A MULTIPLE-CASE STUDY ON UNIVERSITY-INDUSTRY RELATIONS FROM NEO-INSTITUTIONAL PERSPECTIVE

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

MEHMET ALİ YILIK

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY
IN
THE DEPARTMENT OF EDUCATIONAL SCIENCES

FEBRUARY 2018

Approval of the Graduate School of Social Sciences

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ABSTRACT

A MULTIPLE-CASE STUDY ON UNIVERSITY-INDUSTRY RELATIONS FROM NEO-INSTITUTIONAL PERSPECTIVE

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February 2018, 273 pages

This study aims to investigate what characterizes Turkish Technology Development Zones' (TDZ) structures and functions, and how these structures and functions impact Turkey's knowledge and technology production policy and higher education policy from the point of view of a neo-institutional conceptual framework. This is a multiple-case study of three TDZs in two research-intense universities and an institute of high technology in Turkey. Data sources include rich data informants from TDZs and universities as well as strategic plans, activity reports, and policy documents. Data collection instruments are a semi-structured interview form and a document analysis form. The study uses a code list and content analysis technique to analyze data via a qualitative data analysis software called MAXQDA. The data have been processed in the form of both within-case and cross case analyses. Results show that only few top performing TDZs leverage Turkey's becoming a knowledge economy, and its international visibility regarding knowledge and technology production. In search of legitimacy and efficiency in their organizational

fields, universities and their TDZs yield to pressures from neoliberal and new managerial ideologies, and entrepreneurial university approach; thus, adapt their organizational structures and core operations by displaying isomorphism. TDZs experience several conflicts regarding critical mass, ownership conflict in knowledge and technology production, business culture conflict, inadequacy conflict, managerial conflict, and legal gaps and political conflict. TDZs also appear to be drivers of transformation of higher education; they are likely to influence knowledge and technology production policy and implementation more than higher education policy making and implementation.

Keywords: University, University-industry Relations, Technology Development Zones, Neo-institutional Theory, Knowledge and Technology Production

ÖZ

YENİ KURUMSAL KURAM PERSPEKTİFİNDEN ÜNİVERSİTE-SANAYİ İLİŞKİLERİ ÜZERİNE BİR ÇOKLU ÖRNEK OLAY ÇALIŞMASI

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Şubat 2018, 273 sayfa

Bu çalışmanın amacı, Türkiye'deki Teknoloji Geliştirme Bölgelerinin (TGB) kendine özgü yapısal ve işlevsel özelliklerini belirlemek ve TGB'lerin bu yapısal ve işlevsel özelliklerinin Türkiye'nin bilgi ve teknoloji üretimi politikaları ile yükseköğretim politikalarını nasıl etkilediğini yeni kurumsal kuram kavramsal çerçevesi ile incelemektir. Bu çalışma, Türkiye'deki iki üniversite ve bir yüksek teknoloji enstitüsünde yer alan üç TGB'yi içeren bir çoklu örnek olay çalışmasıdır. Veri kaynakları, TGB ve üniversitelerde görevli olup derinlemesine veri sağlayabilecek katılımcılar ile stratejik plan, yıllık faaliyet raporu ve politika belgeleri gibi dokümanlardan oluşmaktadır. Yarı-yapılandırılmış görüşme formu ve doküman analizi formu aracılığıyla veri toplanmıştır. Bu çalışmada veriler, bir kod listesi ve içerik analizi yöntemi kullanılarak MAXQDA isimli nitel araştırma yazılımı aracılığıyla analiz edilmiştir. Veriler, her bir örnek olay için kendi içinde ve ayrıca örnek olaylar arası karşılaştırmalı olarak işlenmiştir. Sonuçlara göre, sadece

birkaç önde gelen TGB Türkiye'nin bilgi ekonomisine dönüşümüne ve bilgi-teknoloji üretimi açısından uluslararası görünürlüğüne katkıda bulunmaktadır. Örgütsel alanlarında meşruiyet ve verimlilik arayışı içinde olan üniversiteler ve ilintili TGB'leri, neoliberal ve yeni işletmeci ideolojiler ile girişimci üniversite yaklaşımından kaynaklı zorlamaların yönlendirmesi ile örgütsel yapılarını ve temel faaliyetlerini bu zorlamalarla uyumlu hale getirip eşbiçimli hale gelmektedirler. Kritik kitle, bilgi-teknoloji üretimi aidiyeti, iş kültürü, yeterlik, yönetsel ve yasal boşluk-politik kararlar, TGB'lerin çatışma alanını oluşturan unsurlardır. TGB'leri aynı zamanda yükseköğretimdeki dönüşümün itici bir gücü olarak ortaya çıkmaktadır. TGB bilgi-teknoloji üretimi politikalarının oluşturulması ve uygulanması açısından, yükseköğretim politikalarının oluşturulması ve uygulanmasına göre daha etkili bir örgüttür.

Anahtar Kelimeler: Üniversite, Üniversite-sanayi İlişkileri, Teknoloji Geliştirme Bölgeleri, Yeni Kurumsal Kuram, Bilgi ve Teknoloji Üretimi

To my wife, and my ever growing family…

ACKNOWLEDGMENTS

I wish to express my deepest gratitude to my supervisor Assoc. Prof. Dr. Yaşar Kondakçı for his guidance, advice, criticism, encouragements and insight throughout my graduate education and in this research.

I would also like to thank Assist. Prof. Dr. Gökçe Gökalp and Assist. Prof. Dr. Cengiz Savaş Aşkun for being members of my dissertation supervisory committee, and their suggestions and comments.

I would also like extend my thanks to Assoc. Prof. Dr. Armağan Erdoğan and Assist. Prof. Dr. Türker Kurt for being members of my dissertation defense committee, and their suggestions and comments.

I'm thankful to Assoc. Prof. Dr. Ronald Flowers, Prof. Dr. James Barott, and Prof. Jaclynn Tracy for their academic support and hospitality during my studies as a visiting scholar at Eastern Michigan University.

My dear 'Yönetimciler' friends, Assist. Prof. Dr. Burcu Erdemir, Dr. Betül Bulut-Şahin and Dr. Ömer Çalışkan, thank you for being a great support team of educational administrators throughout my dissertation.

My dear office mate Didem Ayan and my colleagues Özgür Köse, Serkan Algan, and Buket Tarakçıoğlu, I thank you all for being supportive friends and colleagues from Modern Languages Department.

My beloved Yılık Family - Ali Yılık, Ayşe Yılık, Ersin Yılık, Aslıhan Tuğyan Yılık, Giray Yılık, Murat Yılık, Özlem Yılık, Kaan Yılık and İrem Yılık- thank you for being MY family. You are a priceless and timeless gift to me.

My beautiful wife and colleague Dr. Mine Muyan Yılık, I feel lucky to have started my PhD at METU EDS department, otherwise I could never have met you and later

married you. You have been a class mate, a friend, a lover and a wife to me. We've been through many stages of our dissertations together, we've lived through many hardships, we've survived and at the same time enjoyed our stay in Ankara and in the United States, we've had losses, we've made new close friends together during the past few years. You have always stood by me and helped me whenever I needed you. You are the friend, lover, wife and colleague I have long been looking for. I love you beybim, and I always will.

The other half of my growing family- Mehmet Coşkun Muyan, Alev Muyan, Özgür Gençtürk, Işıl Gençtürk, Ramazan Gençtürk, Mehmet Efe Gençtürk, Mustafa Onur Yelekin, Müge Gaye Yelekin- I'm thankful that our paths have crossed and now I have a much bigger and loving family.

Special thanks to Mira - our the one and only cat- for staying up late with me all nights during the write-up stage of my dissertation.

I feel indebted and grateful to the Republic of Turkey and its founder Mustafa Kemal Atatürk for enabling the grandson of Zanapalı Mustafa of Büyük Kösebalcı Village to become an educated servant of the Turkish society.

I would like to thank participants of this study who spared their time and shared their views, and made this research study possible.

My dear friends Nazlı Büşra Akçabozan Kayabol, Yiğit Kayabol, Gökçen Aydın, Pınar Çağ and Muhsin Doğan, thanks for your continuous support during my dissertation period.

My dear EDS friends Sibel Akın, Fatma Zehra Ünlü Kaynakçı, Özlem Yıldırım Taştı, Elanur Yılmaz, Ayşe Ulu Yalçınkaya and İdil Aksöz, thank you all for being such great friends.

My good old friends Assist. Prof. Dr. İsmail Erim Gülaçtı, Assist. Prof. Dr. Özkan Kırmızı and Assist. Prof. Dr. Serdar Neslihanoğlu thank you for setting good examples of academics and your support during my dissertation.

My dear friends Murat Aktan, Pınar Aktan and Alper Tanırgan, thanks for being supportive throughout my dissertation work.

My dear hocam Serpil Mıstık, you have always inspired me to become a teacher. With your support, I'm going to continue taking further steps up in my career.

TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF ABBREVIATIONS

ATDZ	Association of Technology Development Zones
BSTB	Ministry of Science Industry and Technology
BTYK-SCST	Supreme Council for Science and Technology
CEO	Chief Executive Officer
CoM	The Council of Ministers
DPT	State Planning Organization
EU	European Union
EII	Entrepreneurship and Innovation Index
GDST	General Directorate of Science and Technology
HEC	Higher Education Council
İTÜ	İstanbul Technical University
KİT	State Owned Enterprises
KOSGEB	Small and Medium Organizations Development and Promotion Agency
METU	Middle East Technical University
MoD	Ministry of Development
MoEU	Ministry of Environment and Urbanization
MoF	Ministry of Finance
MoSIT	Ministry of Science Industry and Technology
NASA	National Aeronautics and Space Administration
OECD	The Organisation for Economic Co-operation and Development
ODTÜ	Middle East Technical University
ÖYP	Faculty Development Program
SAN-TEZ	Master or doctoral theses focused on industrial production.
STRCT	The Scientific and Technological Research Council of Turkey
SMEDPA	Small and Medium Enterprises Development and Promotion Administration-KOSGEB
SWOT	Analysis of Strengths Weaknesses Opportunities Threats
TDZ	Technology Development Zone
TDZPI	Technology Development Zones Performance Index

TGBD	Association of Technology Development Zones
TEKMER	Technology Center
TOBB- UCCE	Union of Chambers and Commodity Exchanges
TTO	Technology Transfer Office
TTP	Alliance of Technology Transfer Professionals
TÜBİTAK	The Scientific and Technological Research Council of Turkey
TÜBİTAK MAM	The Scientific and Technological Research Council of Turkey - Marmara Research Center
UK	The United Kingdom
URAP	University Ranking by Academic Performance
US	United States of America
USİMP	University-Industry Relations Centers Platform
WWI	First World War
WWII	Second World War
YÖK	Higher Education Council

CHAPTER 1

INTRODUCTION

In this chapter, first, the rationale and theoretical background of the study has been provided. It not only introduces the background of the study including university-industry relations, neo-institutional theory of organizational science as well as elements from neo-liberal ideology, new managerialism ideology and entrepreneurial approach to higher education, but also blends this background with an exploration of the knowledge and technology production phenomenon with reflections on university-industry relations. Then, the purpose of the study is given in this chapter along with the research questions. Finally, the significance of the study and the definition of terms have been presented.

1.1 Background and Rationale of the Study

Parallel to the transformation of the university, the university-industry relations have been experiencing a rapid transformation in Turkey and in the world. In the last two decades, university-industry relations in Turkey has become a frequently used phrase within circles of knowledge and technology production such as the state, universities and the industry. The phrase has also become common among the public but the public opinion on university-industry relations, and knowledge and technology production is rather limited because these two phrases seem not to have been fully embraced outside the borders of state policy makers, university campuses or industrial zones to reach out to the society. However, these two phrases have been attributed vital roles in the transformation of the state, the industry, higher education, and the society into collective state ideals of creating a knowledge-based economy, a knowledge-

based national development, a knowledge-based industrial production, an innovation and entrepreneurship-driven higher education, and knowledge society in Turkey (Alkibay, Orhaner, Korkmaz, & Ermeç Sertoglu, 2012; Bakırcı, 2018). This is a highly challenging endeavor for Turkey since Turkey's development tradition during the past two centuries depended more on technology transfer rather than technology production. Tanes (2012) exemplifies the magnitude of the challenge that Turkish state, Turkish industry, Turkish universities and the Turkish society are facing today by comparing two centuries of investment in technology production in the West (after industrial revolution) versus two or three decades of investment in knowledge and technology production in Turkey. Aydoğdu (2012) affirms that Turkey has been experiencing a transition into an innovation-driven economic development model that requires intense-research and development activities, adding that this is a chain reaction in which research and development leads to technological advances, technological advances paving the way to knowledge production which heavily depends on core operations and activities of professional research and development units.

These professional research and development units are being spearheaded by Technology Development Zones (TDZ) -official name- or technoparks which act as an interface of university industry relations, and mediate the phenomenon of knowledge and technology production in a way that Turkish state sets the policies for knowledge and technology production; universities generate knowledge and technology as well as human capital; TDZs act as catalyst to transform knowledge and technology from universities into value added products and services. These value added products and services are now viewed as indicators of economic development and welfare in the 21st century. In order to have increased welfare and competitiveness, leading knowledge economies in the 21st century prioritize generation of high value added products or services that are based on intense-research and development rather than heavy industrial production or mass production of goods with low profit margins. In brief, the tool for competitiveness in this

century has shifted from products to efficacy in knowledge and technology production.

1.1.1 Historical Background

Although generation of value added products and services based on intense-research and development activities to reach the ideal of a knowledge-based economy and national development via TDZ is a belated initiative in Turkey compared to its international counterparts, especially after the Second World War, the polarized world found a new path of competitiveness: the space race. Following the lead of Sputnik project and space mission by the Soviets, the US joined the race on this new ground of competition, that of science and technology. The pioneer of knowledge and technology production venue in the US is attributed to the Silicon Valley and Stanford University in 1950s (Kleinman, Feinstein & Downey, 2013; Rahm, Kirkland, & Bozeman, 2000), while in Europe, Germany's post-war recovery was taking place in forms of heavy industry and mass production; an anti-communist shield of countries such as Greece and Turkey were being fed with foreign aid as part of Marshall Plan to advance their economies and development.

Such a political and scientific context after the Second World War and Korean War was also manifesting an industrial leap, that of a third generation industrial leap. Drath and Horch (2014) inform that Industry 1.0 was a shift in production from manual power to steam engine-powered mechanical systems about 200 years ago; Industry 2.0 signaled electrification of production systems around the beginning of 1900s; Industry 3.0 was embodied in digitalization of automation-focused production systems especially with the introduction of the computer in 1960s. Today knowledge-based economies are accommodating another industrial revolution, that of Industry 4.0 which refers to the fourth industrial revolution in which there is continuous communication and interaction among humans, humans and machines, and machines and other machines over the net. (Roblek, Mesko, & Krapez, 2016) This new wave of industrial transformation necessitates production of high value added products

or services that are based on intense-research and development initiatives rather than heavy industrial production or mass production of goods to be a sustainable knowledge-based economy in the 21st century which is competitive and has increased levels of welfare for its citizens. In response to these changes in industry and production systems, states ratified their positions and endorsed national policies to bring together knowledge and technology production capacity as well as human capital from universities, and production potential and capital from industry. Thus, university and industry were commissioned to contribute to reaching state ideals of being a sustainable knowledge-based economy via interface organizations such as TDZs (Kleinman et al., 2013; Olssen & Peters, 2005; Powell & Owen-Smith, 1998).

Although university-industry togetherness (via TDZs) seems to have widespread presence in the knowledge and technology production landscape today, the phenomenon of knowledge and technology production was already taking place in university research centers, state-funded research centers or in free-enterprise research centers from post-Second World War years on into 1980's and 1990's to accommodate scientific and technological advancements due to Industry 3.0 even in the heights of the Cold War. At that time the world was polarized between the leading economic and political powers in the communist and capitalist pacts; however, they shared one common thread: investment in knowledge and technology production in order not to lag behind others in 'science wars' and also to become a competitive welfare state. In these university, state or free-enterprise affiliated research centers, scientists were pushing the frontiers of knowledge and technology while at the same time, in the public management arena, the world was witnessing economic and political tensions such as the worldwide economic crisis in late 1970s and the rise of neo-liberal policies (Kleinman et al., 2013; McClure, 2016, Taylor, 2017).

Neo-liberal public and industry policies around the world at that time were being adopted to welcome a more neoliberal economy and globalized markets which meant a more liberating policy towards economy by promoting

privatization and deregulation – minimizing the state interference with private sector (Gabbard, 2008; Kleinman et al., 2013). Accordingly, as stated by Slaughter and Rhoades (2005), neo-liberal states rest on a knowledge or information economy and position themselves as part of the global economy; deregulation, commercialization and privatization are common practices to fund the national economy as well as a shrinking budget for welfare services such as health, social security or education.

To Gabbard (2008) and Ward (2012), neo-liberal policies paved the way to a transformation in higher education policy and industrial strategy in line with their basic premises. According to Balyer (2011, p. 139), neoliberal policy towards higher education meant cutting public spending; and "the subsequent decline of public funding for universities has led to intense institutional competition, increased neo-liberal discussions, and trends such as industry – university partnerships and the commercialization of research."

Another prevalent ideology at the time was new managerialism. New managerialism, "…has narrowed the focus and scope of the 'public domain' by justifying the much more extensive use of market-based resource allocation mechanisms and the managerial control regimes that they require to operate effectively within institutional environments in which 'competition', rather than 'collaboration', has become the dominant cultural imperative." (Deem, Hillyard, & Reed, 2007, p. 4) Just like neo-liberalism, new managerialism in public administration meant a liberation of markets and restructuring of the state to allow for a less controlled market strategy as well as promoting competitiveness. Deem et al. also state that from 1970's and onwards, universities were labeled as "knowledge intensive organizations" and were placed at the core of knowledge and technology production to reach a knowledge-based and competitive economy.

Following these two ideological influences, an entrepreneurial approach to higher education emerged in which, according to Fayolle and Redford (2014), universities started to adopt an entrepreneurial twist by adapting their structures, core operations, cultures and also they started to encourage students

and academic staff to develop “entrepreneurial mindsets and entrepreneurial actions”. This, in a way, fueled further tensions in the landscape of knowledge and technology production because before the entrepreneurial approach to higher education, universities were commissioned to basically do research and educate students; while produced knowledge was accumulating in “collective scientific knowledge database” for humanity, academics enjoyed a degree of freedom. However, after the entrepreneurial approach, universities were given a ‘third mission’ by states to accommodate strategies, structures and operations to generate marketable knowledge and technology so that the country could reach a knowledge-based economy that is competitive and offers welfare to the public. Strategies here refer to knowledge and technology production policies by the state policy makers; structures refer to research centers or TDZs that carry out the productization stage of knowledge and technology produced by universities; and operations refer to research and development activities to produce value added products and services. In other words, this new university model necessitates a close contact of universities with the state and the industry.

