society Under Siege.* Cambridge: Polity Press.

Baysal, O. O. (2007). *Strategies for an effective university-industry collaboration in industrial design education*. (Unpublished master's thesis, Middle East Technical University, Ankara, Turkey).

Bell, D. (1973). *The Coming of the Post-Industrial Society: A Venture in Social Forecasting*, Middlesex: Penguin.

Becker, G. (2002). *The Age of Human Capital*. in E. P. Lazear (ed.), Education in the Twenty-First Century, The Hoover Institute, available at <http://www.hoover.org/publications/books/fulltext/ed21st/>

Benner, C. (2002). Work in the New Economy: Flexible Labor Markets in Silicon Valley. Malden: Blackwell, 2002.

Benneworth, P. & Charles, D. (2005). University spin-off policies and economic development in less successful regions: learning from two decades of policy practice. *European Planning Studies*, 13, pp. 537-557.

Berdahl, R.O. & McConnell, T.R. (1999*). Autonomy and accountability: who controls academe?* In: Altbach, P.G., Berdahl, R.O &Gumport, P.J. (eds). American higher education in the twenty-first century: social, political, and economic challenges. Baltimore, Md.: John Hopkins University Press.

Bernstein, B. (1990). *Class, Codes and Control: The Structuring of Pedagogic Discourse.* London: Routledge.

Bernstein, B. (1996). Pedagogy, Symbolic Control and Identity: Theory, Research, Critique. London: Taylor 6c Francis.

Bernstein, B. (2000). Pedagogy, Symbolic Control and Identity: Theory, Research, Critique. Oxford: Rowman & Littlefield).

Bettio F. and A. Verashchagina (2009). Gender segregation in the labour market: Root causes, implications and policy responses in the EU, Luxembourg: Publications Office of the European Union.

Beyhan, B. (1999). Dynamics of High-tech Industrial Districts and Some Implications for Turkey. Unpublished Master’s Thesis, METU, Ankara.

Biagoli, M. (1998). The Instability of Authorship: Credit and Responsibility in Contemporary Biomedicine, FASEB Journal 12: 13-16.

BIS. (2009). Higher Ambitions: The future of universities in a knowledge economy, November 2009 http://www.bis.gov.uk/assets/BISCore/corporate/docs/H/09-1447-higher-ambitions [Accessed 12 April 2012].

Blumenstyk, G. (1998). Royalties on Inventions Bring $336 Million to Top Research Universities', Chronicle of Higher Education (27 Feb.), A44.

Board on Science, Technology, and Economic Policy Report. (2009). *The benefits of distance learning, which improves their career-making connections together with the high quality of education which comes from direct contact with fine faculty member.* Washington, DC: The National Academies Press.

Bok, Derek (2007). *Piyasa ortamında üniversiteler: Yükseköğretimin ticarile!mesi.[* Universities in the Market: Marketization of Higher Education] Istanbul: Istanbul Bilgi Üniversitesi Yayınları.

Bourdieu, P. (1977). *Outline of a Theory of Practice.* Cambridge: Cambridge University Press.

Bourdieu, P. (1996). *The State Nobility: Elite Schools in the Field of Power*. Trans. L. C. Clough. Cambridge: Polity.

Brennan, J., King, R., & Lebeau, Y. (2004). The role of universities in the transformation of societies. Informally published manuscript. London: Open University, London.

Brenner, N. (2003), New State Spaces, Oxford: Oxford University Press.

Brighenti, A. M. (2010). On territorology towards a general science of territory. Master's thesis. Roverto, Italy: University of Trento, Rovereto.

Brown, G. (2004). 'Britishness', British Council annual lecture 7 July 2004.

Brown, P. (2000). The Globalization of Positional Competition? Sociology 34/4: 633-53.

Castells, M. (1996). *The Information Age: Economy, Society and Culture, the Rise of the Network Society*. Oxford: Blackwell.

Castells, M. (1997). *The Information Age: Economy, Society and Culture, the Power of Identity*. Oxford: Blackwell.

Castells, M. (1998). *The Information Age: Economy, Society, and Culture: End of Millennium.* Oxford: Blackwell.

Castells, M. (1999). The Information Age: Economy, Society, and Culture, End of Millennium. Oxford: Blackwell.

Castells, M. (2000). *The Rise of the Network Society*. Oxford: Blackwell.

Castells, M. (2001). The Internet Galaxy: Reflections on the Internet, Business and Society. Oxford: Oxford University Press.

Clare, P., Day, A., & Dinham, R. Intellectual Property Office , (2010). Intellectual Asset Management. London: Patent office.

Clark, B. R. (1998). *Creating Entrepreneurial Universities*. Oxford: Pergamon.

Clark, B. (2001) 'The entrepreneurial university: New foundations for collegiality, autonomy, and achievement', Higher Education Management, 13 (2), pp. 9-24.

Collins, T., & Tillraan, S. (1998). Global Technology .Diffusion and the American Research University', in J. T. Kenny (ed.), Research Administration and Technology Transfer. San Francisco: Jossey Bass.

Colorado State University Writing Guide. (2008). Content analysis. Retrieved from http://writing.colostate.edu/guides/research/content/

Connell, R.W., Messerschmidt, J. (2005). Hegemonic masculinity. Rethinking the concept. *Gender & Society*, 2, 19(6), 829-859.