The industrial revolution wave of 1960s -Industry 3.0- approached Turkey in 1980s during the administration of Turgut Özal, who served as the prime minister first and then became the 8th president of Turkey. During Özal’s administration, digitalization and the computer were introduced to Turkey. Özal administration put neo-liberal policies into practice such as privatization of state-owned enterprises *(KİT)*, deregulation – minimizing the state interference with private sector, cut on funds for public services, establishment of foundation universities. Özal also liberated markets and reformed public management to promote competitiveness of Turkish economy and national development. During Özal’s administration investment in knowledge and technology production increased though technology transfer was predominantly common. To exemplify, technology centers were established such as ODTÜ TEKMER, established in 1992, which can be considered the first step to establish TDZs like in the rest of the world. Until

the establishment of ODTÜ TEKMER, TÜBİTAK MAM, established in 1972, was one of the rare institutions for the Turkish landscape of knowledge and technology production. Although Özal's reforms and initiatives were much belated compared to the world, Turkey is believed to have experienced a fundamental transformation in terms of economy, politics, and science and technology during his administration.

Unlike Turkey, world's global knowledge-based economies today are intrigued with Industry 4.0 and entrepreneurial university approach to be even more competitive and add more to their welfare. Turkey appears to be slow in responding to these two pressures as a decades-long restructuring debate is still on the agenda of Turkish higher education together with other challenges such as research and development, entrepreneurship, innovation, quality, accountability and internationalization (Çetinsaya, 2014; Erdoğan, 2014). The industry, on the other hand, has long internalized neo-liberal ideals to the end of twentieth century and shifted from a state-controlled sector to private sector. Demands of industry from university was concentrated on actually the demands of an emerging economic system based on quality work force and knowledge that would serve knowledge economy (Çetinsaya, 2014).

1.1.2 Relocating the Site of Research Mission

Research has always been a fundamental mission and function of higher education in addition to education but the 'monopoly' of higher education on research now seems to be challenged by the 'third mission' - entrepreneurial university- that is attributed to universities, and also by the establishment of TDZs both in the world and in Turkey. The challenge here entails knowledge and technology production as a result of intense-research and development processes on university's side, and facilitation of marketable knowledge and technology production on TDZs' or entrepreneurial university's side. This polarization of roles on the knowledge and technology production continuum (among 'traditional' universities, TDZs and entrepreneurial universities) triggers debates on ownership of knowledge and technology production, and

the place of academics and university in the knowledge economy and knowledge society (Fuller, 2002).

Regarding ownership of knowledge and technology production, according to Gibbons et al.'s (2010) description of a new mode of knowledge production; namely mode 2 knowledge, knowledge production is now owned by more parties than the 'traditional' university such that TDZ researchers, researchers at industrial research and development centers or academics and researchers at industry together also contribute to knowledge production as opposed to mode 1 knowledge that is particular to universities in a 'knowledge for its own sake' fashion. Moreover, knowledge production and use in education sector is expected to follow Mode 2 (Organization for Economic Cooperation and Development-OECD, 2000; Ward, 2012). Similarly, McAuley, Duberly and Johnson (2007) present the assumption that social sciences are increasingly sidelining with mode 2 direction and that organizational theory will need to address this phenomenon. Thus, "universities no longer have a monopoly on scientific knowledge generation…University researchers are 'forced' to become involved not just in exchanges with their academic peers but also in networks of knowledge producers whether in the academy, industry or elsewhere." (OECD, 2000, p. 166)

As for the place of academics and university in the knowledge economy and knowledge society, academics are now considered by some circles as knowledge workers who teach and do research to serve the greater good of knowledge economy and knowledge society ideals of states; thus the characteristic structures, operations and management of universities are being challenged. The manager-academics are now challenged to serve as corporate managers; university as a community of academics has been challenged to transform into work places; and now "a minority of academics, especially in subject areas where applied research is highly marketable to the private sector, have become fully-fledged academic capitalists who are able to supplement

their salaries from spin-off companies and consultancy work." (Deem et al., 2007, p. 78)

While all these challenges and transformations have been taking place regarding knowledge production, mode of knowledge production, place of university academics and university in the knowledge economy and knowledge society around the world, Turkish universities and Turkish industry act retroactively to meet these challenges and adapt to such transformations. Turkey's retroactive response is visible in the timing of establishment of TDZs (2000 and onwards) as well as adaptation to mission diversification of universities (research-intense university or entrepreneurial university). In short, knowledge and technology production that is based on intense-research and development activities to produce value added products and services via TDZs is already a belated initiative in Turkey.

In order to catch up with these changes, Turkey has adopted a TDZ model that would close the widening gap and 'lost' years. Aksan (2012) informs that TDZs in the US fall into Private Sector-Based Model while Turkish TDZs fall into the Mixed Model (a hybrid of State or Local Government Based Model and University-Based Model). In other words, business culture in the US is a free enterprise system and the one in Turkey yields to prevalence of statism. It is likely to say that in order to accelerate the establishment and success of Turkish TDZ model, Turkish state has fueled the system by state funds, tax waivers, and subsidies, and channeled the readily available human capital from universities and attracted capital by investment from the industry. This "compiled model" undoubtedly results in control by the state and university (via supervision of operations, funding and presence of their representatives in executive committees of TDZs). This mixed model for TDZs also generates incompatibility and conflicts between university and TDZs in terms of management (manager-academics versus corporate managers), quality and nature of outputs (technology transfer versus value added products based on research and development), roles of academics (academic capitalism versus academic conservatism) and roles and structures

of universities (‘traditional university’ versus mission diversification, research-intense university or entrepreneurial university). Before these challenges and transformations have been settled, some brand new challenges are setting foot in the door of academe and industry in Turkey such as thematic universities (e.g. University of Medical Sciences in İstanbul or University of Social Sciences in Ankara) and thematic TDZs (e.g. Turkey’s first thematic TDZ-specialized in medicine- at Dokuz Eylül University). Universities and TDZs in Turkey; thus, are generating strategic responses to these challenges and transformations not only to become legitimate universities and TDZs among all other universities and TDZs in Turkey but also to safeguard their prestige, structures and operations for survival.

1.1.3 Neo-institutionalization and Mode of Knowledge Production

In this study, a critique of neo-institutional theory (the prevalent conceptual framework for the study) and a discussion of elements from neo-liberal ideology, new managerialism ideology and entrepreneurial approach to higher education were used to explain the aforementioned challenges and transformations that Turkish universities and TDZs have been experiencing together with the strategic responses that Turkish universities and TDZs generate to accommodate them.

Olssen and Peters (2005, p. 313) depict the interwoven relations between neo-institutionalization, neoliberalism, new managerialism, and entrepreneurial approach to university. They explain that with the rise of neoliberalism and new managerialism practices in 1980s and 1990s, a paradigm shift has taken place to redefine universities and higher education; as a result, universities and higher education built institutional responses (to adopt similar organizational structures and core operations) to maintain their very existence. The traditional university or higher education discourse and intellectual community of scholarship have been replaced with a more entrepreneurial version with performance indicators based on output such as “strategic planning, performance indicators, quality assurance measures and

academic audits"; they also add that in a neoliberal and knowledge-based economy, universities or higher education have come to the front "as a key driver in the knowledge economy and as a consequence higher education institutions have been encouraged to develop links with industry and business in a series of new venture partnerships" which championed entrepreneurial mindsets for the manager-academics, academics and students as well as performance indicators for the 'knowledge work' done by 'knowledge workers' in the new paradigm.

Neo-institutional theory, in particular, advocates that organizations do not only operate in economic settings with the goal of technical efficiency. However, organizations operate in wider socially and culturally determined contexts (organizational field) with a goal of social legitimacy in that organizations seek to fit into social expectations and thus gain legitimacy which will ensure organization's survival. Therefore, rather than pure production systems, organizations must be viewed as social and cultural systems in an institutional environment surrounded by the state, non-governmental organizations, the public (Meyer & Rowan, 1977). Neo-institutional theory also stresses that organizations conform and adapt to widespread social expectations, as a result of which, their organizational structure grows similar in time - also called isomorphism. (DiMaggio & Powell, 1983). Organizations also buffer their structures and core operations from their organizational field by using symbolic coding and decoupling in which they follow rationalized myths or common practices around them, or decouple their core operations and activities from mainstream practices and activities (DiMaggio & Powell, 1983; Greenwood et al, 2008; Meyer & Rowan, 1977; Özen, 2007).

Neo-institutional theory relates to studying knowledge and technology production phenomenon and university-industry relations in many aspects. For instance, Toma (2012, p. 140) exemplifies how neo-institutional theory can be used to understand the way universities respond to institutional pressures:

> In their quest for the perceived greater resources that accompany increased legitimacy and autonomy, universities and colleges tend to pursue common strategies because they (1) are subject to influences within various networks; (2) are less interested in seeking efficiency than in legitimizing themselves through reference to other organizations; (3) become more homogeneous over time, believing that doing so will enhance resources that lead to greater autonomy and stability; (4) can develop narratives to support myths – but reassure themselves and others; and (5) satisfice, limiting the solutions they view as legitimate to a few paths, with isomorphism prominent among these strategies.

Likewise, Meyer and Rowan (2006) conclude that, from a neo-institutional view -in the case of higher education- organizations seek legitimacy rather than efficiency. Organizations are believed to be more loosely coupled and therefore more stable; the technical core of higher education (education and research) the formal structure of the organization are weakly affecting each other. Higher education organizations operate by using rationalized myths instead of quest for efficiency.

Today, universities are observed no longer to be the monopoly in knowledge production – knowledge extended the borders of academia to serve the needs of this broader environment and the society. OECD (2000) and Ward (2012) stress that knowledge and technology production has become a major competency and that in order to achieve competitive advantage states need to face this challenge. States reacted to this challenge, earlier, by funding research and development at research centers. However, the issue today requires a more comprehensive understanding of the phenomenon resulting from the increased ability of universities and demands of the state and private sector as well as the society on knowledge basis and technology production.

In this study, neo-institutional theory is supplemented in an eclectic manner with conceptual elements from neo-liberalism, new managerialism, and entrepreneurial approach to higher education. These ideological and conceptual elements also relate to studying universities and TDZs in the context of university-industry relations in many aspects. To start with neo-liberalism, Olssen (2016, pp. 129-130) informs that:

> The central defining characteristic of … new liberalism was based on an application of the logic and rules of market competition to the public sector. … neo-liberalism has come to represent a positive conception of the state's role in creating the appropriate market by providing the conditions, laws and institutions necessary for its operation. …in neoliberalism the state seeks to create an individual that is an enterprising and competitive entrepreneur.

Olsen, here refers to the impact of neo-liberalism on university-industry relations in a way that (1) the state embeds competitive welfare ideal into market competition via universities and TDZs, and through the knowledge and technology produced in these two venues; (2) the state also takes a regulatory role in university-industry relations- national strategic policies are set and interface organizations like TDZs established; (3) finally, the state invests in creating 'new citizens' for the knowledge society. Moreover, Peters (2013, pp. 12-13) criticizes this new neo-liberal challenge to universities in that:

> Neoliberal universities, have been put in the service of the "new global economy" under conditions of knowledge capitalism that has had several effects. First, it has diminished the public status of the university with a consequent privatization of higher education. … Third, it has focused on issues of intellectual capital and the ownership of the means of knowledge production with the development and expansion of research parks, private-public partnerships in science production, and an emphasis on the commercialization of research and online teaching initiatives. Fourth, it has led to the huge growth of administration vis-à-vis the teaching and research faculty, to an increasing bureaucratization of the university and to the emergence of a new class of "knowledge managers".

As it is clear from the above quotation, as a result of neo-liberal ideology, universities have started to face some challenges starting from 1980s with an even increased degree of challenge in 2000s. First, cuts on public funding for university and establishment of foundation universities are a covert motivation to channel the public into foundation universities; even public universities that are commissioned with public service have started to adopt to a semi-private enterprise essence which collects rents from TDZs and profits from patents produced. Second, some conflicts emerged as to commodification of knowledge and capitalization of intellectual property rights when research has

become much commercialized on university campuses and at their embedded TDZs. This threatens the status of academics who are long used to knowledge and technology production for the sake of the public and humanity at large. Third, a managerial conflict is also visible between manager-academics and knowledge managers or corporate managers as to how professional university-industry relations should be handled from a managerial perspective.

In regards to new managerialism, in a study of universities and TDZs in the context of university-industry relations, its certain elements can be barrowed to explain phenomenon. Deem et al. (2007, p. 26) highlight the impact of new managerialism on:

> (1) internal management structures, systems, and practices…, (2) the longer-term implications of these organizational and managerial changes for professional academic cultures and identities…, (3) the significance of the complex interaction between these two sets of changes, between structural change and cultural change, for the 're-imagining and re-imaging' of the university as a prototypical 'knowledge intensive organization…'

As the quotation suggests, new managerialism impacts the management of university-industry relations in many aspects. First, the managerial conduct of the relationship between universities and TDZs creates conflicts due to a decline of the power, status, and role of academics in university administration as a result of the rise of new managerial conduct. (Amaral, Jones, & Karseth, 2002). Second, current university culture is challenged to change from a traditional view of universities to work places; also an identity conflict emerges since academics are being challenged with a 'proletarianization' or de-professionalization process (Deem et al., 2007). Third, the image of university as a domain of knowledge production and dissemination to humanity is now being challenged by the commodification of knowledge to serve markets or fulfill state ideals of a knowledge-based economy and knowledge society.

In regards to entrepreneurial approach to higher education, in a study of universities and TDZs in the context of university-industry relations, its certain elements can be barrowed to explain phenomenon. Mueller (2006, p. 1506) concludes in her study that, "…knowledge transmission channels –

entrepreneurship and university–industry relations – …improve regional economic performance." Thus, to approach state's knowledge economy ideals there is much expectation from university industry relations. Etzkowitz (2003) explains an entrepreneurial university as one that (1) operates both academically and displays the ability to turn knowledge and technology produced at the university into products and services; (2) and is a promising innovation site that feeds on human capital from the university; (3) the whole university operates as an incubator of innovator students or faculty who engage in knowledge-driven, marketable initiatives; (4) and one that promotes interdisciplinary research and teaching. It can be concluded from Etzkowitz's explanation that university-industry relations are bringing new challenges and conflict grounds. How can universities find a middle ground to accommodate two distinct missions of operating academically but at the same time acting as a semi-enterprise? How much human capital should be channeled to TDZs? How about non-innovation focused faculty and students? When entrepreneurship and innovation enter mission statements of universities and are listed as indispensable elements under "national innovation ecosystem" goals in policy documents by the state, it is likely that entrepreneurship and innovation can be drivers of transformation in higher education, especially after the recent trends like research-intense universities announced in Turkey lately.

When all the above-mentioned challenges, conflicts and transformations are taken together, a comprehensive but uniform conceptual framework (a flagship of neo-institutional theory and a collection of elements from neo-liberalism, new managerialism, and entrepreneurial approach to higher education) is needed to analyze knowledge and technology production phenomenon within the context of university-industry relation in Turkey. In particular, a deeper organizational analysis of (1) the institutionalization processes of TDZs in their organizational field, (2) the challenges universities face with due to pressures from neo-liberalism, new managerialism and entrepreneurial approach to higher education, and (3) TDZs' impact on policy making and implementation are calling for new research. Most of the available

studies on knowledge and technology production within the context of university-industry relations are either dominantly quantitative or have a business administration logic for efficiency models of organizations; few studies today view TDZs from a socio-cultural perspective, and thus lack an in-depth understanding of the real experiences of individuals and institutions in the organizational field of TDZs. To be more specific, few studies today are available to holistically explore the contextual dynamics, structures and roles of TDZs in university-industry relations within its socio-cultural environment. As a result, a comprehensive empirical research study was necessary to analyze them.

1.2 Purpose of the Study

The purpose of this study is to investigate what characterizes Turkish TDZs' structures and functions, and how these structures and functions impact Turkey's knowledge and technology production policy and higher education policy from the point of view of a neo-institutional conceptual framework.

Particularly, the study aims to analyze the contextual dynamics of TDZs in regards to the external forces and internal forces that they interact with in their organizational field; moreover, it aims to investigate the similarized structures and functions that TDZs adopt as a result of neo-institutionalism, neoliberal and new managerial practices as well as entrepreneurial approach to university; and finally the study aims to depict the degree that institutionalized structures and functions of TDZs influence policy making and policy implementation in regards to knowledge and technology production, and higher education.

Main Research Question

How do institutionalized structures and functions of TDZs influence Turkey's knowledge and technology production policy, and higher education policy?

Sub-research Questions

1. How are the contributions and roles of TDZs redefined within the context of neoliberalism?
2. What conflicts spring from a redefined landscape of university-industry relations within the context of new managerialism and entrepreneurial approach to higher education?
3. How are pathways of influence among stakeholders characterized in the organizational field of TDZs?

3.1 What are the drivers of transformation of higher education?

3.2 How do structures and functions of TDZs similarize?

1.3 Significance of the Study

The main implication of the study is the possibility of guiding policy development and policy implementation toward knowledge and technology production, and higher education in Turkey through a detailed organizational analysis of TDZs as interface organizations of knowledge and technology production phenomenon within the context of university-industry relations in Turkey.

Theory

The study has implications for neo-institutional theory as it is criticized for lacking empirical evidence; unlike the beginnings of the theory, now the theory is believed to trivialize the role of power and politics in the institutional environment while emphasizing many other agencies and actors (market, private firms, political interest groups etc.) in a wider organizational field, and rationalized myths. Moreover, during isomorphism of organizations mimetic and normative types are claimed to be hardly separable and comprehensible at times. In addition, unlike the early times of the theory when ceremonial conformity in the organizational environment meant gaining support and access to resources, now the theory is believed to evolve into one that proposes institutional environments can promote both efficiency and conformity due to

intrusion of markets and politics (McFarland & Gomez, 2014; Meyer & Rowan, 2006; Özen, 2007) Thus, further empirical evidence is needed to address these conceptual conflicts of the theory; especially whether to depict organizations as rationality/efficiency-based economic models or legitimacy/conformism-based socio-cultural models (or both). More specifically, the study enables to act as a validation tool for some set of assumptions that TDZs need to be studied in the fields of economy rather than in sociology or public administration; and also a validation tool for the idea that TDZs are viewed as production systems rather than social and cultural systems (or both).