Coenen, L.(2007). The role of universities in the regional innovation systems of the NorthEast of England and Scania, Sweden: Providing the missing links? Environment and Planning C 25(6): 803-821.

Cooke, P. (2004). The role of research in regional innovation systems: new models meeting knowledge economy demands. International Journal of Technology Management, 28(6): 507-528.

Cox, R. and Schechter, M. (2004). *The Political Economy of a Plural World,* London: Roudedge.

Corcoran, M., Gordon, R., Laren, D., & Solon, G. (1992). The Association between Men's Economic Status and their , Family and Community Origins. Journal of Human Resources 27: 575-601.

Creswell, J. W. (1998). Qualitative inquiry and research design: Choosing among five traditions. Thousand Oaks, CA: Sage Publications.

Currie, J., (1998).Universities *and globalization: Critical perspectives.* California: SAGE Publications, Inc.

Cummings, W. (1998) 'The Service University in Comparative Perspective', *Higher Education,* 35, pp.1-8.

Dale, R. (2005). Globalisation, knowledge economy and comparative education. *Comparative Education*, 41 (2), 117-151

Dale, R. & Robertson, S. L. (2007) Beyond Methodological 'Isms' in Comparative Education in an Era of Globalisation, in Kazamias, A and Cowen, R (eds).

Dale, R., & Robertson, S. L. (2009). Globalisation and europeanisation in education. (p. 5). UK: Symposium Books.

Dal Fiore, F., & Martinotti, G. (2005). The organizational community versus the occupational community. 2nd international conference on communities and technologies, Milan, Italy.

Demircan, E. (2006). Küreselleşme Sürecinde Yeni Devlet Anlayışının Bütçe Politikalarına Yansıması; Türkiye Örneği, Kamu Maliyesine Yeni Bakış, (Ed) Nihat Falay, Mehmet Şahin Ve Ahmet Kesik, Ankara: Seçkin Yayınları.

DfES (1998). *Education and Skills: Delivering Results. A Strategy*. London: DfES.

DfES (2003). *The Future of Higher Education, White Paper* (London: HMSO).

DPT Report. (2000). Ekİzİncİ beŞ yillik kalkinma plani (ISBN 975 19 2514-2). Ankara: Devlet Planlama Teşkilatı.

DTI (1998). Our competitive future – building the knowledge driven economy: Analysis and Background, December 1998.

DTI, HM Treasury and DfES. (2002). Investing in innovation strategy, July 2002, http://www.hm-treasury.gov.uk/d/science_strat_sum02.pdf [accessed 25 Jan 2012].

Dicken, P. (1998). *Global Shift: Transforming the World Economy*. 3rd. Ed., London: Paul Chapman Publishing Ltd.

Dost, M. & Cenkseven, F. (2007). Professional problems of faculty members at state and private universities. Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi, 16(2), Retrieved from http://sosyalbilimler.cukurova.edu.tr/dergi/dosyalar/2007.16.2.444.pdf

Drucker, P. (1993). Post-Capitalist Society. London: Butteiworth/Heinemann.

Dülen, E. (2010). Türkiye *Tarihi 3, Darülfunun'dan Üniversiteye Geçiş, Tasfiye ve Yeni Kadrolar* [Turkish History 3, Transformation from Darülfunun to university, clearance and new cadre]. Istanbul: BilgiÜniversitesi Yayınları.

Elçi, S. (2005). Annual Innovation Policy Trends and Appraisal Report Turkey, 2004-2005. European Commission.

lci, S. Enterprise Directorate-General, (2003). Innovation policy profile: Turkey. Enterprise Directorate-General: ADE.

Electronics Coalition. (2012). Green Chemistry versus Toxic Technology. http://www.electronicstakeback.com/toxics-in-electronics/

European Commission (2001). *Lifelong Learning Memorandum*. Brussels: EC.

European Commission (2003), "Innovation Policy in Seven Candidate Countries: The Challenges", Volume 2.7, Innovation Policy Profile: Turkey, Brussels.

European Commission (2006). She Figures 2006. Women and Science. Statistics and Indicators, Office for Official Publications of the European Communities, Luxembourg.

Ercan, F., & Kurt Korkusuz, S. (2011). *Metalaşma ve İktidarın Baskısındaki Üniversite*.[Commodification and Under the Pressure of Government: Universities] Istanbul: Sosyal Araştırmalar Vakfı.

Ercan, F. (2010). Türkiye. In A. Güngen & F. Ercan (Eds.), Emek ve Siyaset (pp. 177-206). Ankara: Dipnot.

Ercan, F. (1999). *1980'lerde Eğitim sisteminin yeniden yapılanması: Küreselle!meve neoliberal eğitim politikaları.* [Re- structure of education system in 1980s: Globalisation and neoliberal politics]. Istanbul: TarihVakfıYayınları.

Ercan, F. (1998). *Toplumlar ve Ekonomiler*. Istanbul: Sarmal Yayınevi.

Erguvan, I.D. (2010)Vakıf Üniversitelerinin Türkiye Yükseköğretim Sistemine Etkilerinin İncelenmesi. Marmara Üniversitesi Eğitim Bilimleri Enstitüsü Eğitim Bilimleri Anabilim Dalı Eğitim Yönetimi ve Denetimi Bilim Dalı.

Etzkowitz, H. & Leydesdorff, L. (1997a), 'Introduction: Universities in the Global Knowledge Economy', in H. Etzkowitz and L. Leydesdorff (eds.), Universities and the Global Knowledge Economy. London: Pinter.

Etzkowitz, H. (2003). "Research groups as quasi firms: the invention of the entrepreneurial university". Research Policy, 32: 109-21.

European Commission (1996), Teaching and Learning: Towards the Learning Society. Luxembourg: Office for Official Publications of the EC.

Feldman, M.P. and Desrochers, P. (2003). The Evolving Role of Research Universities in Technology Transfer: Lessons from the History of Johns Hopkins University. *Industry and Innovation*. 10, pp. 5-24.

Florida, R. & Kenney, M. (1990). Silicon Valley and Route 128 Won't Save Us"California Management Review, p. 68-88.

Florida, R.(2002). *The Rise of the Creative Class.* New York: Basic Books.

Finquelievich, S. (2002). Cities, and science and technology parks: Innovation environments as a new urban hierarchy. Paper presented at XIX IASP world conference on science and technology parks, Canada. Retrieved from http://www.links.org.ar/infoteca/citiesparks.pdf

Flecker, J., Holtgrewe,, U., Schönauer, A., & Gavroglou, S. European Comission, (2005). *Value chain restructuring and company strategies to reach flexibility* (CIT3-CT-2005-006193). WORKS report, HIVA-K.U. Leuven.

Franco A. (2007). "La concentration des hommes et des femmes dans les différents secteurs d'activité", Statistiques en bref - Populations et conditions sociales EUROSTAT, (Vol. 53).

Fukugawa, N. (2005). Science parks in Japan and their value-added contributions to new technology-based firms. *, International Journal of Industrial Organization*, 21, 1323 -1356.

Fukuyama F.(2006). America at the Crossroads: Democracy, Power and the Neoconservative Legacy. New Haven, Connecticut: Yale University Press

GAO (2005) U.S. PUBLIC DIPLOMACY: Interagency Coordination Efforts Hampered by the Lack of a National Communication Strategy, United States Government Accountability Office.

Gellner, E. (1983). *Nations and Nationalism*. Oxford, Blackwell.

Gibbons, M., Limoges, C., Nowotny,T., Schwartzman, S., Scott, P., Trow, M. (1994). The New Production of Knowledge: Science and Research in Contemporary Societies. London: Sage.

Gorz, A. (1989). *Critique of Economic Reason.* Verso: London.

Gök, F. (2002). The privatization of education in Turkey. In, N. Balkan & .S. Savran (Eds.), *Ravages of neoliberalism: Economy, society and gender in Turkey* (pp. 93-104). New York: Nova Science Publishers.

Green A. and Preston J. (2001). 'Education and social cohesion: re-centering the debate. *Peabody Journal of Education*, 76(3/4): 247-284.

Green, A., Stankosky, M., & Vandergriff, L. (2010). *In research of knowledge management*. (1st ed.). UK: Emerald Group Publishing Limited.

Green, F. (2006). Demanding Work: The Paradox of Job Quality in the Affluent Economy (Princeton: Princeton University Press).

Grubb, W. N. & Lazerson, M. (2006). *The Education Gospel: The Economic Value of Schooling.* Cambridge Mass.: Harvard University Press.

Guile, D. (2002). Work, Skill, and Work Experience in the European Knowledge Economy. Journal of Education and Work. 15/1: 25-76.

Gürüz, K.(2003). *Dünyada ve Türkiye'de yükseköğretim: Tarihçe ve bugünkü sevk ve idare sistemleri*.[*Higher* education in Turkey and in the World: The history and the current administration system] Ankara: ÖSYM Yayınları Istanbul Üniversitesi, Ana sayfa [Home] Retrieved October 29, 2010 from http://www.istanbul.edu.tr/tarihce.php.

Halsey, A. H. (2000). *Twentieth Century British Social Trends*. Basingstoke: Macmillan.

Hannon, P. and Chaplin, P. (2003). Are incubators good for business? Understanding incubation practice – the challenges for policy. *Environment and Planning C: Government and Policy*. 21, pp. 861-81.

Hansson, F., K., Husted and J. Vestergaard. (2005). *Second Generation Science Parks: from Structural Holes Jokeys to Social Capital Catalysts of the Knowledge Society,* Technovation, Denmark.

Harvey, D. (2000). *Spaces of Hope*. Edinburgh: Edinburgh University Press.

Harvey, D. (2001). *Spaces of Capital*. Edinburgh: Edinburgh University Press.

Harvey, D. (2003). *Tim New Imperialism*. Oxford: Oxford University Press.

Harvey, D. (2005). *A Brief History of Neoliberalism*. Oxford: Oxford University Press.

Harvey D. (2006). Spaces of global capitalism. London: Verso.

Hashim, L. B., & Taib, K. M. (2012). Training and development for knowledge workers – malaysian scene. International Journal of Business, Humanities and Technology , 2(2), 138-146.

Hekkert, M. P., Suurs, R. A. A., Negro, S. O., Kuhlmann, S., & Smits, R. E. H. M. (2007). Functions of Innovation Systems: A new approach for analysing technological change. Technological Forecasting and Social Change, 74(4), 413-432.

Hillier B. & Penn, A. (1996). *Space is the Machine*, Cambridge University Press.

Hilts, P. (1993). U.S. seeks to protect fruits of tax-supported research. New York Times (17 June), A12.