The study also provides insight into ongoing restructuring and mission diversification debates in Turkish Higher Education (Çetinsaya, 2014; Erdoğan, 2014) by exposing the various challenges resulting from an entrepreneurial university approach to higher education, and by providing some suggestions for transformation of higher education in Turkey. In addition, the study helps uncover potential conflicts that arise during the managerial conduct of university-industry relations that are rooted in new managerialism ideology; and it also enables to locate the sources of these conflicts in regards to management of university-relations, and provides suggestions for a conduct that benefits all parties involved.

Practice

The study enables to depict clearer roles and implications for universities and TDZs within the context of university-industry relations. The study offers TDZs practical implications to help improve its structure and core operations. In addition, the study gives practical suggestions for TDZs and universities to carry out a more professional and productive management relationship. The study is utmost important to universities who have recently established a TDZ or those who are planning to establish one soon. The study may prove useful to depict suggestions and practical applications for mission diversification processes of higher education in regards to research-intense universities. The

study may also depict suggestions and practical applications for mission diversification processes of TDZs in regards to thematic TDZs or other emerging TDZ models. The study may provide useful insights that transcend boundaries among different disciplines such as educational sciences, economy, entrepreneurship and innovation studies etc., and also open new directions for interdisciplinary research and education among these disciplines. Finally, the study provides implications for other stakeholders than university and industry, such as government and non-governmental organizations. In brief, implications for TDZs, universities, state policy makers and non-governmental organizations are presented in this study.

Research

The study provides some implications for research, as well. This study combines neo-institutionalization theory and the study of university-industry relations in that abundant research is available on the two separately; however, studying university-industry relations from a neo-institutional perspective is rather limited. Through this combination, studying the institutionalization processes of TDZs with a specific focus on their structures, roles, institutional norms and practices in university-industry relations can be illuminating. Moreover, the study provides a comprehensive but uniform conceptual framework for research by borrowing mainly from neo-institutional theory together with contributions of other ideologies and approaches - neo-liberalism, new managerialism, and entrepreneurial approach to higher education. Previous research depicts they have all been separately studied so far but all of them combined together gives a more accurate organizational analysis of knowledge and technology production phenomenon in university-industry relations. Finally, quantitative research on organizational design and outputs of TDZs is plentiful but an in-depth qualitative analysis of how key participants who are involved in university-industry relations reflect upon their unique experiences while constructing their own meanings in knowledge and technology production phenomenon is rare. Even rarer are multiple-case

studies that aim to analyze and understand multiple organizations in the organizational field rather than focusing on isolated organizations. In addition, this method relates to researchers who study organizational field and organizational ecology.

1.4 Definitions of the Terms

University. Higher Education Council of Turkey -YÖK (2000) defines university as "an institution of higher education possessing academic autonomy and juristic personality, conducting advanced-level education, scholarly research, publication and consultancy; it is composed of faculties, graduate schools, schools of higher education and similar institutions and units."

Institute of High Technology. A higher education institution like universities but it specializes in certain disciplines such as engineering, technology and other applied sciences; and it organizes its teaching and learning accordingly. YÖK (2000) defines it as "an institution of higher education possessing academic autonomy and juristic personality, carrying out high-level research, education, production, publication, and consultancy specifically in the areas of technology."

Technoparks or -officially- Technology Development Zones. According to the Law No: 4691 on Technology Development Zone (2001), it is a site where academic, economic and social structures become integrated or a TDZ which has these characteristics, where, by benefiting from the opportunities of a particular university or higher technology institute or research and development center or institute, companies using high/advanced technology or companies that aim at new technologies produce/develop technology or software, where the companies work to transform a technological invention into a commercial product, method or service, thus contributing to the development of the zone, which is in the premises or close to the same university, higher technological institute or the research and development center or institute.

Neo-institutionalization: Neo-institutional theory suggests, organizations face with uncertainty and a continuous challenge from their organizational field. Organizations seek legitimacy in their organizational field and try to minimize uncertainty via rationalized myths and decoupling; and eventually resemble other exemplary organizations. Those organizations that can do these can survive while others are eliminated (DiMaggio & Powell, 1983; Meyer & Rowan, 1977).

Neo-liberalism. In neo-liberalism, according to Slaughter and Rhoades (2005), states rest on a knowledge or information economy and position themselves as part of the global economy; deregulation, commercialization and privatization are common practices to fund the national economy as well as a shrinking budget for welfare services such as health, social security or education.

New Managerialism. It as an ideology that "…has narrowed the focus and scope of the 'public domain' by justifying the much more extensive use of market-based resource allocation mechanisms and the managerial control regimes that they require to operate effectively within institutional environments in which 'competition', rather than 'collaboration', has become the dominant cultural imperative." (Deem et al., 2007)

Entrepreneurial University. Etzkowitz (2003) explains an entrepreneurial university as one that (1) operates both academically and displays the ability to turn knowledge and technology produced at the university into products and services; (2) and is a promising innovation site that feeds on human capital from the university; (3) the whole university operates as an incubator of innovator students or faculty who engage in knowledge-driven, marketable initiatives; (4) and one that promotes interdisciplinary research and teaching.

Policy. According to Koşar (2013), policy refers to policy makers' determining the major goals, priorities and privileges by taking into consideration a topic or need.

Knowledge. Gibbons et al. (2010) explains knowledge as that of a mode 2 knowledge in which knowledge production is now owned by more parties than the 'traditional' university such that TDZ researchers, researchers at industrial research and development centers or academics and researchers at industry together also contribute to knowledge production as opposed to mode 1 knowledge that is particular to universities in a 'knowledge for its own sake' fashion.

Technology. Technology refers to the state of knowledge concerning ways of converting resources into outputs (Schreyer, 2001).

Knowledge Economy. Powell and Snellman (2004) define knowledge economy as, "production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources."

Innovation. According to OECD (2005), "an innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations."

CHAPTER 2

LITERATURE REVIEW

In this chapter, an overview of university, university-industry relations and TDZs has been presented. The social, economic, political and scientific background to university, university-industry relations, and TDZs have been reviewed, and related literature about them has been provided. Finally, the chapter provides an overview on neo-institutional theory and its application to higher education context, and lists previous empirical studies.

2.1 University in the Turkish Context

To start with, the origins and emergence of university, the transformational phases of university, and the current landscape and role of university in the West and, particularly, in Turkey are discussed.

2.1.1 Origins-the West and Turkey

University has roots in the medieval ages in the Western world. By then, often backed by the church and the local community, universities were hubs to transfer knowledge to privileged layers of the society and train select young people to be vital professionals within state administration or the society they were brought up in. Later, universities were equipped with more roles such as knowledge creator and distributer by using basic research what came to be known as the Humboldtian model in the aftermath of Renaissance in the nineteenth century (Altbach, 2005; Çetinsaya, 2014). Likewise, in the Eastern hemisphere particularly in the Middle East, civilized cultures started to establish schools known as *madrasa* to educate their state officials and spread knowledge; madrasa was often backed by the state or royal families. Madrasa

was only succeeded by a western style higher education institution, *Darülfünun*, late in the nineteenth century after reform movements in Ottoman territory were put into practice (Akyüz, 2012; Güven, 2014).

The intersection of these two distinct higher education traditions in different hemispheres of the world was due to a growing need for science and industrial production after the Industrial Revolution. After the industrial revolution, university has become an inseparable party in research. Higher education (two basic missions of which were education and knowledge for the state, and education and knowledge for the community) was given another mission: research that aimed at creating knowledge and technology for the industry (Erdil, Pamukçu, Akçomak, & Erden, 2013).

Industry, in time went beyond being a shareholder or buyer of knowledge and technology; it soon started to stimulate a transformation of university and diversification of its roles to serve demands of industry; particularly, the domain of research was added to mission statements of universities. A "common heritage" for the university today was created after "mid-nineteenth century [when] a newly united Germany harnessed university for nation building". By using the "significant resources given by the state [German higher education] took on the responsibility for research aimed at national development and industrialization" and nation building. Graduate studies were introduced and research became a basis for reorganization of university deriving from newly established scientific disciplines (Altbach, 2005, p. 17). This may be considered the first German influence on early Turkish higher education.

In the Western world, this German heritage in university and industrial development fueled a more competitive world design. Much of the near eastern territory was controlled by the Ottomans at that time. Ottoman statesmen reacted to this trend in the Continental Europe by instilling political, social and educational reforms known as *Tanzimat*. Due to the inefficiency of madrasa to help keep up with knowledge and technology produced in the western world, a series of reforms were enacted especially in military industry and

administrative structure of the Ottoman state because the need for a more competitive Ottoman military industry and state administration cadres was immediate. The first initiatives of sending students abroad to European universities for the purpose of knowledge and technology transfer also corresponds to this era (Kılıç, 1999; Kim & Sarı, 2013). Furthermore, Özduman, Güdük, Elmacı and Pamir (2013, p. 26) inform that the initial steps taken to transfer European-style universities into Ottoman land (prior to *Darülfünun*) correspond to end of 18th century and the beginning of 19th century:

> The opening of the Imperial Naval College in 1773 marks the second era in Turkish higher education [first being the *madrasa* era]. In the late 18th century, Ottoman Sultans started a wave of reforms aimed at reversing the decline of the Ottoman Empire's power. There was a need to follow the scientific, technological, and cultural advances in Europe. New secular schools were established, which were modeled after higher education institutions of European empires; however, these reforms merely focused on military improvement, with only secondary effects on the general society. Four institutions of higher education were opened during this time, starting with the Imperial Naval College in 1773, Imperial Military Engineering College in 1795, Imperial Medical College in 1827, and the Imperial Military College in 1834.

Darülfünun can be referred to as the university model that is much closer to a western style university that was established in the late nineteenth century-in 1863. It was formed to help Ottoman reformist wave of *Tanzimat* catch up with the trends imposed by industrialization; it also aimed at educating state officials for bureaucracy and transferring knowledge and technology to mostly military industry (Erichsen, 1998; Namal & Karakök, 2011).

2.1.2 University in Modern Turkey

Following the First World War (WWI) The Turkish Republic, successor of the Ottoman Empire, followed a pattern similar to German university tradition and nation building ideals from the previous century by reforming *Darülfünün* and starting to introduce industrial development plans. University, in the early republic period, was meant to be compatible with secular state and nation

building ideals, and therefore, some opposition from *Darülfünun* to these ideals was not welcome by the statesman of the new republic. The new Turkish state of 1920s was motivated to embed and spread national ideals via universities in a time when dominant state-initiated industry (KİT) was seen the key to national development and independence. Thus, a new approach towards university to help economic and social transformation was pressing (Çelik, 2011; Erichsen, 1998; Namal & Karakök, 2011).

The year 1933 is a milestone in Turkish higher education. It's the year when the Ottoman impact on higher education was reduced to minimum with the closure of *Darülfünün* and the opening of İstanbul University. Until post-Second World War (WWII) years, university became a catalyst of social and economic development. As stated by Altbach (2005, p. 20), "post-secondary education has expanded since WWII in virtually every country in the world. March (2007) approves this attributes part of this expansion to relocation of scholars from war-torn Europe and especially Germany. Thus, strengthened by the staff from Europe who escaped the turmoil of the WWII, Istanbul University became not only an educational institution but also an incubator for teaching staff of universities that were established in the years to follow (Çelik, 2011; Tekeli, 2010). This may be regarded the second wave of German influence on Turkish higher education. WWII may have brought together stagnation in economy and industry elsewhere but Turkey, by sticking to nation state ideals of development and staying neutral during WWII, was to benefit western post-war economic recovery schemes for Europe such as the Marshall Plan. After the introduction of a multi-party political system, election victories of Democratic Party (right-wing) in mid-nineteenth century was signaling a new political, social, economic and academic landscape for Turkey. New universities were established in the Turkish frontier -Anatolia- in 1950s and there was a boost in state investment in infrastructure and heavy industry.

However, after the WWII, Turkey also went through decades of alternation back and forth between instability, military coups, and economic crises, and stability, growth, liberalization. While universities grew in number

and enjoyed autonomy for the first time in 1960s, the introduction of a centralized authority over universities, Higher Education Council (HEC), in 1981 was contradictory; not to mention that two military coups in less than two decades was hindering scientific, political, economic and social development.

University in 1990s and onwards lived through an era of enlargement, diversification and transformation. 25 new universities were established. Some of these new universities were *vakıf* or non-profit foundation universities controlled by private institutions, which was a totally new phenomenon in Turkish higher education (Çelik, 2011; Çetinsaya, 2014; Namal & Karakök, 2011). This enlargement was aided by ÖYP program – a program to educate future teaching staff of the newly established universities.

2.1.3 University in the Aftermath of Neoliberalism

These developments in Turkish universities coincide with more neo-liberal public and industry policies around the world at that time. In a time when the rest of the world started to welcome a more neoliberal economy and globalized markets, and specifically when Turkish efforts to become part of the E.U. was revived, Turkey was not be left behind and therefore adopted a more liberating policy towards economy. The adoption of this new neoliberal economy meant promoting privatization and deregulation – minimizing the state interference with private sector (Gabbard, 2008; Kleinman et al, 2013). Neoliberal code redefined the interaction among state, public and economy that was prevalent from 1930s into 1970s; it is a revival of 18th and 19th century liberal doctrine that market exchange was central to social, economic and political order. Neoliberalism detached people from the nation state ideals and their cultures, and turned them into self-interested competitors, self-actualized entrepreneurs and rational consumers in a dynamic and ever-changing global marketplace. Neo-liberalist policies and reforms transformed the public sector or public domain as well as its institutions and services such as public housing, health, welfare, transportation, and public knowledge and education (Ward, 2012). Neoliberal policy towards higher education, in particular, meant cutting public

spending; and “the subsequent decline of public funding for universities has led to intense institutional competition, increased neo-liberal discussions, and trends such as industry – university partnerships and the commercialization of research.” Balyer (2011, p. 139)

Peters (2013, pp. 12-13) criticizes this new challenge from neoliberalism to universities in that:

> Neoliberal universities, have been put in the service of the “new global economy” under conditions of knowledge capitalism that has had several effects. First, it has diminished the public status of the university with a consequent privatization of higher education. ... Third, it has focused on issues of intellectual capital and the ownership of the means of knowledge production with the development and expansion of research parks, private-public partnerships in science production, and an emphasis on the commercialization of research and online teaching initiatives. Fourth, it has led to the huge growth of administration vis-à-vis the teaching and research faculty, to an increasing bureaucratization of the university and to the emergence of a new class of “knowledge managers”.

As Peters depicts in the above quotation, neoliberalism in higher education has led to a privatization of higher education, commodification of knowledge and commercialization of basic research, and conflicts in management of universities. Hursh (2008) also touches on the introduction of neoliberal policies in markets and education, and comments that state has a regulatory role for markets to operate; and adds that neoliberal education policy favors entrepreneurial individuals who are educated to benefit personally from the neoliberal configuration of the public domain and its services like education.

In the follow-up of the intensity of neoliberal policies in higher education from 1980s until 2000s, today’s issues of enlargement of higher education, mission diversification, and restructuring of higher education are more fluid and pressing than ever with nearly 190 universities – public, foundation, vocational, etc. A decades-long restructuring debate is still on the agenda of Turkish higher education together with other challenges such as research and development, entrepreneurship, innovation, quality, accountability

and internationalization (Çetinsaya, 2014; Erdoğan, 2014). The industry, on the other hand, has long internalized neo-liberal ideals to the end of twentieth century and shifted from a state controlled sector to private sector. Demands of industry from university was concentrated on actually the demands of an emerging economic system based on quality work force and knowledge that would serve "knowledge economy" (Çetinsaya, 2014).

As a result, university started to experience pressing demands from the industry and was commissioned by the state and higher education policy makers to meet these demands; a strong university-industry relation has become a major state policy- university and industry becoming the other parties involved in this joint mission. University; thus, revisited its structure and functions which ended in adopting a more flexible structure and role to accommodate these challenges and demands, allowing for new structures such as TDZs, technology transfer offices; and embracing roles such as innovation, entrepreneurship, co-producer of knowledge and technology with industry (Balyer, 2011; Çetinsaya, 2014 YÖK, 2007). According to Fayolle and Redford (2014), universities began to adopt an entrepreneurial configuration by adapting their structures, core operations, cultures and also they started to encourage students and academic staff to develop "entrepreneurial mindsets and entrepreneurial actions." Bousquet (2008) refers to this entrepreneurial divergence of higher education as the corporate university in which institutional relations between university and industry are prime; it is a transitory phase when universities take stage in the marketplace, which also brings concerns regarding intellectual property, market-oriented education, control of curriculum and research. Slaughter and Rhoades, on the other hand, call this entrepreneurial turn from 1980s to 2000s "an academic capitalist knowledge/learning regime that is known to introduce commercialization of colleges and universities; they add that commercialization spreads to curriculum, intellectual property, patents etc.

Some others call it an entrepreneurial university or University 3.0. "The digit in its name refers to the number of university missions: University 1.0 -

only educational mission, University 2.0 - education and research; University 3.0 - commercialization of knowledge is added to the last two missions." (Karpov, 2016, p. 355) Etzkowitz (2003) provides a detailed explanation of an entrepreneurial university saying that it is a university which (1) operates both academically and displays the ability to turn knowledge and technology produced at the university into products and services; (2) and is a promising innovation site that feeds on human capital from the university; (3) in which the whole university operates as an incubator of innovator students or faculty who engage in knowledge-driven, marketable initiatives; (4) and one that promotes interdisciplinary research and teaching. Thus, it is likely to state conclude that entrepreneurial university is an approach to higher education which highlights a semi-enterprise structure for universities which generates future entrepreneurs, and sells knowledge and technology. This new entrepreneurial design for university may provide support and funding for more research, a closer operation with industry and rapid developments and products; on the other hand, this entrepreneurial twist for universities may also mean commodification of knowledge, interference of markets into research ethics, and alter traditional academic missions of universities (Zusman, 2005).

2.2 University-industry Relations

An overview of university-industry relations is provided below with reference to origins of university-industry relations, the nature of university-industry relations, foundations and roles of university-industry relations with specific emphasis on how university-industry relations relate to knowledge and technology production in Turkey.

2.2.1 Origins of University-industry Relations

Beginnings of industry in the West dates back to 18th and 19th century when manual labor was mechanized signaling a shift from agriculture to industrial society in which volume of production was utmost important since this Industry 1.0 barely met the growing demand; products were not much varied

and they were particularly agricultural. From the end of 19th century up until 1960s-1980s, a second wave of industrial revolution (Industry 2.0) took place, when electrification of mechanical production systems came to the front, and volume and variety of production was visible especially in car industry and household goods industry. A third wave of industrial revolution (Industry 3.0), signaled the introduction of computers, and a shift from analogue technology into digitalization of production systems especially in electronics industry with even increased volume and variety. Today, an Industry 4.0 is a widely accepted terminology which correspond to technological innovations like internet of things (IoT), big data, electric vehicles, 3D printing, cloud computing, artificial intelligence and cyber-physical systems (Drath & Horch 2014; Yin, Stecke, & Li, 2017). Throughout these revolutionary waves of industrial development, universities in the west also transformed from a University 1.0 to University 2.0 in the 19th century -with the Humboltian model- (addition of research mission) and lately a University 3.0 (addition of commercialization mission) is prevalent today (Erdil et al., 2013).

In Turkish context, socio-economics and politics have always intervened with university and industrial development. This is evident in the transition from an outdated madrasa to a reformist Ottoman model of *Darülfünün*, and from *Darülfünün* to a western style university to pass on the nation state ideals during the early republic period of 1920s. Similarly, with respect to industry, socio-economics and politics have always played a significant role in reflecting the ideals of the ruling authority - from a military industry model of nineteenth century Ottoman survival model to a national economic development model envisioned by the new republic in 1920s. An emphasis by the new Turkish state policy makers was placed on economic development; change from an agrarian society to industrial society was the main objective aided with socio-cultural reforms. The industry initially provided public with basic goods and only a few heavy industry. However, after the WWII, industrial development was high on the political agenda; therefore, industry set out to produce more machinery and home appliances,

which needed more technology. The increasing demand for technology from the industry necessitated that state take some actions to promote science and technology. Organizations such as TÜBİTAK (The Scientific and Technological Research Council of Turkey) and DPT (State Planning Organization) were set up to coordinate and guide scientific and technological developments in 1960s. Moreover, subsidies for industry was high and five-year economic development plans was a common practice (Göker, 2008; Yıldız, Ilgaz, & Seferoğlu, 2010).

2.2.2 Intersection of University-industry Relations in Past Decades

Today a new university model and a new perspective on university-industry relations is on the political agenda, a model that highlights research, research and development, innovation and entrepreneurship in collaboration with the industry. Other state institutions and non-governmental organizations embraced the idea of university-industry relations. To illustrate, Yardımcıoğlu and Müftü (2014) - on behalf of the Union of Chambers and Commodity Exchanges of Turkey – recently published a report about university-industry relations from industry perspective and called for an action plan to form a concrete management structure, reform university infrastructure / structure to address demands of industry, revisit existing legal basis and support programs, and to establish harmonious work between interface structures of university-industry relations such as TDZs, technology transfer offices etc. Besides, Turkish Higher Education Council-YÖK (2007) highlights that success of higher education systems depends not only on pure academic research but also sensitivity to demands of the society and industry. According to YÖK, this success rests on university-industry relations.

The context of knowledge and technology production in regards to university-industry relations reminds one of a transition from a university model that fulfills earlier manpower needs of Ottoman *Tanzimat* times to a model university that creates cadres to stabilize nation state ideals of early republic period in 1920s and 1930s, and lately to a university model that is a

catalyst for social construction and transformation of the knowledge society in the twenty-first century. The context for industry reminds one of an earlier model in which devoted citizenship and hard work were forged to realize national ideals through economic and industrial development. This model was succeeded by one in which skilled human capital was key to produce for-industry or marketable knowledge and technology. In this new model the aim is to liberate the work force by championing entrepreneurship and skills necessary to survive in an age of knowledge economy and free trade (Sancar & Sancar, 2012; Taylor, 2017).

Moreover, socio-economic context for knowledge and technology production demonstrates a shift from a mostly agrarian and commerce-based socio-economy of the Ottoman times to a national welfare and industrial leap of 1930s and post WWII. And lately, after 1970s, a shift from industrial socio-economic indicators to more competitive knowledge economy indicators is needed. YÖK (2007) published a strategy document for the future of Turkish higher education system. This strategy document touches on this shift such that as of late 1970s, world witnessed a transition from industrial society into knowledge society due to advances in information technologies that dominated research agenda of nations in order to eliminate worldwide economic crises. Instead of mass production, high value added products and services were favored; ways to educate quality work force that would serve a more competitive and dynamic knowledge economy was a critical concern.

YÖK also published a strategic plan for Turkish higher education for the years 2016-2020 (YÖK, 2015). In this strategic plan, several strategies have been listed to foster university-industry relations such as 1) encouraging higher education institutions to set education and research strategies, implement and monitor them in cooperation with related stakeholders, (2) encouraging higher education institutions to develop programs - two-year, undergraduate, graduate and doctoral- in order to meet demands of university-industry relations in terms of knowledge production and creating skilled work force, (3) using the output or services of higher education institutions within the context of university-

industry relations and proposing new forms of cooperation, (4) using the interfaces of higher education institutions (centers, institutes, technology transfer offices etc.) within the context of university-industry relations and encouraging formation of such structures and their sustainability, and (5) making use of teaching staff and support teaching staff within the context of university-industry relations and encouraging their contribution to these processes.

Moreover, State-University-Industry Relations Strategy and Action Plan 2015-2018 lists several strategies to promote university-industry relations such as (1) to increase the synergy among stakeholders in state-university-industry relations, (2) to increase this cooperation in national innovation ecosystem, and (3) to transform the structure of industry into a more sustainable and high technology one that can produce competitive, high value added and innovative products. Likewise, Turkey Industry Strategy Document 2015-2018 lists aims of industry as (1) advancing the efficiency and competitiveness of Turkish industry, (2) accelerating the transformation of industry into one that takes a greater share from world export, mainly produces high value added high-tech products, has skilled human capital, and on that is sensitive towards the environment and the society.

Last but not the least, scientific context and power groups in regards to university-industry relations needs to be addressed. Scientific understanding of the world and documenting the reality is almost as synonymous as research. In earlier times, universities were seen as the nests for pure research. Later national ideals of development and competitiveness in global scale were embedded in research. However, the common practice of conducting pure academic research in universities has been challenged lately by the demands the industry in the forms of more marketable research (Taylor, 2017; Zusman, 2005). Earlier efforts put into pure research and applied research in university and industry in late twentieth century within contexts such as research and development centers and technology centers, gradually turned into a joint venture today in the forms of TDZs. However, issues of competitiveness,

producing marketable knowledge and technology versus pure research, curricular pressures to universities in terms of knowledge and technology production, the institutionalization and administration of knowledge and technology production and the degree of involvement of power groups and policy makers such as governmental bodies such as ministries and non-governmental organizations all add to the ambiguity and complexity of the organizational field of TDZs where knowledge and technology are produced in close contact with universities.

2.3 Technology Development Zones -TDZs- in the West and in Turkey

In this section, transformation of university-industry relations in the twentieth century, emergence of TDZs as institutions/interface of knowledge and technology production, and organizational features and roles of TDZs are given.

2.3.1 TDZs in the West

Mid-20th century was full of conflicts such as post-WWII Cold War and Korean War. Governments such as the U.S. invested in research and development to maneuver in military and aerospace industries because the launch of Sputnik by the Soviets triggered a competition in science and technology - establishment of NASA, for instance, coincides with this era. There was state incentives in forms of contracts and grants to merge efforts of the public and private sector - bring together university and industry (Rahm et al., 2000). Thus, some nations had already started investing in the marriage of university and industry in post-WWII era such as the Silicon Valley example in the United States-Silicon Valley can be stated as one of the earliest examples of the interface for university-industry relations; namely, TDZs (Kiper, 2010).

Mid-1970s and onwards there was a decline in governmental support in research and development funding; the focus deviated from a military priority to a civilian priority for new and improved products based on research and development. “The desire to link universities to industry and thus improve the

national competitiveness became U.S. public policy in the 1980s" via a series of legislations. The aim with this policy shift was to "involve the universities in applied research directly applicable to national needs and to move technologies developed on university campuses to the private sector for commercialization (and ultimate improvement in the national economic health)." (Rahm et al., 2000, p.20). In Europe, university-industry linkage was also spreading in 1980s and 1990s and first TDZs were being established. According to Stoica (2012). Governments in Europe backed university-industry initiatives and aimed to realize innovativeness and competitiveness of their states in order to develop economically and enjoy welfare from research and development returns.

2.3.2 TDZs in Turkish Context

Turkey went through foundational and transformational stages in political, social and economic fields in the first half of the 20th century. After the Second World War (WWII) through 1980s, Turkey witnessed fragmented periods of development and ceaseless turmoil. In the political, social and economic landscape of 1980s, came the introduction of neoliberal perspective into state policy making which had fundamental implications for every sphere of life for Turkey; higher education and industry are no exception to this radical policy change.

Although reforms and initiatives in 1980s and 1990s were much belated compared to the world, Turkey is believed to have experienced a fundamental transformation in terms of economy, politics, and science and technology. Thus, the era of 1980s and 1990s in Turkey signaled a crossroad of higher education and industry both of which were seen as the drivers of social and economic development and a chance for Turkey to catch up with the developed international community. This collective effort of higher education and the industry has been a state policy since 1980s (Balyer, 2011; Çetinsaya 2014) because a society nourishing from knowledge and technology as well as a

competitive and stable economy based on producing value added products and services were inevitable.

During 1980s and 1990s Turkish investment in knowledge and technology production increased though technology transfer was predominantly common. Technology centers were established such as İTÜ (İstanbul Technical University) and ODTÜ (Middle East Technical University) TEKMERs, established in 1991 and 1992 respectively. Until the establishment of ODTÜ and İTÜ TEKMERs, TÜBİTAK MAM, established in 1972, was one of the rare institutions for the Turkish landscape of knowledge and technology production. TEKMERs were a joint initiative of universities and KOSGEB (Small and Medium Organizations Development and Promotion Agency) following the World Bank funds with the goal of developing technology via incubators (Gümüş, Yükseloğlu & Binark, 2013; TGBD, 2015; Tunçay & Özcan, 2016). Successful implementation and outputs from TEKMERs such as ODTÜ TEKMER paved the way to the establishment of TDZs like in the rest of the world. In the Turkish context, TDZs evolved from TEKMERs of 1990s - technology centers- and were started to be established in 2000s in the aftermath of the legislation for Law numbered 4691 on Technology Development Zones. Today a definition of TDZ from the Law numbered 4691 on Technology Development Zones (2001, p.1) can be derived; it is defined as an interface of university-industry relations in that:

> …it is a site where academic, economic and social structures become integrated or a TDZ which has these characteristics, where, by benefiting from the opportunities of a particular university or higher technology institute or research and development center or institute, companies using high/advanced technology or companies that aim at new technologies produce/develop technology or software, where the companies work to transform a technological invention into a commercial product, method or service, thus contributing to the development of the zone, which is in the premises or close to the same university, higher technological institute or the research and development center or institute.

Based on MoSIT's (2017**)** data - Ministry of Science Industry and Technology-, there are 69 TDZs in Turkey, 55 of which are currently

functional. TDZs host 4475 companies- 250 are foreign investment and, 1510 are either owned by teaching staff or teaching staffs are shareholders in them. TDZs employ 44.580 personnel including research and development, and support personnel. Project capacity of TDZs have reached 33.279 with a net sale volume of 50.8 billion liras; and a net export volume of 2.9 billion dollars. The products or services out of TDZs mainly include patents, industrial designs, and software copyright. The dominating sectors in TDZs are software, information and communication technologies, and electronics.

TDZs in Turkey are modelled as a Mixed Model- a hybrid of state or local government based model and university-based model unlike the prevalent model in the US - a private sector-based model (Aksan, 2012). Precisely, business culture in the US is a free enterprise system and the one in Turkey yields to prevalence of statism. In order to accelerate the establishment and success of Turkish TDZ model, Turkish state has fueled the system by state funds, tax waivers, subsidies and channeled the readily available human capital from universities and attracted capital by investment from the industry. Technology Development Zones Law and Technology Development Zones Regulation mandate that a university representative is a default member of the TDZ executive committee under which a TDZ executive firm operates; all TDZs have managerial units, incubators and technology transfer offices; human resources include research and development personnel, researchers, technicians, support personnel, software personnel, design technicians and designers; TDZs reports to General Directorate of Science and Technology (GDST) under MoSIT; The Council of Ministers (CoM) supervises all activities of TDZs via different ministries and councils; TDZs exercise funds, tax waiver and subsidy as mandated by law which include value added tax waiver, income tax waiver, social security premium discounts.

2.3.3 TDZs and Transformation of Research Context

Upon their establishment, TDZs signaled a challenge for the monopoly of one of the grand missions of higher education- research. Higher education,

university in particular, started to have a competitor or competitive partner in knowledge and technology production - university was no longer the only knowledge and technology producer. A recent categorization in knowledge production needs to be referred to here; that of Mode 1 and Mode 2. Gibbons et al. (2010) observe a change from mode 1 to mode 2 forms of knowledge production in that knowledge production is now owned by more parties than the 'traditional' university such that TDZ researchers, researchers at industrial research and development centers or academics and researchers at industry together also contribute to knowledge production as opposed to mode 1 knowledge that is particular to universities in a 'knowledge for its own sake' fashion. Thus, "universities no longer have a monopoly on scientific knowledge generation…University researchers are forced to become involved not just in exchanges with their academic peers but also in networks of knowledge producers whether in the academy, industry or elsewhere" (OECD, 2000, p. 166).

This may potentially create a conflict among academics in terms of their involvement in university-industry relations, management of university-industry relations, and ownership and ethics of knowledge and technology production. Altbach (2005, p. 29) states that "worldwide, the rise of managerialism and ever more complex bureaucratic arrangements is part of the academic landscape. So far, the trend is for traditional governance to lose authority and power." Ward (2012), similarly, expresses that 1980s and 1990s witnessed the rise of new manageralism that aimed to mime the philosophy, principle, and procedures of private sector to run public sector. In regards to education, new managerialism "redefined and governed the relationships between administrators and professionals…who make up the fields that provided direct public services" in the field of education. Upon arrival of new managerialism in the context of knowledge and technology production, academics in universities were to be treated more as employees; university administrators were to be treated more as corporate managers; universities were to be treated as work places; academic work was to be treated as

knowledge work. Bousquet (2008, pp. 283-284) adds that a corporatization of higher education would mean a workplace for millions of people; a "de-skilling of the workforce" and a pressure on academics for "accountability, high performance, and excellence"; and a "management-engineered faculty culture: academic capitalism or managed professionalism."

2.4 Neo-institutional Theory

In this section, first, a brief background about organization science has been provided to grasp the developmental stages of organizational theory until the advent of neo-institutional theory. Then, foundations or fundamental principles of neo-institutional theory have been given together with a definition and basic argument of the theory. Finally, basic concepts of neo-institutional theory have been listed and explained in regards to how they relate to TDZs and universities in knowledge and technology production phenomenon within the context of university-industry relations.

2.4.1 Brief 'Organization Science Background' to Neo-institutional Theory

In organizational science, neo-institutional theory has roots in an open systems logic in which focus was on the greater organizational environment and how organizations interacted with this environment. In 1960's, the understanding of organizations as efficient and rational models in the first half of the 20th century, gradually transformed into one which proposed that organizational structures were contingent on the organizational dynamics and external forces (Sargut & Özen, 2007). Unlike the stability quest for relationships and tasks in the rational models of the first half of the 20th century, structural contingency puts forward the idea that conditions in the organization's environment are instable and change continuously such as "changes in markets, funding opportunities, politics, technology, and public values." (Greenwald, 2008)

In 1970s and 1980s, there was a boost in organizational theories that built on structural contingency and also focused on the interplay of between organizations and their environments such as neo-institutional theory which

suggests that organizations face with uncertainty and a continuous challenge from their organizational field. Organizations seek legitimacy in their socio-cultural environment and try to minimize uncertainty via rationalized myths and decoupling; and eventually resemble other exemplary organizations. Those organizations that can do these can survive while others are eliminated (DiMaggio & Powell, 1983; Scott, 2001). In this study, neo-institutional theory and its propositions about the interlink between organizations and their environments was adopted because neo-institutional theory advances the idea that organizational structures of organizations in the same field resemble one another; environmental factors push organizations to grow similar in time; organizations generate strategic responses against environmental pressures; however, these strategic responses result in socially constructed structures as shaped by organizations' socio-cultural environment (Scott, 2001). Scott recounts that earlier organizations were rather depicted as rational economic models to achieve efficiency or productivity in the past; however, under neo-institutional perspective, organizations are regarded social and cultural systems because they interact with social and cultural dynamics at large. Based on Scott's contention, in current organizational science perspective, universities and TDZs today co-exist in a more social and cultural milieu compared to that of a pre-1970s restricted view when organizations were seen more like a system for production that processed input from the institutional environment to produce output. Organizational analysis, thus, should be one that allows for active meaning construction among members of the organization in a wider context of the society and culture rather than emphasizing only the resources, goals and productivity of the organization.

According to Meyer and Rowan (2006), neo-institutional theory has gained popularity among researchers from disciplines such as sociology, political science and organization theory that focus on educational research and policy analysis. Meyer and Rowan also point to the changing nature of higher education that it is becoming more market oriented and entrepreneurial in an increasingly knowledge-based economy. Meyer and Rowan also conclude that,

from a neo-institutional view, organizations seek legitimacy rather than efficiency. Organizations are believed to be more loosely coupled and therefore more stable; the technical core of higher education (education and research) the formal structure of the organization are weakly affecting each other. Higher education organizations operate by using rationalized myths instead of quest for efficiency.

Such new realities or initiatives in the context of education are becoming more institutionalized, which calls for further research. In short, the complexity of the organizational field and the many facets of TDZs may be studied from a sociological and administrative perspective. Borrowing from administrative sciences -organizational studies in particular- a framework that lays a neo-institutional eye on how TDZs and universities interact can be both exploratory and explanatory.

2.4.2 Foundations of Neo-institutional Theory

In their organizational environments, organizations conform to widely accepted institutional beliefs or conceptions that can be explained as cultural-cognitive controls or deep social structures in the organizational environment (McFarland & Gomez, 2014). These institutional controls that organizations yield to in the organizational environment come in three forms: regulations or regulatory institutions, normative control, and cognitive beliefs (DiMaggio & Powell, 1983; Meyer & Rowan, 1977); early neo-institutional theorists such Meyer and Rowan, and DiMaggio and Powell depicted how organizations similarize when confronted with these institutional controls. Scott (2001) called them the three pillars of institutional control. Regulations or regulatory institutional control means that in the organizational environment, laws or regulatory bodies have control over organizational structure and operations of organizations. Normative control refers to informal rules or guidelines that exert control over what organizations should do or how organizations should act in the organizational environment. Finally, cognitive beliefs can be described as shared conceptions and frames through which meaning is

understood; they are taken granted way of doing things for organizations such as organizational routines and activities. (McFarland & Gomez, 2014; Miles, 2012; Powell & Colyvas, 2008; Scott, 2001).