Hirst, P.Q. & Thompson G. (1999). *Globalization in Question: the International Economy and the Possibilities of Governance*. Cambridge: Polity Press, Hirschman, A. (1989), Rival Views on the Market (Cambridge, Mass.: Harvard University Press).

Shaphiro, I. (2010). *Leviathan: Or the Matter, Forme, and Power of a Common-Wealth Ecclesiasticall and Civill*, Thomas Hobbes. New Haven: Yale University Press.

Hoepfl, M. C. (1997). Choosing qualitative research: A primer for technology education researchers. Journal of Technology Education, 9(1), 47-63.

Holstein, J. A., & Gubrium, J. F. (1995). The active interview. (Vol. 37, p. 3). CA: Sage Publications.

Hsieh, F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. Qualitative Health Research, 15(9), 1277-1288.

Hu, T. S., Lin, C. Y., & Chang, S. L. (2005). *Technology-based regional development strategies and the emergence of technological communities: A case study of HSIP*. Technovation: Hsinchu City.

ILO (2005). Global Employment Trends Briefing, Geneva: FLO, 7-8. Initiatives 2012,

Jayasuriya, K. (2001). Globalisation and the changing architecture of the state: regulator)' state and the politics of negative coordination', Journal of European Public Policy, 8(1): 101-123.

Jessop, B. (1997) The entrepreneurial city: re-imaging localities, redesigning economic governance, or restructuring capital, pp. 28–41. In N. Jewson & S. MacGregor (eds.) Transforming Cities - Contested governance and new spatial divisions, London: Routledge.

Jessop, Bob and Brenner, Neil and Jones, Martin (2008) Theorizing Socio-Spatial Relations. Environment and Planning D: Society and Space, 26 (3). pp. 389-401. ISSN 0263-7758

Jones, P.W with Coleman, D. (2005). *The United Nations and Education: Midtilateralism, Development and Globalisation*. London: Routledge Falmer.

Joppe, M. (2000). The Research Process. Retrieved February 25, 1998, from http://www.ryerson.ca/~mjoppe/rp.htm

Kapoor, I. (2004). *Deliberative democraq and the WTO*. Review of International Political Economy, 11(3): 522-41.

Kefela, G. T. (2010). Knowledge-based economy and society has become a vital commodity to countries. International NGO Journal, 5(7), 3.

Kenney, M. and Goe, W.R. (2004). The role of embeddedness in professional entrepreneurship: a comparison of electrical engineering and computer science at UC Berkeley and Stanford. *Research Policy*. 33 (5), pp. 691-707.

Kısabacak, G. (2011). Private universities as a working place through the eyes of academics. (Unpublished master's thesis, Bogazici University).

Knight, J. (2003). *GATS, Trade and Higher Education Perspective 2003*. London: The Observatory on Borderless Higher Education.

Koepp R. (2002). Clusters of creativity: enduring lessons on innovation and entrepreneurship from Silicon Valley and Europe's Silicon Fen. Chichester : Wiley.

Kogan, M.(2007). Key challenges to the academic profession.International Centre for Higher Education Research Kassel: UNESCO.

Korkut, F., Evyapan, N. A. G. Z., (2005). "Dynamics of Collaboration with Industry in Industrial Design Education: The Case of a Graduation Project Course", paper presented at *Crossing Design Boundaries, Engineering and Product Design Education Conference,* Napier University, Edinburgh, September, 15-16, 2005.

Lam, A. (2000).Tacit knowledge, organisational learning and societal institutions: an integrated framework. *Organisation Studies*, 21 (3), pp. 487-513.

Larson, M. S. (1977). *The Rise of Professionalism*. Berkeley: University of California Press.

Lauder H. & Brown. P. (1991), *The Creation of Market Competition for Education in New Zealand.* Wellington: Smithfield Project.

Lauder H. & Brown. P. (2001). *High Skills: Globalization, Competitiveness and Skill Formation.* Oxford: Oxford University Press.

Lauder H. & Brown. P. (2004). Sociology and Political Arithmetic: Some Principles of a New Policy Science', British Journal of Sociology 55/1:

Lauder H. & Brown. P. (2006). Globalization, education, and social change. Oxford: Oxford University Press.

Lawton Smith, H. (2007) 'Universities, innovation and territorial development: a review of the evidence', Environment and Planning C, Government and Policy, 25, pp. 98-114.

Lefebvre, H. (1991). *The Production of Space.* Cambridge Mass.: Blackwell.

Lerner, J. (2005). The University and the Start-up: Lessons from the Past Two Decades. *Journal of Technology Transfer*, 30, 1-2, pp. 49-56.

Levine, A. (1999). How the academic profession is changing (pp 42-53). *Journal of the American Academy of Arts and Sciences.Vol* 126. No:4.

Lewis, J., &Shorten, N. (1991). Equality, Difference: State Welfare Labor Market Policies and Family Polities in Sweden. Feminist Studies 18/1: 59-87.

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. Beverly Hills, CA: Sage.

Link, A. N., & Scott, J. T. (2002). Science Parks and the Academic Missions of Universities : An Exploratory Study. Science, (603).

Link, A. N. (2009). Understanding research, science and technology parks: Global best practice. (p. 214). Greensboro: the National Academies Press.

Luger, M. I. & Goldstein, H.A. (2006). Research Parks Redux: The Changing Landscape of the Garden, Washington, DC: U.S. Economic Development Administration.