In this study, the institutional controls in the organizational field of interface organizations of university-industry relations - TDZs- can also be stated regulatory, normative, and cultural /cognitive controls. As for regulatory control, ministries in charge of knowledge and technology production, governmental funding institutions, technology development zones law and its regulation can be stated. Regarding, normative control, TDZs' informal way of doing things, or labelling some TDZs as good, bad, or top performing TDZs can be given as examples. Finally, cultural /cognitive control over TDZs in the organizational environment can be exemplified with the culturally supported and taken for granted routine activity of doing research and development to produce value-added products and services- common for each TDZ and not questioned.

The main proposition in neo-institutional theory is; thus, that organizations in their organizational environments adopt these institutional controls prescribed by rationalizing agents (such as government units, professionals, universities and the public) and grow similar in time. In particular, "…organizational survival and success are contingent on integrating institutional beliefs (or ritual classifications) from the environment that are believed to be signals of legitimacy. In most cases institutions are legitimated when they are widely held and believed to be rational. (DiMaggio & Powell, 1983; McFarland & Gomez, 2014; Meyer & Rowan, 1977; Miles, 2012; Özen, 2007; Powell, 2008). In this study, TDZs are assumed to adopt the institutional controls - Scott's three pillars- in their organizational environment and resemble one another because their survival and success are contingent or dependent on internalizing these institutional controls which are widely accepted to lead the way to socio-cultural acceptance or legitimacy.

Accordingly, a recent definition of neo-institutional theory is that, "… an organization's survival depends on its fit with the cultural environment.

That is, a firm's success depends on whether it adopts structures that are deemed rational and legitimate in the external environment; that is, the firm mirrors environmental beliefs about what a legitimate organization of that type should look like.…." (McFarland & Gomez, 2014)

Bearing in mind this novel definition, it is possible to trace neo-institutional theory back to 1970s when it was heralded by scholars such as Richard Scott, John Meyer, Walter Powell and Paul DiMaggio. Scott's (2001) "Institutions and Organizations", DiMaggio and Powell's (1991) "The New Institutionalism in Organizational Analysis" are seminal books that set the ground for the theory along with many other chapters and articles such as Meyer and Rowan's (1977) "Institutional Organizations: Formal Structure as Myth and Ceremony", and DiMaggio and Powell's (1983) "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields". Some recent contributions to neo-institutional theory are noteworthy such as Meyer and Rowan's (2006) "New Institutionalism in Education" and "The SAGE Handbook of Organizational Institutionalism" by Greenwood, Oliver, Suddaby and Sahlin-Andersson (2008).

2.4.3 Central Concepts in Neo-institutional Theory

Some central concepts to neo-institutional theory need to be emphasized to better grasp the theory. These are organizational field, legitimacy, rationalized myths and coupling, and isomorphism.

Organizational Field

Organizational field depicts, in a way, the scope or the unit of analysis in this study which is the wider socio-cultural context of organizations -TDZs- as opposed to organizational analysis alternatives such as analyzing isolated organizations, analyzing intra-organizational field, analyzing units in organizations, or analyzing groups or individuals. Organizational field according to DiMaggio and Powell (1991) means a community of diverse organizations which consists of producers, buyers, supervisors, advisors that

operate and involve in joint-activities, and are exposed to regulatory and prestige-related pressures. Lune (2010) explains organizational field as an area of multiple organizations that organizations engage in to operate in recognized core activities of that particular area - it is an institutionalized area of multiple organizations. In this study, the organizational field of TDZs consist mainly of other TDZs and universities but also it involves diverse organizations and groups such as ministries, non-governmental organizations, market, and the public.

Legitimacy

Based on Meyer and Rowan's (1977) initial proposition, and McAuley et al., (2007) further explanation, the more organizations conform to institutional controls in their organization field, the more legitimate they become as opposed to the drive for technical efficiency. Legitimacy can simply be defined as being reliable and accountable due to conformity with the widely accepted rules in organizational field. Lune (2010) also touches on legitimacy stating that it is a fundamental element in relations among organizations because organizations check and balance their fit into the organizational field because they seek reputation and want to show they are connected to the overall system. Miles (2012) states that legitimacy shows an organization's social and cultural acceptance (due to conformity to institutional controls) by its own stakeholders and the ones outside the organizations. Thus, in this study, legitimacy is related to TDZs' acceptance in their socio-cultural environment, safeguarding their resources, and ensuring survival that result from their adoption of regulatory, normative and cognitive controls.

Buffering Strategies: Ceremonial conformity / Rationalized Myths / Symbolic Coding

McFarland and Gomez (2014, p. 156) relate legitimacy to the buffering strategy of ceremonial conformity or rationalized myths in that "in order to survive in modern societal environments, organizations must be regarded as legitimate, and this legitimacy is accomplished by maintaining ceremonial conformity. To Scott (2001) organizations need ceremonial conformity that is regarded the common strategy to gain acceptance and reach resources. Meyer and Rowan (2006) also explain that rationalized myths or ceremonial conformity help organizations stay intact in that they provide explanations for situations that does not reflect, in reality, what is happening in the organization or in the organizational field, through which they can reassure themselves and others that they are legitimate organizations in the organization field. It can be concluded that organizations buffer their formal structures by adapting to the rationalized myths in their organizational field; that is why, in the organizational field organizations that copy each other exist due to this ceremonial conformity. In other words, organizations yield to institutional controls and accept them as rationalized myths- take them for granted- because in the organizational field there is widespread adoption and use of such 'myths' in the organizational field. In this study, TDZs are assumed to buffer themselves by symbolically coding their structures to resemble beliefs about 'real' TDZs that are held in the institutional environment; thus, TDZs are in quest for legitimacy by using the buffering strategy of ceremonial conformity or rationalized myths.

Buffering Strategies: Coupling

Meyer and Rowan (1977) explain that coupling is a structural adaptation of the organization (following the rational myths) to its environment in terms of daily practices and routines. Some organizations decouple from standard formal structures and daily functions to buffer the technical core and intra-

organizational activities from externally inflicted harms or pressures (McFarland & Gomez, 2014; Özen, 2007). In this study, universities structurally adapt to their environment by buffering their core activities such as education and research via decoupling or loosely coupling; as for TDZs, they decouple or loosely couple from their organizational structure by buffering their core activities such as value-added products and services.

Bridging Strategies -Isomorphism

DiMaggio and Powell (1983) elaborated on the way organizations seek legitimacy in the organizational field; they put forward the idea of isomorphism – organizations have a tendency to resemble one another as they function in the organizational field. DiMaggio and Powell proposed three isomorphism strategies; namely, coercive, mimetic and normative. Coercive isomorphism is associated with pressures from state or regulatory organs that push an organization to look like others in the organizational field. Mimetic isomorphism is related to copying daily practices of other organizations and embracing innovation from others in the organizational field. Normative isomorphism is more about the will to look professional via training, certification, and professional networks (Handel, 2003; Lune, 2010; McAuley et al., 2007; McFarland & Gomez, 2014; Miles, 2012; Özen, 2007). In this study, TDZs are considered to be exposed to coercion from governmental bodies and laws so they grow similar in time due to coercive isomorphism; that they experience mimetic isomorphism by imitating truly operational TDZs in their organizational field, and also experience normative isomorphism by copying professional standards and practices set by education and training etc.

2.5 Previous Research Studies

In this section, some exemplary research studies have been listed that touch upon practical applications university-industry relations in the literature. Unlike this research study which employs a more comprehensive but uniform research frame to address the phenomenon of knowledge and technology

production within the context of university-industry relations, previous research studies have been observed to succumb to isolated research orientations such as focusing only on how universities react to institutional pressures in their organizational field. Under these isolated research orientations, the below-listed previous empirical studies can broadly fall under two categories such as those research studies purely on (1) university-industry relations, and (2) those research studies on neo-institutional theory within the scope of university-industry relations (or with an emphasis on ideologies and approaches such as neoliberalism, new managerialism and entrepreneurial university). It is also notable that in the literature nearly half of the research studies on university-industry relations are carried out by faculty or researchers from departments such as economy and business administration. About a quarter of them are done by faculty or researchers from specialized departments, institutes or centers such department of entrepreneurship, institute of entrepreneurship or entrepreneurship center. Another quarter of the available research studies on university-industry relations is conducted by faculty or researchers from educational sciences or education related fields. The following selection of previous research studies is representative of this ratio.

2.5.1 Studies on University-industry Relations

To start with research studies purely on university-industry relations, Martin (2000) reports how to manage university-industry relations in her case study series of institutional practices from 12 different countries. The main objective of the research was to collect empirical evidence on innovative management practices (management of interfaces, financial and personnel management, and the management of intellectual property) through which universities worldwide manage their relations with industry. The overall conclusion of the study on the management of university-industry relation is that as universities are getting more involved in their relationships with enterprises, they act proactively and display improved coordination mechanisms in management. Universities also

buffer their core operations from external forces by using regulations and procedures to benefit university-industry relations more.

Link and Scott (2003) studied TDZs in the United States and collected data from 29 universities that are in relation with TDZs. They used quantitative survey data from key participants. Two major findings from the study show that a formal (institutional) relationship between university and TDZ means improved research output, funding etc.; and proximity of TDZ to university leads to more employment for graduate students and an applied research driven curriculum.

Stoica (2012), in her master's thesis, conducted a case study and investigated how and why a science park collaborates with the university that it's embedded in by interviewing five top administrators from the university (deans) and the TDZ (CEOs) via a semi-structured interview form. Her findings reveal that creating university – industry links is favored by the participants but presence of an on-campus TDZ may not directly result in better cooperation and bonds between TDZ companies and teaching staff than the ones between teaching staff and TDZ companies outside the campus due to some network factors depending on competence of the TDZ, opinions of the teaching staff, field of study and expected advantages from the TDZ.

Peker, Ar and Baki (2014) determined the barriers in university-industry cooperation with survey data from ten faculty -key decision makers- via analytical network process method at a Turkish university. Structural problems were stated as the most important barrier to university-industry cooperation; a lack development of cooperation culture between university and industry, a lack of interest of industry, and bureaucratic problems were listed as other barriers to university-industry cooperation.

Kılıç and Ayvaz (2011) examined the level of cooperation among defense industry firms at two TDZs towards the technology transfer via administering a survey to 104 firm managers at a total of 45 defense industry firms at these two TDZs. The findings of the study show that the degree of collaboration among defense industry firms at these two TDZs were low due to

a lack of willingness defense industry firms to benefit research and development potential from university, and absence of a professional intermediator organization - TTOs.

Baykul, Sungur and Dulupçu (2016) examined 39 TDZs in Turkey in regards to the TDZ executive firms' efficiency in managing the TDZs by using data envelopment analysis technique - a technique that measures the efficiency of TDZ based on multiple input (capacity development activities, total number of cooperation, total number of key personnel) and output (number of academic spin-offs, total number of firms, total number of foreign investment firms and total employment). The results show that 13 TDZs fall under technically efficient category (more efficient); 23 TDZs go under pure technically efficient category (less efficient and needs improvement); 12 TDZs go under scale efficient category (least efficient).

Simmons, Levie and Monsen (2016) study TDZ firms' perception of competitive advantage in regards to teaming up with universities with a sample of 5,000 U.S. firms by using survey method, and by analyzing data using t-tests and regression models. The results show that a firm's subjective perception of having a competitive advantage towards collaboration with university, greater research and development expenditure, valuable patent stocks, collaboration with other firms and government labs, smaller firm size, operating in certain industries all increase the possibility of a firm's perception regarding the competitive advantage it can gain from teaming up with universities.

2.5.2 Studies on Neo-institutional Theory and Other Conceptual Elements

When it comes to research studies on neo-institutional theory within the scope of university-industry relations (or with an emphasis on ideologies and approaches such as neoliberalism, new managerialism and entrepreneurial university), Aypay, Şahin and Işık (2003) used new institutionalization frame to investigate the level of structural reforms and their institutionalization in a faculty of education with nine faculty member participants in a qualitative study that used semi-structured interviews. The conceptual tools included in

this qualitative study were coercive institutional pressures, normative institutional pressures, and cognitive institutional pressures (Scott's 3 pillars). The findings in the study demonstrate that faculty members welcomed regulative institutional pressures; however, acceptance of normative and cognitive institutional pressures still attract skepticism.

Lam (2010) stresses that academia is facing challenges from a knowledge based entrepreneurial university. In a case study aided with a survey, Lam collected data from academic scientists from research universities in the United Kingdom to investigate how the ambiguous boundary between university and industry is perceived and can be formed by academic scientists. The study borrows from neo-institutional theory and the notion of boundary work to examine "how scientists seek to protect and negotiate their positions, and also make sense of their professional role identities." Four categories of scientist have been listed: the traditional, the entrepreneurial, traditional hybrid and entrepreneurial hybrid. The majority are the hybrids who are skilled at benefitting the most out of the vague boundaries between academia and industry. This research study has also showed that scientists are capable of defending and negotiating their identities; they also act as agents of change via boundary work.

McClure (2016) conducted a case study at a public research-intense university to analyze the roles top university administrators in executive and managerial positions to strategically prioritizing innovation and entrepreneurship. The study uses an analytical framework of administrative academic capitalism and extended managerial capacity, and a sample of 31 participants (administrators, faculty, and students). The participants identified five roles of executive and managerial administrators who facilitated academic capitalism: building infrastructure, creating new programs, cultivating donors and raising funds, setting a vision around entrepreneurship, and changing policies. The results of the study show that deviation of university to commodification of knowledge and 'knowledge for sale' stems largely from administrators' initiatives; and that promotion of innovation and

entrepreneurship in academy produced some conflicts with academics showing that this inflicts production mechanisms due to extended managerial control over academic work.

Mueller (2006) test the hypotheses that "entrepreneurship and university–industry relations are vehicles for knowledge flows and, thus, spur economic growth". More specifically, she used a model to the impact of capital, research and development, entrepreneurship, and university–industry relations on economic performance via a common macro-economic function: the Cobb-Douglas production function which depicts the relationship among two or more inputs and outputs that can be generated with those input. She concludes that a critical mass of knowledge production, high levels of entrepreneurial involvement, and more knowledge input flow from university to firms determine a region's economic performance.

Aslan, Duman, Dünya, Duran and Atarbay (2016) conducted a phenomenological research with five key participants from firms at a Turkish university's TDZ by using semi-structured interviews. The purpose of their study was to depict how firm managers interpreted the terms of innovation and entrepreneurship, and how they interpreted their experiences during entrepreneurship process. Their findings show that innovative entrepreneurs in the study commented mostly on a general frame of innovation process; their definition of innovation related mostly to added value with the product they produce; regarding the features of their products they refer to inclusion of innovation; finally, the participants commented that learning experiences have positive impact on innovation process.

Abreu and Grinevich (2013) analyze university-business links to depict the determinants of academic entrepreneurship in its typical commercial context such as patent-based activities of spinouts, licensing, etc., in its informal commercial context such as consultancy, and finally in its non-commercial context such as lectures or informal advice by using a multivariate regression analysis based on survey data from over 22,000 UK academics that is complemented by information from reports. Their findings show that

individual and institutional determinants of academic entrepreneurship depends on the type of activities that academics involve in. Older, more senior, male academics favor less risky and more informal activities; natural sciences academics are more inclined to formal activities and applied research while social sciences academics involve more in informal activities, and are considered not entrepreneurial. Institutional support mechanisms work more and effectively for commercial activities than non-commercial activities. Entrepreneurship training positively affects informal and non-commercial activities, which supports the researchers' argument that informal activities can also be regarded entrepreneurial in nature.

Huyghe and Knockaert (2016), via an institutional point of view, investigate how characteristics of an organization (university culture and climate) affect academics' entrepreneurial intention to spin off a firm. They collected data from 437 academics from at a total of six Swedish and German universities: a combination of interviews with TTO (Technology Transfer Office) directors and an online survey for academics. A hierarchical regression and bootstrapping analysis were run to depict both the effects and mediating effects of university mission, university role models, and university reward system on spin-off intentions of academics. Their findings demonstrate that the degree a university includes entrepreneurship in its mission statement increases academics' spin-off intentions; the existence of a role model around an academics affects the academic's tendency to involve in entrepreneurship directly and indirectly via the mediation of entrepreneurial self-efficacy; finally, if a university explicitly rewards academics for their entrepreneurial outputs, the likelihood of academics' starting a spin-off firm increases.

Yasuda (2016) studies if the mobility of academics increases academic entrepreneurship with a sample of over 500 scientists at a university in Japan. The study compares career paths of academic entrepreneurs and non-academic entrepreneurs in regards to job mobility, sector mobility, and international mobility. Their regression analysis demonstrates that academics who involve in job mobility and international mobility are likely to show increased levels of

academic entrepreneurship unlike sector mobility. The study concludes that academics who display mobility in their careers have better access to resources, learn new skills and acquire traits which make them more entrepreneurial.

Guerrero, Urbano and Salamzadeh (2014) examine the entrepreneurial transformation process of two universities in a developing country - namely Iran- to understand the evolution, experiences and challenges of entrepreneurial universities in this developing country context. They employ an entrepreneurial university framework that covers selected universities' external and internal factors (to carry out their education, research and entrepreneurial activities) entrepreneurial university missions, and socio-economic impacts by using case study methodology. Their results show that universities grow similar as a reaction to environmental factors such as organizational structure, support mechanisms and formal entrepreneurial education, and also they grow dissimilar regarding their attitudes to entrepreneurship; and that universities react similarly to internal factors regarding financial resources, and display differences in human capital; and finally that differences in external and internal factors directly affected entrepreneurial outputs of universities.

2.6 Summary of Literature Review

A review of literature on university, university-industry relations, and TDZs as well as neo-institutional theory has been provided in this chapter. The fabric for knowledge and technology production in Turkey has roots in a history of universities and industry that dates back to madrasa of middle ages, Ottoman *Darülfünun*, early universities of the modern Turkish Republic, and reaches to university boom in 1990s, and lately mission diversification and 'third mission' of universities in the last two decades. What's more, this texture for knowledge and technology production in Turkey is closely linked to advances in industry from as early as the Industrial Revolution, world wars, military coups, and political competition to neo-liberalism and globalization, and knowledge economy in the twenty-first century.

The introduction of an interface institution – TDZs- necessitated certain changes in the structure, functions and missions of university. University, as an institution of knowledge and technology producer, needed to transform into a more flexible structure, and revisit its functions and missions to accommodate changes and challenges posed by TDZs as an emerging organization. TDZs offered a more intertwined structure and function for university-industry relations. TDZs can be viewed as institutions/interface of knowledge and technology production that link university and industry.

The main argument in neo-institutional theory is that organizations in their organizational environments adopt institutional controls prescribed by rationalizing agents to gain legitimacy and, as a result, they grow similar in time. The organizational field of TDZs consist mainly of other TDZs and universities but also it involves diverse organizations and groups such as ministries, non-governmental organizations, market, and the public. TDZs seek for legitimacy or being accepted in their socio-cultural environment, safeguarding their resources, and ensuring survival that result from their adoption of regulatory, normative and cognitive controls. In other words, TDZs are in quest for legitimacy by using the buffering strategy of ceremonial conformity or rationalized myths. Moreover, TDZs decouple from their standard formal structures and daily functions to buffer their technical core and intra-organizational activities from externally inflicted harms or pressures. Finally, TDZs have a tendency to resemble other TDZs as they function in their organizational field by using three isomorphism strategies; namely, coercive, mimetic and normative.

Finally, organizational analysis on TDZs and university-industry relations needs more empirical evidence as suggested by this research study. This study may contribute to closing the gap in the literature to study TDZ within the context of university-industry relations.

CHAPTER 3

METHODOLOGY

This chapter covers the methodology of the study; in particular, the research tradition and orientation, research design, the context, data sources - sampling procedure and participants, data collection instruments and protocols, data analysis, validity and reliability, and limitations.

3.1 Research Tradition and Orientation

Contrary to dominating positivism in the first half of the twentieth century, social sciences is experiencing a complimentary if not an equally dominating approach to explain phenomena of individuals or societies: interpretive paradigm. In order to explain and interpret phenomena within their social context, educational researchers have increasingly started to employ qualitative inquiry in addition to positivist methods (Cohen, Manion, & Morrison, 2011; Denzin & Lincoln, 2000).

While some forms of qualitative inquiry such as phenomenology have gained popularity, some less common forms such as case study fails to do so. This is partly because case study is not seen as a main research design or strategy; it is seen as a prior phase or a sub-dimension of other research designs; or because case studies are believed to be far less generalizable compared to positivist designs, which is viewed as an obvious strength of positivist paradigm (Yin, 2009). However, according to Lincoln and Guba (1985) case studies are also known to have strengths such as truth–value, applicability, consistency and neutrality which may, respectively, be translated as credibility, transferability, dependability and confirmability. Other researchers also point to the fact that case studies can prove valid or reliable –

just as in quantitative terminology- and that these terms do not only apply to quantitative research, though may have different terminology in qualitative research (Miles & Huberman, 1994; Thomas, 2011; Yıldırım & Şimşek, 2016).

Seminal researchers and authors seem to have agreed upon reliability and validity as twin pillars of case studies that have come to the front of educational research agenda. As for generic definitions of the these term for the moment; reliability can be defined as results and procedures of a study being consistent, and that it can be repeated to yield similar experiences or outcomes; validity can be referred to as researcher's objective and accurate analysis of the phenomenon- which is an institutional analysis of university-industry relations in this research study.

3.2 Research Design

Multiple case study has been employed as the research design or strategy in this study. A synthesis definition for multiple case study is possible. Multiple case study is the in-depth and multi-lens analysis of more than one case to depict uniqueness and complexity of these cases within the context of real life (Creswell, 1998; Eisenhardt 1989; Miles & Huberman, 1994; Yıldırım & Şimşek, 2016; Yin, 2009). In order to understand multiple-case study better, insight into some fundamental parameters is useful.

Subject, purpose, approach and process are the parameters that lead researchers to make an informed decision to set out to conduct a case study. Subject of a multiple case study can be outlier, key or local cases. The purpose of a multiple case study can be to explore, explain or evaluate a phenomenon (Thomas, 2011). The approach of a multiple case study can be to test a theory, build a theory or to interpret as suggested by Eisenhardt (1989). The process can be a single or a multiple case. In this study, key subjects -TDZs- have been selected; the purpose is to explore a less researched phenomenon - the case of TDZs within university-industry relations; the approach is to explore and then explain cases of TDZs; and finally the process involves a multiple-case study.

The rationale of the researcher to prefer to employ multiple-cases over a single case is that single case study differs significantly from a multiple-case study in ways that one exemplary, extreme or rich case is chosen to extract the meanings and constructs found in that one case by the researcher. Multiple-cases are preferable over single case studies when robustness and replication logic are concerned (Yin, 2009); which is the case in this research study where robustness and replication logic across cases is prime.

Moreover, multiple case studies also have variations. The typology of multiple case study can be outlined as (1) multiple cases with a holistic design and (2) multiple cases with an embedded design (Yin, 2009). Multiple-case embedded design is the underlying design for this study because each of the TDZ cases in this study is composed of multiple units of analysis: university administrators, university teaching staffs, TDZ administrators and TDZ firm administrators. Multiple case embedded design makes it possible not only to provide thick descriptions for each case or each TDZ as a whole but also to depict common and different patterns across cases. Moreover, this design helps seek any possibility to replicate or analytically generalize perspectives and experiences of participants to other TDZs. According to Hartley (2004), in organizational sciences, case study is a key method since it allows for in depth understanding of social or organizational processes due to richness of data that can be collected from the context of organizational phenomena, in which the cases can be one or more organizations, or groups and individuals operating inside or in the periphery of the organization. Among earlier contributors to the idea of using multiple-case studies in organizational science, Eisenhardt (1989) stands out. She uses a "roadmap" for conducting case studies- a synthesis of previous seminal works which is enriched by additional constructs such as triangulation of multiple researchers, within-case and cross-case analyses, and integration of existing literature. Her hybrid roadmap aims at building theory from cases to give a fresh twist to social science research. For example, Brown and Eisenhardt (1997) conducted a multiple-case study in computer industry "to explore continuous change in the context of multiple-product innovation,"

with a motive to build theory based on inductive case data. Their major findings included theoretical understanding of "organizational structures and processes that characterize successful multiple-product innovation and more broadly, continuously changing organizations." In short, their study sets an example to conduct multiple-case study in the study of organizations with the highlights of within-case writing for each case, replication logic (Yin, 2009) or cross-case validation (Eisenhardt, 1989), embedded units of analysis, triangulation of data, use of interviews as the primary source of data collection etc. According to Turan, Karadağ, Bektaş and Yalçın (2014), organizational research, as part of research practice under educational administration, is no exception to benefit from case studies because qualitative research is gaining more popularity and there are calls for more qualitative studies due to a dominating quantitative research design in this discipline. Some recent contributions to this call come from Kondakçı and Sivri (2014), and Bulut-Şahin (2017). Kondakçı and Sivri conducted a multiple-case study to determine the salient characteristics of nine high-performing schools; via semi-structured interviews they collected data from nine cases. Their data reveal that the nine cases or high-performing schools share common characteristics: "achievement orientation, positive instructional environment and classroom management, educational leadership, school climate, monitoring pupils' progress, parental support, and adequate physical infrastructure, which fit into academic, administrative, and external environment levels." (p. 265) Likewise, Bulut-Şahin (2017) conducted a multiple-case study but her purpose was to examine "(1) the contributions of internationalization at individual, institutional and national level, (2) conflicts in internationalization process, and (3) sources of conflicts in internationalization" via interview data and document analysis data from four universities - the four cases of the study. Her results show that "the universities as institutions and the individual academicians have experienced both contributions and conflicts related with internationalization trends in academic, economic, politic and socio-cultural domains." (p. 4)

Neo-institutional framework in this research study also calls for an institutional analysis of the cases -TDZs- in this study. Neo-institutional theory and multiple-case study are a methodological fit because they allow for researching phenomena taking place in the organizational field of organizations, and also they make it possible to collect interpretations and experiences of key informants in the organizational field compared to a single case study of an organization in the organizational field; thus they enable a more holistic look into university-industry relations rather than an inter-organizational analysis- a more limited research venue. The institutionalization processes of TDZs in the cases, the dynamics of TDZs in the cases, structures and functions of TDZs in the cases, how and to what extent these TDZs influence policy making all result in more robust and replicable depiction of the TDZs as interface institutions of university-industry relations.

3.3 The Context: Three TDZs

TDZs nested in universities and institutes of technology in Turkey form the context of this research study. TDZs are formally referred to as Technology Development Zones (TDZ) by the TDZ Law numbered 4691. For confidentiality of participating cases and the participants within, the researcher will hereafter refer to the three cases as University A (in the center of Turkey) and its TDZ, University B (in the west of Turkey) and its TDZ, and University C (in the south of Turkey) and its TDZ. These three cases form the multiple-cases in this study. Therefore, the study was carried out by analyzing these three cases.

3.3.1 University A and its TDZ

University A is a state university founded in mid-twentieth century with two other campuses: one outside the city and one abroad. University A's official website informs that, "University A's mission is to attain excellence in research, education and public service for society, humanity and nature by nurturing creative and critical thinking, innovation and leadership within a

framework of universal values"; and describes its vision as, "A pioneer university at international level, which transforms its region and the world." In regards to code of ethics, University A's stakeholders internalize the following honor code and reflect it in their academic life, "The members of the University A community are reliable, responsible and honorable people who embrace only the success and recognition they deserve, and act with integrity in their use, evaluation and presentation of facts, data and documents." The core values have been listed as: commitment to campus heritage, cooperative individualism, credibility, high academic quality, informed self-confidence, innovativeness and leadership, investigative approach, merit, respect for humanity, scientific freedom, sensitivity to the natural environment, and social responsibility.

Medium of instruction at University A is English; University A ranks in 1-10 band of University Ranking by Academic Performance- URAP's (2017b) list of high performing universities. It is an independent non-profit organization charting university rankings based on a set criteria of published articles, article per staff ration, number of citations, citations per staff, doctoral graduates etc. (URAP, 2017a). University A also ranks in 1-10 band of TÜBİTAK's (2016) list of high performing universities. It is a state organization charting university rankings based on a set criteria of performance in innovation and entrepreneurship (TÜBİTAK, 2016). University A's Strategic Plan 2011-2016, University A's Annual Activity Report 2016, and University A's official website inform that University A has five faculties and offers 43 undergraduate programs and 107 graduate programs - 69 of which are doctoral programs. As for human resources, University A has a total of 791 academics- some of which are instructors. Total number of students reach 28000, and 8448 of them are graduate students.

University A's TDZ was founded in early 2000s; it became fully operational following the introduction of TDZ Law. University A's TDZ website informs that, "University A's TDZ's mission is to design, set and help live an innovation ecosystem where entrepreneurs, innovators and firms can

flourish and develop"; and describes its vision as, "creating a successful and international innovation ecosystem that can shape the future." University A's TDZ hosts 332 firms (51 of which are staff-run/ affiliated) and it employs around 5800 employees including the research and development and support personnel. The leading sectors in University A's TDZ are software, ICT and electronics. University A's TDZ has so far completed around 1300 projects, produced 39 patents and turned 8 ideas into products. It ranks in 1-10 band of MoSIT's 2015 performance index for TDZs (BSTB, 2015); there is an affiliated technology transfer office and a design and innovation center.

3.3.2 University B and its TDZ

University B is a state institution of high technology founded in late twentieth century. (In simplest terms an institute of high technology means a higher education institution like universities but specializes in certain disciplines such as engineering, technology and other applied sciences; and it organizes its teaching and learning accordingly). University B 's official website informs that, "University B has taken on a mission to carry out advanced research, education and production as well as publication and counselling in the field of science and technology"; and describes its vision "to be a leader in science and technology and a unique world university in terms of its educational standards." In regards to core values, the following have been listed as: innovative, creative, independent, participatory, environmentalist and entrepreneurial.

Medium of instruction at University B is English; University B ranks in 10-20 band of URAP's (2017b) list of high performing universities. It is an independent non-profit organization charting university rankings based on a set criteria of published articles, article per staff ratio, number of citations, citations per staff, doctoral graduates etc. (URAP, 2017a). University B also ranks in 1-10 band of TÜBİTAK's (2016) list of high performing universities. It is a state organization charting university rankings based on a set criteria of performance in innovation and entrepreneurship (TÜBİTAK, 2016). University

B's Strategic Plan 2014-2018, University B's Annual Activity Report 2016, and University B's official website inform that University B has three faculties and offers 12 undergraduate programs and 40 graduate programs - 17 of which are doctoral programs. As for human resources, University B has a total of 184 academics- some of which are instructors. Total number of students reach 4430, and 1568 of them are graduate students.

University B's TDZ was founded in early 2000s; it became fully operational after a two year establishment period. University B's TDZ's website informs that, "University B's TDZ aims to inform Turkish industry with its knowledge and experience as well as research and development outputs; work with the industry to contribute to economic and social transformation." University B's TDZ hosts 157 firms (19 of which are staff-run/ affiliated) and employs around 850 employees including the research and development and support personnel. The leading sectors in University B's TDZ are software, ICT and biomedical. As for output, University B's TDZ has produced 39 patents. It ranks in 1-10 band on MoSIT's 2015 performance index for TDZs (BSTB, 2015); there is an affiliated technology transfer office and a design and innovation center.

3.3.3 University C and its TDZ

University C is a state university founded in late twentieth century. University C's official website informs that universities mission is to sustain a model that "offers teaching and learning with its high quality academic program within the scope of universal codes and values; uses its knowledge and experience for the good of humanity; aware of cultural values; is devoted to fundamental principles of the Turkish Republic founded by veteran Mustafa Kemal Atatürk; produces highly qualified individuals who are involved, productive and can represent their country; can serve the public with outputs of the scientific research and study; contribute to regional and national sustainable development"; and describes its vision by depicting a university model that "…integrates its students, graduates, employees, and the public with life-long

learning; is quality focused, sensitive to values of the public, and has international visibility with its international and national teaching and learning, and generated knowledge, technology and art." It also has the motto, "A world university following the light of science and modernity."

Medium of instruction at University C is Turkish; University C ranks in 50-60 band of URAP's (2017b) list of high performing universities. It is an independent non-profit organization charting university rankings based on a set criteria of published articles, article per staff ration, number of citations, citations per staff, doctoral graduates etc. (URAP, 2017a). University C also ranks in 30-40 of TÜBİTAK's (2016) list of high performing universities. It is a state organization charting university rankings based on a set criteria of performance in innovation and entrepreneurship (TÜBİTAK, 2016). University C's Strategic Plan 2013-2017, University C's Annual Activity Report 2017, and University C's official website inform that University C has thirteen faculties and offers 96 undergraduate programs and 89 graduate programs - 47 of which are doctoral programs. As for human resources, University C has a total of 1686 academics- some of which are instructors. Total number of students reach 40909, and 4367 of them are graduate students.

University C's TDZ was founded in mid-2000s; it became fully operational after a year of establishment period. University C's TDZ's website informs that, "University C's TDZ's mission is to bring together national and international firms that work in the field of innovative technologies and knowledge production; and to create a synergy in regional development within the context of university-industry relations; and describes its vision as contributing to development of innovative knowledge and technology regionally, nationally and internationally; and to become a hub in regional and national development. University C's TDZ hosts 74 firms (11 of which are staff-run/ affiliated) and employs around 397 employees including the research and development and support personnel. The leading sectors in University C's TDZ are software, ICT and machinery. University C's TDZ has so far completed around 350 projects. It ranks in 1-10 band of MoSIT's 2015

performance index for TDZs (BSTB, 2015); there is an affiliated technology transfer office and an innovation center.

Table 1. *Descriptive information about universities and TDZs in the study*

	Category	University A	University B	University C
Basics of university	foundation year	mid-20th century	late 20th century	late 20th century
	type of institution	university	institute of higher technology	university
	location	center of Turkey	west of Turkey	south of Turkey
	number of campus outside the city/country	3	1	1
	medium of instruction	English	English	Turkish
	rank on university ranking (URAP, 2017)	1-10 band	10-20 band	50-60 band
	rank on entrepreneurship and innovation index (TÜBİTAK, 2016)	1-10 band	1-10 band	30-40 band
Units of university	number of faculty	5	3	13
	number of undergraduate programs	43	12	96
	number of graduate programs	107 (69 doctoral)	40 (17 doctoral)	89 (47 doctoral)
Human resources of university	number of academics	791	184	1686
	total number of students	28000	4430	40909
	number of graduate students	8448	1568	4367

Table 1 (continued).

Basics of TDZ	foundation year- operational	early 2000s	early 2000s	mid-2000s
	number of firms	332	157	74
	Number of staff-run/ affiliated firms	51	19	11
	number of employees (research and development+ support)	5800	850	397
	leading sectors	software, ICT, electronics	software, ICT, biomedical	software, ICT, machinery
Units, output, performance	output (patent etc.)	1300 projects 39 patent 8 marketed idea	18 patent	335 projects
	rank on TDZ performance index (BSTB, 2015)	1-10 band	1-10 band	1-10 band
	technology transfer office	yes	yes	yes
	(design and) innovation center	yes	yes	yes

3.4 Data Sources: Sampling Procedure and Participants

In their organizational field, TDZs interact with other TDZs, universities, the state, industry and the society. Data sources of the study include rich data informants from TDZs and universities as well as policy or strategic documents from government offices, universities and TDZs. Qualitative research disregards probabilistic sampling of positivist designs and favors purposive sampling alternatives because the aim of qualitative inquiry is not to generalize from a sample to a population but to analyze cases with rich information deeply in their real context.

3.4.1 Sampling Procedure

Participating cases were selected based on criterion and maximum variation sampling techniques. Criterion sampling means the cases were selected based on a pre-determined criterion or criteria. Maximum variation sampling aims to keep the sample size to a minimum but to maintain the versatility of the participants at the maximum level (Marshall & Rossman, 2006; Yıldırım & Şimşek 2016). Specifically, in this study Technology Development Zones Performance Index (TDZPI) for 2015 was used as the criterion. This sole index for how TDZs are performing each year is announced by MoSIT based on three broad categories of parameters: input -finance, funding and infrastructure-, operations-research and development, incubators, technology transfer, institutionalization and sustainable ecosystem, technologic product investment-, and output-research and development, intellectual property rights, research and development results, and internationalization (BSTB, 2015). The selected multiple cases in this study (University A and its TDZ, University B and its TDZ, and University C and its TDZ) are top performers in this index-particularly in the top 10 list that perform high in these above-stated three categories. During case selection, also consideration was given to the point that cases come from three different cities and regions with potentially different local realities that may have implications for university-industry relations.

3.4.2 Participants

In regards to maximum variation sampling, key informants from several segments of the university-industry relations were selected. Namely, rich informants from university administration, university teaching staff, TDZ administration and TDZ firm administration took part in the study. Firstly, participants from university administration category can be vice-rectors, advisors to rector, deans, vice-deans, institute directors. Secondly, participants from university teaching staff category can be academics involved in TDZs in forms of advising TDZ projects, supervising TDZ projects, owning a start-up or an established TDZ firm etc. Thirdly, participants from TDZ administration category can be directors, vice-directors or unit directors in TDZ executive firm. Finally, TDZ firm administrators can be top directors, vice-directors, unit directors within a specific TDZ firm.