Lundvall, B-A. (1992). *National Innovation Systems: Toward a Theory of Interactive Learning.* London: Pinter Publishers.

Lundvall, B. R., & Johnson, B. (1994). The learning economy. Journal of Industry Studies, 2, 23-42.

Lundvall, B-A. & Soete, L. (2002).GLOBELICS: Global Network for Economics of Learning, Innovation and Competence Building Systems, University of Aalborg: Department of Business Studies.

Mahoney, P. (2001), 'Social Justice and the Reconstruction of Teacher Education. Paper presented to the British Educational Research Association, York, UK.

Malmberg, A. and Maskell, P. (2002). The elusive concept of localization economies--towards a knowledge-based theory of spatial clustering. Environment and Planning 34(3): 429-450.

Marginson, S., & Considine, M. (2000). *The enterprise university*. Cambridge: Cambridge University Press.

Marginson, S. (2004). *Cross-border post secondary education in the Asia Pacific region.* in Larson, K. and Vincent-Lancrin, S. (eds). *Internationalisation and Trade in Higher Education: Opportunities and Challenges*. Paris: OECD.

Markman, G. Siegel, D. & Wright, M. (2008). Research and technology commercialization. *Journal of Management Studies*, 45 (8), pp. 1401-1423.

Maron. M. & Meulders. K. (2008). Women on the labour market (PE 408.3) European Parliament, Policy Department.

Martens, K., Balzer, C, Sackmann, R., and Waymann, A. (2004). Comparing Governance of International Organizations: The EU, The OECD and Educational Policy. Bremen: Univeristat Bremen.

Marx, K. (1981). *Capital: A Critique of Political Economy*. Harmondsworth: Penguin.

Massey, D. (1994). *Space, Place, and Gender*. Minneapolis: University of Minnesota Press.

Massey, D. S., & Denton, N. (1992). American Apartheid: Segregation and the Making of the Underclass. Cambridge, Mass.: Harvard University Press.

Mayntz, (2003). Mechanisms in the Analysis of Social Macro-Phenomena. . California: Sage.

McCarthy, C. (2006). Understanding the Work of Aesthetics in Modern Life: Thinking about the Cultural Studies of Education in a Time of Recession', Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April.

McKinsey Global Institute (2003), "Turkey – Making the Productivity and Growth Breakthrough", New York.

Merriam, S. (1998). Qualitative research and case study applications in education. San Francisio: Jossey-Bass Inc.

Merrian, S. B. (2002). Qualitative Research in Practice San Francisco: Jossey-Bass.

METU-Technopolis. (2012, 04 01). Retrieved from http://metutech.metu.edu.tr/english/teknokent/genel.php.

Meulders D., Plasman R., Rigo A. & O'Dorchai S.(2010). Topic report horizontal and vertical segregation. European Union.

Meulders M.& Garey L. (2010). From enlightenment to neuroscience. Cambridge: MIT Press.

Ministry of Economy. (2012.04.01). Initiatives 2012. Retrieved from http://www.economy.gov.tr.

Ministry of Science, Industry, and Technology. (2012, 04 01). Retrieved from http:/www.sanayi.gov.tr.

Minshall, T., & Wicksteed, B. (2005). *University Spin-Out Companies: Starting to Fill the Evidence Gap*. London: St. John's Innovation Centre.

Mittelman, J. (2004). *Weather Globalization? The Vortex of Knowledge and Ideology*, London: Routledge

Monck, C.S.P, Porter, P., Storey, D.J., & Wynarczyk, P. (1988). *Science Parks and the Growth of High Technology Firms.* London: Croom Helm.

Morgan, K. (1997) „The Learning Region: Institutions, Innovation and Regional Renewal", Regional Studies 31, pp. 491-504.

Moustakas C. (1994). Phenomenological research methods. California: Sage.

Naidoo, R. (2004). Fields and Institutional Strategy: Bourdieu on the Relationship between Higher Education, Inequality and Society. British Journal of Sociology of Education 4/25: 457-72.

Napier, G., Serger, S. S., & Hansson, E. W. (2004). Strengthening innovation and technology policies for SME development in Turkey – Opportunities for private sector involvement. Malmö: IKED.

Napier, G. (2004), "The Role of Public Intervention in Venture Capital", World Bank's Knowledge Economy Development Gateway, IKED, Malmö.

Nedeva, M. (2007) 'New tricks and old dogs? The 'third mission' and the re-production of the university', in D. Epstein (ed.) *Geographies of Knowledge, Geometries of Power: Framing of the Future of Higher Education.* pp. 85-103. World Yearbook of Education 2008. New York: Routledge.

Nedeva, M. (2008) .Knowledge, Geometries of Power: Framing of the Future of Higher Education. World Yearbook of Education 2008. Routledge, New York, pp. 85-103.

Nelson, R. (1993). National Innovation Systems: A Comparative Analysis, New York: Oxfrd University Press.

Nelson, B. (2003). Higher Education: Report for 2003 to 2005 Triennium, Department of Education, Science and Training, Canberra, viewed 10 February 2004, <http:// www.dest.gov.au/highered/he report/2003 2005/pdf/ triennium2003_2005.pdf>.

Noble, D. F. (2001). Digital diploma mills. New York: Monthly Review Press.