3.4.3 Specifics for Sampling Procedure and Participants

For the main study, a selection of three TDZs or TDZs within universities or institutes of technology in Turkey constitute the multiple cases in the main study: University A, University B, and University C. Criteria for choosing these three top performing TDZs was TDZPI 2015. Maximum variation was achieved by choosing participants or subjects from the four categories; namely, (1) university administrators affiliated with TDZs, (2) university teaching staffs affiliated with TDZ projects or firms, (3) administrators from TDZ executive firm, and (4) administrators of TDZ firms. For each of these four categories, all efforts have been made to assign at least two participants. Therefore, a total of eight participants for each case and a grand total of 24 participants have been projected at first. However, four participants withdrew from the study. Fortunately, there were participants falling in each unit of analysis or four participant categories in all three cases. Moreover, finding saturation had already been reached. As a result, a total of 20 interviews were included in the main study.

Table 2. *Descriptive information about participants in the main study*

	Category	University A	University B	University C
Group	University Admin	2	2	1
	University Staff	2	2	1
	TDZ Admin	2	2	1
	TDZ Firm Admin	2	1	2
Gender	Male	7	5	4
	Female	1	2	1
Age	25-30	0	1	0
	30-35	1	0	1
	35-40	0	0	2
	40-45	2	3	1
	45-50	1	0	0
	50+	4	3	1
Education	Undergraduate	2	0	2
	Master's	1	3	0
	Doctoral	5	4	3

Table 2 (continued).

Academic Title	Professor	4	2	1
	Associate Professor	0	2	1
	Assistant Professor	0	0	1
	Doctor (PhD)	0	0	0
	Lecturer	0	0	0
Job Title	General Director	0	0	2
	Vice General Director	1	1	0
	Director	3	2	0
Experience in University-industry Relationships (in years)	0-1	0	0	0
	1-3	0	2	1
	3-5	2	1	1
	5-10	3	1	2
	10+	3	3	1
Major / Field of Study / Specialization	Computer Engineering	2	1	1
	Engineering (not specified)	2	0	0
	Mechanical Engineering	1	0	0

Table 2 (continued).

	Metallurgical and Materials Engineering	1	0	0
	Mathematics/Computer Engineering/Education	1	0	0
	Electrics-Electronics Engineering	1	1	0
	Not specified	0	1	2
	Chemistry	0	1	0
	Molecular Biology and Genetics / Biophysics	0	1	0
	Electronics and Communications Engineering	0	1	0
	Biotechnology	0	1	0
	Business Administration	0	0	1
	Marine Transportation Engineering	0	0	1
Networking with (other) universities and TDZs	(only) their own university & TDZ;	7	4	1
	University A's TDZ+ another TDZ in Northwest;	1	1	0
	University B's TDZ + another TDZ in West;	0	1	0
	University B's TDZ + several TDZs in West;	0	1	0
	Another TDZ in Centre of Turkey;	0	0	1
	other TDZs in West + Center + Northwest;	0	0	1
	University C's TDZ + another TDZ in South	0	0	2

3.5 Data Collection Instruments

In this study two forms of qualitative data were collected; namely, interview data and document analysis data. Two data instruments were finalized based on a pilot study.

Data collection instruments were crafted following a detailed study of the conceptual framework- neo-institutionalization- and existing research studies with a similar scope, and those that adopt a multiple-case design. Moreover, expert opinion on the instruments were obtained from three authorities before implementing them in the pilot study phase of the study. Yıldırım and Şimşek (2016) highlight the importance of obtaining expert opinion in that experts may provide feedback and suggestions to help improve researcher's design and instruments and may give the researcher new perspectives of interpreting results and arriving at conclusions. This also gives the researcher a chance to have a critical eye on his or her own progress in the research study. The supervisor of the researcher is an associate professor of Educational Administration and Planning who supervised the development and improvement of data collection instruments. Moreover, two other experts were consulted in this study who have insight into organization studies, science and technology policies, higher education, and qualitative research. Based on the guidance of the researcher's supervisor and feedback from two other expert opinions, data collection instruments were improved before the pilot stage. In addition, after the pilot stage, shortcomings of the instruments were remedied and some emerging components were added to the instruments. Data collection instruments utilized in this study were basically an interview form and a document analysis form.

3.5.1 Pilot Study: Development of Data Collection Forms

The pilot study was conducted at University A with four participants for developing the data collection instruments, each of whom fall into one of the four units of analysis: university administration, university teaching staff, TDZ

administration and TDZ firm administration. A total of four interviews were conducted; a range of policy and strategic documents were also analyzed by using the document analysis form. University A is considered by many as one of the best exemplars of university-industry relations and it is one of the top ten ranking TDZs on TDZ performance index. It is seen as one of the top performing TDZs in terms of input (finance, funding and infrastructure), operations (research and development, incubators, technology transfer, institutionalization and sustainable ecosystem, technologic product investment), and output (research and development, intellectual property rights, research and development-results, and internationalization) (BSTB, 2015).

Table 3. *Descriptive information about participants in the pilot study*

	Category	University A
Group	University Admin	1
	University Staff	1
	TDZ Admin	1
	TDZ Firm Admin	1
Gender	Male	3
	Female	1
Age	25-30	0
	30-35	1
	35-40	0
	40-45	2
	45-50	0
	50+	1
Education	Undergraduate	1
	Master's	0
	Doctoral	3
Academic Title	Professor	2
	Associate Professor	0
	Assistant Professor	0
	Doctor (PhD)	0
	Lecturer	0
Job Title	General Director	0
	Vice General Director	1
	Director	1
Experience in University-industry Relationships (in years)	0-1	0
	1-3	0
	3-5	2
	5-10	1
	10+	1

Table 3 (continued).

Major / Field of Study/ Specialization	Computer Engineering	1
	Engineering (not specified)	1
	Civil Engineering	1
	Nuclear / Mechanical Engineering	1
Networking with other universities and TDZs	only University A & its TDZ;	2
	University A's TDZ & a neighboring foundation university and its TDZ	1
	University A's TDZ & several neighboring state universities, and foundation universities and their TDZs	1

The interview form in the pilot study was accompanied by a consent form (see Appendix B) for participants that was modified from the consent form suggested by Middle East Technical University - METU's School of Social Sciences. The interview form itself is preceded by a demographics section where data about case number, gender, age, educational background, experience (in years) in university-industry relations, affiliated TDZs and universities were collected to later give descriptive tables of the cases and participants in the results section, and if possible, draw some preliminary conclusions from collected demographic data. This demographics section helps the interviewee to build trust with the interviewer and feel comfortable with the stressing phenomenon of being interviewed. The interview form for pilot study comprises a total of 10 questions and some probe questions or prompts to guide the interviewee or lead the interviewee to give more details. The interview starts with a more generic question to establish a swift and easy transition into the instrument; a question that most participants would feel they have an answer to, "What is the importance of TDZs in university-industry relations?" Then, other specific interview questions follow such as, "What are the roles of TDZs?" or "What is the potential of TDZs to influence policy makers in regards to higher education?"

In addition to pilot interview form implemented on participants, a selection of major documents for document analysis was done. These include strategic plans, annual activity reports, policy documents, data sheets and reports. For the pilot study, for instance, among the selected documents for document analysis were University A's Strategic Plan 2011-2016, University A's 2016 Activity Report, TDZ Law, MoSIT data on TDZs, Higher Education Law, and 10th Development Plan.

The document analysis form also has a preceding part for descriptive data for the collected documents; data about type of document and source of document were collected. Document analysis form has five questions that aim to extract facts from documents rather than asking these questions in the interview. The data coming from document analysis form would require

specific numbers and classified information in some cases; therefore, participants would not know the answers to these questions. As a result, the researcher aimed at obtaining specific numbers or data, policy statements and strategic aims through a compilation of documents from the pilot case-University A. The questions in document analysis form include, "What constitutes the organizational environment of TDZs", "What do TDZs produce?"

3.5.2 Main Study: Implementation of Data Collection Forms

The main study was conducted at University A, University B, University C and, and in their embedded TDZs. A grand total of 20 informants participated in the main study; unevenly falling into each case (University A -8 participants, University B -7 participants and University C-5 participants) and under four participant categories: university administration, university teaching staff, TDZ administration and TDZ firm administration. From each case, strategic plans were collected as well as other reports or important documentation. Document analysis was conducted on these case-specific documents as well as other superordinate policy and strategic documents such as TDZ Law, TDZ Regulation, MoSIT 2016 Activity Report, TDZ 2016 data by MoSIT, University A's Strategic Plan 2011-2016, University A's 2016 Annual Activity Report, University B's Strategic Plan 2014-2018, University B's 2016 Annual Activity Report, University C's Strategic Plan 2013-2017, University C's 2017 Annual Activity Report, 10th Development Plan, State-University-Industry Relations Strategy and Action Plan 2015-2018, Turkey Industry Strategy Document 2015-2018, Higher Education Law, Higher Education Council Strategic Plan 2016-2020, and official websites of universities and TDZs.

Building on the insight from pilot study, changes were made to both the interview form and the document analysis form. What's more, the initial code list was fed with more emerging codes and themes. Resulting from pilot study interviews, the researcher made changes to the interview form (see Appendix C) and finalized it for use in the main study. These changes include but are not

limited to changing the sequence of questions, merging questions, limiting the number of probes or adding new ones. The descriptive data form that precedes the interview questions also needed some changes and additions. Participant category and position at TDZ were added to the demographics. Formerly, only case number was given to interviews but since it was important to demonstrate the category or the unit of analysis within each case (university administration, university teaching staff, TDZ administration or TDZ firm administration) a change was made. Participants from TDZ administration or TDZ firm administration needed career/position options to choose from as opposed to university teaching staff and their rank or position being asked in the previous form.

After analyzing policy and strategic documents from University A and University A's TDZ as well as other strategic documents related to university-industry relations during the pilot study phase, some minor changes were made to document analysis form (see Appendix C) that would be used in the main study. For the category of document type, some other items were added such as official data document and policy document. The questions in document analysis form were maintained since they proved lucrative in providing rich data. Specifically, a collection of major documents for document analysis was aimed for the main study. These include strategic plans, strategy documents, policy documents, reports etc. from all of the three cases. Also, related documents from governmental organizations related to university-industry relations were collected. These include but are not limited to TDZ Law, TDZ Regulation, MoSIT 2016 Activity Report, TDZ 2016 data by MoSIT, University A's Strategic Plan 2011-2016, University A's 2016 Annual Activity Report, University B's Strategic Plan 2014-2018, University B's 2016 Annual Activity Report, University C's Strategic Plan 2013-2017, University C's 2017 Annual Activity Report, 10th Development Plan, State-University-Industry Relations Strategy and Action Plan 2015-2018, Turkey Industry Strategy Document 2015-2018, Higher Education Law, Higher Education Council Strategic Plan 2016-2020, and official websites of universities, TDZs etc.

3.6 Data Collection Protocol and Procedures

Following the approval of METU's Applied Ethics Research Committee (See Appendix A) in July 2016 for a full year of research with human subjects, the researcher set out to design an audit trail or case study protocol as suggested by and Yin (2010) and Lincoln and Guba (1985). According to Lincoln and Guba (1985, pp. 382-393):

> An audit trail is achieved by (a) describing the specific purpose of the study; (b) discussing how and why the participants were selected for the study; (c) describing how the data were collected and how long the data collection lasted; (d) explaining how the data were reduced or transformed for analysis; (e) discussing the interpretation and presentation of the research findings; and (f) communicating the specific techniques used to determine the credibility of the data.

As clear from their explanation, a researcher needs to clarify the stages, procedures and rationale of taking specific decisions in a case study. Yin (2010, p. 2) also explains a complete case study protocol as one that includes:

> (a) The procedures for contacting key informants and making field work arrangements; (b) explicit language and reminders for implementing and enforcing the rules for protecting human subjects; (c) a detailed line of questions, or a mental agenda to be addressed throughout the data collection, including suggestions about the relevant sources of data; and (d) a preliminary outline for the final case study report.

As seen in Yin's explanation, a systematic documentation of steps, procedures and background to the study as well as projection for the write-up are crucial for the researcher to carry out a case study.

When this research study is concerned, the researcher made every effort to meet these criteria listed by Yin, and Lincoln and Guba. The researcher included an overview of the case study, main research questions and data collection strategy in the informed consent paper given to each participant before the interviews. The researcher made a systematic review of prospective participants from each of three cases in the study. The researcher contacted each participant and made field work arrangements with the participants. Moreover, potential policy and strategic documents were accessed,

downloaded and analyzed. As for the specific concerns for the protection of human subjects, the explanations in consent form and those given by the researcher during the interviews catered for this concern. The researcher had a mental agenda while conducting research in the field. The researcher also internalized the data collection tools thoroughly and knew which sources or information to search for in each site or which document to access to in the field etc. Finally, the researcher had a draft outline of data analysis and write-up procedures in a way that these procedures were already decided (a code list was crafted, MAXQDA software was bought, content analysis technique was decided, within-case and cross-case validation tools were adopted etc.).

When it comes to specifics of the interview tool and the document tool, the researcher conducted an average of 40-50 minute semi-structured interviews with participants. The logic behind the choice of semi-structured interviews as the main source of data in this study can be grounded such that semi-structured interviews allow both for a structure that covers a predetermined set of themes or issues the researcher wants to raise and also the researcher can deviate from the structure and ask some probe or follow up questions **(**Bogdan & Biklen, 2007; Marshall & Rossman 2006; Thomas 2011; Yıldırım & Şimşek, 2016; Yin 2009).

The interviews were audio-recorded for transcription in almost all cases; however, in some cases the informants did not give consent for audio-recording. As a result, the researcher took detailed notes during the interview and right after the interview wrote a full account or transcription of the interview based on his notes. The researcher sent these transcriptions back to the relevant informants for them to add or delete comments. This is called member check or informant feedback and it is a widely used technique which makes the transcribed data more consistent with what the informant had really said or meant (Yıldırım & Şimşek, 2016; Yin 2009).

Data from interviews were complimented by a collection of documents, reports, laws, strategic plans and any other available data from TDZs, universities, and government bodies. This complimentary data source in this

study is actually a way to triangulate data. Triangulation is an effort by researchers to increase the trustworthiness and robustness of results by employing different data sources, data collection strategies and data analysis techniques (Bogdan & Biklen, 2007; Eisenhardt, 1989; Yıldırım & Şimşek, 2016; Yin 2009).

In regards to reaching closure to the data collection phase of the present study, the researcher started to experience a saturation of data starting from the second case onwards. Eisenhardt (1989) refers to this as theoretical saturation which dictates when to stop adding more cases to a case study. Yin (2009) takes saturation as a point where researcher reaches based on his or her observation that the categories or themes identified are no longer fed with new information or the informants no longer provide new information for the researcher. Thus, the researcher went on to collect data from the third case, as well. However, data collection procedure was finalized after the third case. Speaking of the number of cases, it is worth mentioning that scholars seem not to converge on a specific number of cases that suffices for a multiple-case study partly because a small number of cases would not yield rich and thick descriptions of the case while many cases would result in mass volumes of insight into a case, which may be difficult to handle and reduce into meaningful interpretations of cases. Most authors and scholars hesitate to give an exact number of cases but Eisenhardt (1989) states four to ten cases is the common perception. Fewer than four cases would risk grounded theory but still they can provide convincing details about the case as long as the cases have sub-units of analysis or an embedded design. The present study has embedded units of analysis or participant groups (university administration, university teaching staff, TDZ administration or TDZ firm administration) and reached saturation after the third case- originally the study was projected to have four cases; however, once saturation had been reached, the fourth case was removed from the study.

3.7 Data Analysis

As for data analysis, firstly, an initial code list was designed which was later improved following the conduct of the pilot study. A code list can be explained as a list of codes in which themes and sub-themes from literature, data and assumptions of the researcher are used for the purpose of data reduction **(**Miles & Huberman, 1994). Using the finalized version of the code lists for the interviews and the document analysis (see Appendix D and Appendix E), data were reduced under some themes which were later used to explain the research questions of the study. While doing so, content analysis technique has been employed for data analysis. Content analysis is a technique to help researchers reduce mass volumes of qualitative data by applying a matrix of codes to specific nodes or patterns in the data (Patton, 2002; Yin, 2009). In this study, content analysis technique has been used via MAXQDA Software which makes it possible for the researcher to process, evaluate and interpret qualitative data systematically; that is, transcribe data, code parts in data, store all data in the study, write memos for reflection on data and provide graphic illustrations of the data segments or patterns if needed.

Furthermore, descriptive statistics of cases, participants and documents have been provided by tabulation of data as suggested by Miles and Huberman (1994), which clusters data and helps researcher represent data in an organized manner. The data from interviews and documents have been processed in the form of both within-case and cross case analyses. Within-case analysis provides thick descriptions of each case holistically with the purpose of building more familiarity with each case. Across case analysis, on the other hand, goes further than forming an initial opinion of each separate case and looks through cases to identify confirming or opposing patterns with the themes selected for analysis. Cross-case validation also aims at seeing the similarities or differences across cases (Eisenhardt, 1989; Yıldırım & Şimşek, 2016; Yin, 2009).

3.8 Validity and Reliability

Validation or trustworthiness of research is an indispensable part and concern of qualitative research as it determines the extent to which a study complies with ethics and soundness of scientific inquiry. Just as positivist approach to science and research requires some basic trustworthiness parameters such as validity and reliability, interpretive paradigm also bears some principles that aim to clear any skepticism off qualitative research. LeCompte and Goetz (1982) borrow from quantitative research and list these principles as internal validity, external validity, reliability and objectivity (as cited in Yin, 2009). Later, Lincoln and Guba (1985) introduced more qualitative-friendly version of these terms as credibility, transferability, dependability and confirmability. Specifically, first two correspond to validity and the last two match with reliability. Other researchers and authors extend and contribute to these principles (Miles & Huberman, 1994; Yıldırım and Şimşek, 2016; Yin 2009). However, a more concentrated form of these principles common among prominent researchers and authors can be listed as validity and reliability. These two terms form the basis for further discussion of trustworthiness of this research study. First, a discussion of these two terms have been provided; then, strategies used in this study to achieve them are provided.

Validity in a case study is achieved when a researcher makes necessary adjustments on the course of the study to fully grasp the meanings and experiences in a case; as a result, a more precise account of the case is possible. The study must have internal validity or present credible analysis and results of the cases. External validity, on the other hand, is related to results of a case study's being analytically generalizable or transferable to other cases in the forms of experiences and exemplary themes unlike its equivalent of generalizing to population in quantitative research (Miles & Huberman, 1994; Yıldırım and Şimşek, 2016; Yin 2009).