NTVMSNBC, (2012) Retrieved January 15, 2012 from http://arsiv.ntvmsnbc.com/news/431890.asp#storyContinues

Nyborg, H. (2003). Sex-related differences in general intelligence g, brain size, and social status. Personality and Individual Differences Journal. 39 (2005) 497–509.

OECD. (1996). *The Knowledge-Based Economy*. Paris: OECD.

OECD. (1997). *National Systems of Innovation*. Paris: OECD.

OECD. (2001). *Knowledge Management in the Learning Society*, Paris: OECD.

OECD. (2002).Science and Technology Labour Markets. Paris: OECD.

OECD. (2004). *Small and medium-sized enterprises in turkey: Issues and policies* . Paris Cedex: OECD Publications.

OECD. (2005-2006). OECD Work on Education 2005-2006. OECD: website.

OECD. (2006), OECD Science, Technology and Industry Outlook, OECD, Paris, available at www.oecd.org/sti/sti-outlook.

OECD. (2007). Higher Education and Regions: Globally Competitive, Locally Engaged. Paris Cedex: OECD Publishing.

OECD. (2010). Science, Technology and Industry Outlook. Paris Cedex: OECD Publishing.

OECD. (2011). An Overview of Growing Income Inequalities in OECD Countries: Main Findings. Paris Cedex: OECD Publishing.

OECD. (2012). Preparing Teachers and Developing School Leaders for the 21st Century. Paris Cedex: OECD Publishing.

Ohmae, K. (1990). *The Borderless World: Power and Strategy in the Interlinked Economy*. London: Collins.

Okçabol, R. (2007). *Yüksek Öğrenim Sistemimiz* [Our Higher Education System]. Ankara: ÜtopyaYayınları.

Olssen, M. (1999). Michel Foucault as Thin Communitarian: Difference, Community, Democracy', Cultural Studies-Critical Methodologies 2/4: 483-513.

Ozturk, S. (2004). *Türkiye'de Üniversite Özerkliğinin mali, akademik ve yönetsel boyutlarıyla devlet ve vakıf Üniversiteler için betimlenmesi*. (Doctoral dissertation, Ankara University, Ankara, Turkiye).

Patton, D., Warren, L. & Bream, D. (2009). Intangible Elements That Underpin High-Tech Business Incubation Processes. *Journal of Technology Transfer*, 34, pp. 621-636.

Pawson, R. (2002). *Evidence and policy and naming and shaming*. Policy Studies, 23(3): 211-230.

Peng, X. (2006). 'University spin-offs: Opportunity or challenge?' Nature Materials, 5, 923–925, http://www.nature.com/nmat/journal/v5/n12/full/nmat1790.html [accessed 12 March 2012].

Penksa , J. (2010). A “Triple-Helix within the Triple-Helix” A Case Study of a University-Government”, NY: Buffalo University, Published Dissertation.

Perrucci, R., & Wysong, E. (1995). *The New Class Society*. Oxford Rowman & Littlefield.

Polat, C. (2007). *Assessment of technology development activities in Turkish techno-parks*. (Master's thesis, Bogazici University, Istanbul, Turkey).

Porter, M. and Scott, S. (2003), “National Innovation Capacity”, in World Economic Forum (2003), Geneva.

Power S., Aggleton, P., Brannen, J., Brown, A., Chisholm, L., and Mace, J. (eds.) (2003), A Tribute to Basil Bernstein.London: Institute of Education.

Prawat, R. S. (1999). Cognitive Theory at the Crossroads: Head Fitting, Head Splitting, or Somewhere in Between? *Human Development* 42/2: 59-77.

PriceWaterhouseCoopers LLP (2007) The Economic Benefits of a Degree (in association with London Economics) for UUK, February 2007.

Ranson, S. (1994). *Towards a Learning Society*. London: Cassell.

Ratcliff, S. (2009). Qualitative research. Retrieved from http://www.qualitative researchratcliffs.net/5.htm.

Rees, G., Gorard, S., Fevre, R. & Furlong, J. (2000), 'Participating in the Learning Society: History, Place and Biography', in F. Coffield (ed;), Differing Visions of a Learning Society: Research Findings. Bristol: Policy Press.

Regalia, I.(2006). *New forms of employment and new problems of regulation. In Regulating New Forms of Employment: Local experiments and social innovation in Europe*, ed. Ida Regalia, London: Routledge.

Rhoads, R. A., & Torres, C. A. (Eds.). (2006). The university, state, and market: The political economy of globalization in the Americas. Stanford, CA: Stanford University Press.

Robertson, S. and Dale, R. (2002) Local states of emergency: the contradictions of neoliberal governance in New Zealand, British J. of Sociology of Education, 23 (3), pp. 463-82.

Robertson, S. and Dale, R. (2006) Changing geographies of power in education: the politics of rescaling and its contradictions, in D. Kassem, E. Mufti and J. Robinson, (eds.) Education Studies: Issues and Critical Perspectives, Maidenhead, UK: Open University Press.

Robertson, S. (2006). Regionalism, Europe/Asia' and higher education, a paper presented to the AAG, 7-11th March, Chicago.

Robertson. S. L. (2007). Globalisation, rescaling, national education systems and citizenship regimes, in Klas Roth and Nicholas Burbules (eds.) Citizenship Education in National, Trans-national and Global Contexts, Rotterdam: Sense Publishers.

Robertson, S. and Dale, R. (2008) Researching education in a global era, in J. Resnik (ed). The Production of Educational Knowledge in a Global Era, Rotterdam: Sense Publishers.

Robertson, S. (2009) Metaphoric Imaginings: Re-/Visions on the Idea of a University, in R. Barnett, J-C Guedon, J. Masschelein, M. Simons, S. Robertson and N. Standaert, Rethinking the University After Bologna, Antwerp: Universitair Centrum Sint-Ignatius Antwerpen.

Robertson, S.L. (2010) Globalising UK Higher Education published by the Centre for Learning and Life Chances in Knowledge Economies and Societies at: http://www.llakes.org

Robertson, S.L., and Kitagawa F. (2011). University Incubators and Knowledge Mediation Strategies: Policy and Practice in Creating Competitive City Regions, published by the Centre for Learning and Life Chances in Knowledge Economies and Societies at: http://www.llakes.org

Robertson, S. L. (2011). The new spatial politics of (re)bordering and (re)ordering the state-education-citizen relation . *International Review of Education*, 57(3-4), 277-297.

Rose, M. (1993). *Authors and Owners: The Invention of Copyright.* Cambridge, Mass.: Harvard University Press.

Rose, M. (1999). *Powers of Freedom: Reframing Political Thought*. Cambridge: Cambridge University Press.

Rosenblatt, R. (1993). Government denounces Scripps-Sandoz deal. Los Angeles Times (18 June), D2.

Ruggie, J. (1992). Multilateralism: the autonomy of an institution. International Organisation, 46(3): 561-598.

Ruttan, V. (2006). Is War Necessary for Economic Growth?: Military Procurement and Technology Development NY: Oxford University Press.

Salmi, J. (2009). The challenge of establishing world-class universities. Washington, DC: The World Bank.

Sanayi ve Ticaret Bakanlığı, (2001). 4691 Sayılı Teknoloji Geliştirme Bölgeleri Kanunu, Ankara.

Santos, B. S. (2012). The university at a crossroads. *Human Architecture: Journal of the Sociology of Self-Knowledge*, *X* (1Winter 2012), 7-16.

Saritas, O., Taymaz , E., & Tumer, T. (2006). Vision 2023: Turkey's national technology foresight program – a contextualist description and analysis. *ERC Working Papers in Economics*, *06*(01), 1-28.

Sart, G. (2012). Emotional intelligence in peace and conflict resolution education. Saarbrücken, Germany: Lambert Academic Publishing.

Sassen, S.(2006). New Global Classes: Implications for Polities', in A. Giddens, and P. Diamond (eds.), The New Egalitarianism. Cambridge: Polity.

Sennett, R. (1998). *The Corrosion of Character: The Personal Consequences of Work in the New Capitalism.* New York: W. W.Norton.

Saxenian, A. (1985). *Regional Advantage, Culture and Competition in Silicon Valley and Route 128*. Cambridge, Mass.: Harvard University Press.

Schiller, D. (1999). *Digital Capitalism: Networking the Global Market System.* (Cambridge, Mass: MIT).

Schirato. A., and Webb, J. (2003). Understanding Globalization. London: Sage.

Scott, P. (1998). The Meanings of Mass Higher Education. Buckingham: Open University Press.

Sennett, R (2006). *Respect: The Formation of Character in an Age of Inequality.* London: Penguin.

Seo, J.H. (2006). The Korean Techno-parks as the Hub of Sub-national Innovation System: Case of Daegu Techno-park, Kathmandu, Nepal.

Shapiro, I. (2010). *Leviathan: Or the Matter, Forme, and Power of a Common-Wealth Ecclesiasticall and Civill*, Thomas Hobbes. New Haven: Yale University Press.

Shaughnessy, J. & Zechmeister, E. (1997). Research Methods in Psychology. New York: McGraw Hill.

Siegel, D.S., Westhead, P., & Wrigth, M. (2003). Science Parks and the Performance of New Technology-Based Firms, A Review of Recent UK Evidence and an Agenda for Future Research, Vol. 20, pp. 177-184.

Slaughter, S & Leslie, L. L. (1997). Academic *Capitalism: Politics, Policies, and the Entrepreneurial University.* Baltimore, MD.: The John Hopkins University Press.

Slaughter, S. and Rhoades, G. (2004). *Academic Capitalism and the New Economy: Markets, State and Higher Education.* London: Johns Hopkins University Press..

Smith, A. and VauxT. (2003). *Education, Conflict and International Development*, London: DAD.

Snitow. (Producer), & Koffman, (Director) (2002). Secrets of Silicon Valley [DVD].

Stine , D. D. Congressional Research Service, (2009). Science and technology policymaking: A primer (7-5700). Washington, DC: CRS.

Stromquist, N. P. (2000). *Globalization and education: integration and contestation across cultures.* Rowman& Littlefield Publishers.

Talbot, G., (2009). Q&A: Aneesh Chopra, National CTO, Technology Review [online] Available at< http://technologyreview.com/communications/23127/page1/>[Accessed 22 March 2012].

Timur, T. (2000). *Toplumsal değisme ve universiteler.* [Social changes and Universities]. Ankara: Imgekitabevi.

Toker, U. 2003. *Space for Innovation: Effects of Space on Innovation Processes in Basic Science and Research Settings*. UMI Number: 3128797.

TOBB (2004), "President's Press Conference", January 11, Ankara. TOBB (2004), "President's Press Conference", January 11, Ankara.

Tofflet, A. (1990). *Power Shift: Knowledge, Wealth and Violence at the Edge of the 21st Century*. New York: Bantam.

Torres, R. M. (2000). *One Decade of Education for AH: The Challenge Ahead.* Buenos Aires: International Institute of Educational Planning and UNESCO.

Tremblay, K. (2002). Student Mobility between and towards OECD Countries: A Comparative Analysis' in OECD, International Mobility of the Highly Skilled. Paris: OECD.

Troman, G. (2000).Teacher Stress in the Low Trust Society. British journal of Sociology of Education 21/3: 331-53.

TUBITAK, (1999). Science and Technology Policy and Strategy Meeting Report, http://www.tubitak.gov.tr (Last accessed on April 14, 2012).

TUBITAK. (2011). The National Science, Technology and Innovation Strategy 2011-2016 (UBTYS 2011-2016).

TUBITAK. (2010). Türkiye Bilim, Teknoloji ve Yenilik Sistemi ve Performans Göstergeleri. Ankara: Tubitak.

TUBITAK. (2006). Vizyon 2023 ve Teknoloji Öngörüsü, Vision 2023. Ankara: Tubitak.

Tural, N. K. (2007). Universities and academic life in Turkey: Changes and challenges. (pp. 63-78). *International Journal of Educational Policies,* Vol.1. (1). ISSN:1307-3842.

TÜSIAD (2003), "TÜSIAD Report on Knowledge Economy in Turkey", Istanbul.

TUBITAK, (1999). Science and Technology Policy and Strategy Meeting Report, http://www.tubitak.gov.tr (Last accessed on April 14, 2012).

TSI (Turkish Statistical Institute). (2011). Women in Statistics. Ankara: Türkiye İstatistik Kurumu Matbaası.

Tüzün, İ.K. & Devrani, T.K. (2008) Müşteri memnuniyeti ve müşteri çalışan Etkileşimi üzerine bir araştırma.Eskişehir Osman gazi Üniversitiesi İİBF Dergisi.

UKSPA. (1985). Science parks and the academic missions of universities: An exploratory study. London: UKSPA.

UN Millennium Project (2005). Investing in Development: A Practical Plan to Achieve the Millennium Development Goals, available at http://mw.unmMenniumproiett.org.last accessed 10 May, 2012.

Usher, R., & Edwards, R. (1997). Postmodernism and Education: Different Voices, Different Worlds. London: Routledge.

Uzunyayla F. , Ercan F., , & Kurt Korkusuz S., (2011). Metalaşma ve İktidar baskısındaki Üniversite. Ankara: Sosyal Araştırmalar Vakfı.

Vehviläinen, M., Vuolanto, P., & Yiljoki, O. H. (2010). Gender equality in interface organizations between science, technology and innovation. *Journal of Technology Management and Innovation*, *05*(1), 64-74.

Vehvilainen, M. (2009). Global economy, flexible work and the shaping of gender and ICT. 5th European Symposium on Gender & ICT, Bremen 5-7, 2009. http://www.informatik.uni-bremen.de/soteg/gict2009/ proceedings/GICT2009_Vehvilaeinen.pdf

Walshok, M. (1995). Knowledge without Boundaries: What America's Research Universities Can Do for the Economy, the Workplace, and the Community, Foreword by Daniel Yankelovich. San Francisco: Jossey Bass.

Waters, R. & Lawton Smith, H. (2002). RDAs and local economic development: scale and competitiveness in high technology Oxfordshire and Cambridgeshire. *European Planning Studies*, 10, 5, pp. 633-649.

Webster, E (2002). *Theories of the Information Society*, 2.1 Ed. London and New York: Routledge

Wessner C. W. (2009). Innovation policies for the 21st century. Washington, D.C.: National Research Council.

World Bank. (1997). World Development Report 1997: The State in a Changing World, Washington, DC: World Bank.

World Bank (2004) Technology in Schools: Education, ICT and the Knowledge Society, available at http://mwl.worldbank.org/educaoon/pdf/ICT report oct04a.pdf, last accessed 07/01/12, Washington, DC: World Bank.

World Bank, (2007). Turkey – Higher education policy study volume i: Strategic directions for higher education in Turkey (39674 - TU). Washington, DC: World Bank.

World Bank. (2008). *Gross national income per capita 2008, Atlas method and PPP.* Washington, DC: World Bank.

World Bank. (2011). Improving the quality and equity of basic education in turkey: Challenges and options (54131 TR). Washington, DC: World Bank.

World Bank. (2012). Counrty partnership strategy 2012-2015. Washington, DC: World Bank.

Wright, M., Clarysse, B., Lockett, A. & Binks, M. (2006). University spin-out companies and venture capital. *Research Policy*, 35 (4), pp. 481-501.

Yin, R. K. (2003). Case study research: Design and methods (3rd ed. Vol. 5). United States of America:

Sage.Young, I, (1990). *Justice and the Politics of Difference*. Princeton: Princeton University Press.

Yiğitler H. (2006). Implemantation and comparison of reconstruction. (Master's thesis, METU, Ankara, Turkey).

YÖK(The Council of Higher Education). (2012, april 01). *Universities* . Retrieved from http://www.yok.gov.tr/en/content/view/527/222/

Youtie, J. and Shapira, P. (2008). Building an innovation hub: a case study of the transformation of university roles in regional technological and economic development. *Research Policy*, 37, pp. 1188-1204.