Reliability can be defined as results and procedures of a study being consistent, and that it can be repeated to yield similar outcomes. A case study

must have both internal and external reliability; the former being associated more with consistency when two or more researchers/raters converge on the same findings to explain a phenomenon. The latter is more related to confirmabiliy in that findings or interpretations from a case study should be able to be repeated or confirmed in similar cases (Miles & Huberman, 1994; Yıldırım and Şimşek, 2016; Yin 2009).

In order to achieve validity and reliability in this study, several strategies were employed: prolonged engagement in the field, audit trail or case study protocol, triangulation of data sources, peer review, member (informant) check of findings and interpretations, rich and thick descriptions as well as description of cases including direct quotations, a pre-determined and later enriched code list, and data analysis based on a thorough discussion of framework. Each of these measures have been explained below:

Prolonged engagement in the field and persistent observation. The researcher obtained approval from METU Applied Ethics Research Committee; using this approval document the researcher accessed the research sites without obstruction. As suggested by Creswell (1998), building trust with participants, learning their culture and remedying any misinformation was vital for validity of data from participants and the research site. The researcher did so to exploit the research site and interpretation of participants to arrive at varied data sources. The study was not a longitudinal; the researcher spent about six months to visit and revisit the research sites in three different cities to collect data. The researcher built trust with the gateway persons and the participants, paid several visits to the research sites and collected fundamental documents from the research sites.

Audit trail/Case Study Protocol. An audit trail Lincoln and Guba (1985) or case study protocol Yin (2010) helps a researcher to clarify the stages, procedures and rationale of conducting a case study; the researcher can systematically document steps, procedures and background to the study; the researcher can also make decisions for the write-up from the onset of the study,

which all add to the validity of the study. The researcher provided informed consent paper to participants which had the purpose, overview and data collection procedures of the study. Following a systematic review of prospective participants, participants were contacted; key documents from each site were also accessed. The researcher also had a draft plan on the onset of the study on how to analyze data, present findings and report them. These preparations help researchers to have a more valid construct for research.

Triangulation of data sources. The researcher triangulated data sources by using multiple forms of data- interviews and documents- to increase the trustworthiness and robustness of results (Bogdan & Biklen, 2007; Eisenhardt, 1989; Yin, 2009). Specifically, semi-structures interviews were the primary sources of data but they were supplemented or triangulated with the use of strategic plans and activity reports from universities, data from ministries etc.

Peer review, debriefing or external audit Peer review is a strategy for researchers to increase the validity of a research by getting other researchers or peers to review the research measures and processes (Creswell, 1998; Yıldırım & Şimşek, 2016). The researcher got external researchers to check his research design and tools before the pilot study; and also the researcher got his supervisor to check the whole process of the research. In addition, in two international conferences, an overview and methodology of the study were presented to obtain feedback for improvement during the course of the study.

Rich and thick descriptions. Creswell (1998) informs that researchers need to provide detailed description of the research, research site and interpretations of participants to allow for transferability to other cases. The researcher provided rich and thick descriptions on research procedures, each research site and interpretations of each participant.

Member (informant) check of findings and interpretations. In order to increase the validity of data, the researcher transcribed the recorded interviews; once

transcriptions were verified by the participants, the data was finalized for data analysis.

The researcher also used frequent *direct quotations* to give a more reliable account of the interpretations of the participants. Moreover, a pre-determined and later enriched *code list* helped researcher to operate more reliably during data reduction; thus, the researcher carried out a data analysis based on a thorough discussion of framework.

3.9 Limitations

This research study is not free from limitations; certain shortcomings can be listed as state versus foundation universities and their potentially diverse TDZs, consideration of developmental stages of TDZs, additional unit of analysis under cases, and sampling factors regarding geographical distribution and degree of the development of regions.

To start with, a selection of state-only universities and their embedded TDZs may hinder more diverse data patterns since foundation universities may also have potentials to explore and learn how university-industry relation is established and experienced in these contexts especially in terms of contextual dynamics, management, institutionalization processes, and degree of impact on policy.

Secondly, the population of TDZs in Turkey, 69 founded and 55 currently operational, has not developed equally since some are at pre-operational stage; some are in their early period of establishment; some are developing ones; and some others have already been through developmental period and started pushing the frontiers of Europe, North America or South East Asia. Thus, developmental stages of TDZs may also play a role in the intensity and future of university-industry relations. This study draws a sample from TDZs which were established ten or more years ago.

Third, the multiple case-study design could have been enriched by inserting additional units of analysis under cases such as employees in TDZs or

intern students involved in innovation and entrepreneurship at universities, whose data would have provided additional variation and richness in the data so the researcher could explore more into the phenomenon of university-industry relations.

Lastly, further consideration of sampling factors would enable a more distributed selection of TDZs in Turkey's geography; the selected universities and TDZs are from only metropolitan cities where accumulation of industry and qualified human capital potentially eases and contributes to university-industry relations. However, other regions (in Anatolia) have diverse and local industrial, economic and socio-cultural realities that would provide additional patterns to the data collected in ways that factors that boost or hinder university-industry relations would have been extracted from the data better.

CHAPTER 4

RESULTS

This section consists of two parts. First, the results of the within-case analysis have been reported for the three cases in the study. Second, the results of the cross-case analysis have been presented.

4.1 Within-case Findings

Analyzing single cases sets the ground for a more informed cross-case analysis. Therefore, each case is analyzed and findings pertaining to that case is reported consecutively under four categories; namely, contribution of TDZs, conflicts of TDZs, zone of influence of TDZs, and suggestions for TDZs.

4.1.1 University A and Its TDZ

4.1.1.1 Contributions of TDZs

Data reveal that TDZs have several contributions. The superordinate theme category of 'contributions of TDZs' can be split into five themes; namely, economic anchor or leverage for economy, showcase of country image, mutualism between university and TDZs, international outreach of knowledge and technology production, and socio-cultural development.

Economic Anchor / Leverage for Economy. Several participants have stated TDZs' leverage role in economy and TDZs' ability to meet what is expected of them in terms of economic development, exports, etc. Participants hold the view that Turkey's jump start into the league of top economies -knowledge economy is dependent on the success of TDZs initiative, adding that Turkey's

cumbersome economy is not sustainable with only mass production of goods or via heavy industry; value-added products and services via TDZs offer Turkey a promising seat in the league of international knowledge economies where national export-import balance is sustained and high volume of foreign investment is attracted to Turkey. While a university administrator views TDZs as export boosters, two TDZ administrators say the state considers leading TDZs such as that of University A an integral part of Turkey's economy. A TDZ administrator exemplifies TDZs' being an economic anchor as:

> High value added technologies, products and services are a key motto of direct contribution to Turkey's economy. To give an example, there is a spin-off company in our TDZ operating in micro-electro-mechanical systems. Via a university-based research center together with companies that are based on the output of doctoral dissertations, they produce and export Turkey's first microchip to the United States at 1.7 million dollars / kg where Turkey's average is 1.4 dollars / kg. This is the expected contribution; this way, the gap between Turkey's import and export can be closed. (Ekonomide katma değeri yüksek teknolojiler ürün ve hizmetler ekonomiye doğrudan katkının kilit mottosu. Bir spin-off şirketi var bir araştırma merkezi aracılığı ile yapılıyor, üniversiteden çıkan bir araştırma merkezi, yanında doktora tezlerinin çıktılarından oluşan şirketler oluşturuyor. Bu şirketler aracılığıyla da bazı ürünler çıkarıp bu ürünleri ihrac etmeye çalışıyor. Türkiye'nin ilk mikro çipi buradan Amerika'ya ihrac edildi. Özellikle 1.7 milyon dolar / kg olarak ihrac edildi; Türkiye ortalaması ise 1.4 dolar / kg. Hedeflenen katkı bu işte. Cari açık kapayabilemek için önemli.) - TECHADM2-

As it is obvious in this TDZ administrator' comments, Turkish TDZs can produce value added products and services which are worth tens or hundreds of times more than the investment for the microchip example- a concrete example to leverage Turkish national economy. Moreover, university staffs note that TDZs are a state investment policy - an investment in knowledge, technology and human capital to produce value added products and services which was no more sustainable with the outdated industry production of 1980s and 1990s. A TDZ administrator also believes the state sees TDZs as a leverage for technological and developmental leap for Turkey. A TDZ firm administrator adds that TDZs are the result of a policy set by the state. Besides, TDZ administrators and a TDZ firm administrator emphasize that local

potential determines the suitability of founding a TDZ in a city as TDZs are also catalysts of local development.

Showcase of Country Image. Most participants hold the view that TDZs are the showcase of a country that contributes to the country's visibility and competitiveness. University A's TDZ and other top performing TDZs with higher volumes of value-added product and service generation, and an internationalization goal are believed to be displayed in the showcase of Turkey by the participants; and thus, they contribute to Turkey's visible, competitive and knowledge-based country image. For example, a university administrator stated that:

> The prominent expectation from TDZs is that they focus on research and development, better say, focus on research and development in close contact with universities. Research and development is a must to produce innovative products or services. Now that TDZs are research and development centers, they are expected to contribute to Turkey's visibility and scientific and technological development. (Teknokentlerden en önemli beklenti Ar-Ge yapılması ve üniversite ile işbirliği halinde Ar-Ge yapılması, yenilikçi ürünler ve hizmetler için Ar-Ge şart, hani teknokentler de Ar-Ge merkezleri olduğu için bu anlamda Türkiye'nin tanınırlığı bilinirliği, bilimsel ve teknolojik ilerlemesinde katkı yapmaları bekleniyor) - UNIADM 2-

The university administrator here touches on the contribution of TDZs to Turkey's country image in terms of visibility in the international arena and scientific and technological development.

Mutualism between University and TDZs. Universities and TDZs mutually contribute to one another and each party benefits this relationship. Universities benefit this mutualism via employment and internship for their students and graduates as well as applied research opportunity for academics and students, while at the same time TDZs enjoy this mutualism in forms of ready-made, abundant and easily accessible highly-skilled human capital. A consensus has been reached on the role and contribution of TDZs on employment and internship by all four groups of participants. Especially during their master or doctoral studies, students prefer to work at TDZ firms. Student have the chance to apply what they have learned in classes but according to TDZ

administrators, fewer social sciences student employment is a weakness in this mutualism between universities and TDZs. They also note that University A is a source of highly skilled work force, which is something Turkey lacks. For a TDZ firm administrator semester-long internship is a critical need for TDZ firms so they can invest more in their interns. Moreover, a compulsory TDZ internship at undergraduate level is a suggestion.

International Outreach of Knowledge and Technology Production. Some TDZs like University A's aim at reaching out internationally via especially defense, software or ICT clusters. Their regional or peripheral attraction and impact can also be in forms of TDZs mentoring other national and international TDZs in their hinterland as well as TDZs' expansion into their vicinity in forms of branches, or thematic-boutique TDZs. A TDZ administrator says that University A's TDZ is broadening its horizon and sharing know-how with TDZs such as those in Pakistan, where they participate in the foundation of TDZs. Another TDZ administrator states that University A' TDZ is developing a business model for franchising its accumulated knowledge and experience to other regions or countries.

Socio-cultural Development. Some participants mention the contribution of TDZs to social and cultural development of the society, adding that TDZs reach out to the public and interact with people in multiple ways such as connecting and exchanging with local community, providing a social and cultural context for academics, researchers and students etc. Participants are convinced that University A's TDZ, in particular, creates a socio-cultural environment, products and services that reach out to public. While university administrators believe TDZs fail to directly reach out to public, TDZ administrators emphasize business to business as well as business to consumer services or products which are ways for TDZs to reach out to customers or the society. According to a university staff TDZs indirectly help improve socio-cultural development of a community by channeling welfare and skilled work force to a region, which later necessitates socio-cultural events.

4.1.1.2 Conflicts of TDZs

Data reveal that TDZs have several conflicts in relation to their organizational structure, relationship with their universities, and their management, missions and core operations. The superordinate theme category of 'conflicts of TDZs' can be split into six themes; namely, critical mass, ownership in knowledge and technology production, cultural misfit, inadequacy of TDZs, managerial conflict, and legal gap and political conflict.

Critical Mass. Participants express their views on universities' and TDZs' ability to reach a critical mass of knowledge and technology production capacity, human capital, capacity for generating value-added products or services etc. - they express 'value-added' here as doubling or tripling the profit against investments. In the interviews, TDZ administrators state that University A's TDZ is a pioneering contributor to knowledge and technology production in Turkey in forms of patents, copyrights, utility models, and industrial design and software thanks to availability of University A's skilled academics and graduates, implying that University A's TDZ has reached a critical mass of knowledge and technology production capacity and human capital.

Ownership in Knowledge and Technology Production. Participants mention that a conflict over ownership of knowledge and technology production phenomenon arises between 'conservative ivory tower academics' and university on one side of the continuum and entrepreneur academics and TDZ on the other. A TDZ administrator explains:

> Knowledge produced by natural sciences may not fit with the demands of the market. Necessary knowledge for a product is present but its marketability is obscure. It takes a long time to transform basic knowledge into a marketable product or service. To exemplify, implants produced in one of University A's research unit are a breakthrough but their certification takes about 10 years due to clinical tests and investment. This pure research is not worth turning into a marketable product for us as the TDZ. (Temel bilimlerde üretilen bilgi ürünleştirme ve pazarlama açısından tam örtüşmeyebiliyor. Ürün için bilgi var ama nasıl satacaksınız kısmı belirgin değil. Temel bilgi çok önemli ama uzun vadede ürüne dönüşebiliyor. Örneğin, üniversitenin bir

> araştırma biriminde üretilen implantlar çığır açacak bir buluş fakat bunun sertifikasyonu 10 yıl, klinik testler ve yatırım gerekiyor derken. Bu araştırma teknokent olarak bizim doğrudan ticarileştirebileceğimiz bir araştırma değil). -TECHADM2-

The TDZ administrator in this quote states that marketability precedes knowledge and technology production for TDZs. A university staff mentions that a miscommunication exists between universities and TDZs in terms of transforming pure knowledge into marketable products or services via research and development. Another TDZ administrator confesses that University A's TDZ is structurally closer to a science park - type of technology development zones dominated by universities-; conflicts potentially arise since the priorities of university and industry do not converge much, adding that TDZs are more dependent on universities than universities depend on TDZs because of TDZs' dependence on human capital, research, and knowledge and technology generation from universities. A TDZ administrator complains that some university staffs resist such change as they believe in pure academic knowledge and technology production, and research and development - a change in the academics' perspective is necessary. To conclude, ownership in knowledge and technology production is a conflict zone in University A and in its TDZ in a way that while participants from University A's TDZ seem to own the innovation, and research and development-oriented marketable knowledge and technology, the participants from the university side seem to own the pure knowledge and technology production, and research and development for the sake of knowledge.

Cultural Misfit. Some participants stated the mismatch between Turkish TDZ business model and those abroad by giving the example of a Turkish Silicon Valley dream such that business culture in the US (a free enterprise system) and Turkey (prevalence of etatism- the idea of state's control over policies regarding economy, society or both at a certain level) do not converge; therefore it is a dream to imagine a Turkish Silicon Valley soon. A university administrator narrates an official visit to Silicon Valley where one could easily

observe the difference in organizational structure and management, adding that Silicon Valley has no TDZ executive committee like in the Turkish example - where it is likely to say that state's interventionism is visible via membership of a state representative, local governments or a university administrator. Moreover, Turkish state invests in and subsidizes TDZs (in forms of funds, tax waivers etc.), and supervises operations of TDZs via ministries and laws. Besides, TDZs are embedded in university campuses. As a result, state control is visible on the Turkish TDZ model; however, different models prevail in the international environment for TDZs such as the one in Silicon Valley - a free-enterprise version. Thus, a clash of TDZ business culture is evident.

Inadequacy of TDZs. Participants express views on inadequacy of TDZs in regards to functionality despite all investments such as funds, tax waivers, channeling qualified human capital etc., adding that only established TDZs like University A's are truly functional while most others have a resource draining profile. University administrators agree that TDZs are more functional compared to their first years in operation when they were not well understood by the society and the industry; the companies have also evolved into firms with research and development focus; University A's TDZ is a truly functional TDZ for them. A university administrator adds; however, that in Turkey only 10 to 15 TDZs would be considered truly operational and functional. TDZ administrators are keen on the idea that developmental stages play a role in functionality; not to mention the amount of time it takes for a TDZ to become truly operational and functional in about 6-10 years. A TDZ administrator stresses that TDZs are functional otherwise they would not have survived they years and supervision from the state; subsidies and tax waivers would not have been extended until 2023. A TDZ firm administrator also finds TDZs functional - especially those in established TDZs like University A's TDZ. TDZ administrators do not attribute a resource-draining profile to University A's TDZ but to some newly established TDZs.

Managerial Conflict. Participants mention that conflicts also arise in the management of university-industry relations due to changing nature of roles and practices of university administration or manager-academics; adding that for some people, 'traditional' academics are now viewed as knowledge workers, manager-academics are viewed as corporate managers, and traditional university as a community of scholars is now viewed as work places due to recent trends like New Managerialism- the power, status and role of manager-academics declined as New Managerialism found supporters and widespread practice (Deem et al., 2007); however, it seems that Turkey is yet to embrace/absorb it. A university administrator expresses that in strategic issues the university administration provides guidance leaving daily operations to TDZs without much involvement. However, then, the university administrator confesses that the university administration interferes with the management of University A's TDZ via the presence of rector and vice-rector in the executive board of University A's TDZ; adding that university administration favors a strategically dependent but operationally independent TDZ in daily operations:

> TDZs have a responsibility here… I mean we, as the university administration, spared land about 1 million square meters, spared skilled human capital, paid importance…University expects something in return both in terms of guiding strategic decisions and revenue. (…yani teknokentin şöyle bir sorumluluğu var yani üniversite bizim özelimizde orda bir arazi ayırmış, 1 milyon metrekare ayırmış. Ve bunun için kaynaklar ayırmış, yani insan gücü ayırmış, şey yapmış önemsemiş, bunun karşılığında da birşey bekliyor üniversite yani. Hem yönetim anlamında diyor ki ben hani biraz ben yönlendireyim üniversitenin şeyleri açısından hemde maddi olarak bekliyor.) -UNIADM1-

The university administrator here in the quote has a 'landlord' attitude justifying dominance over TDZs by the resources allocated to TDZs. TDZ administrators assert that they professionally manage University A's TDZ and fulfill their role in the scenario set by the Technology Development Zones law to promote university-industry relations. A university administrator believes the responsibilities between university and TDZ are set clearly. Similarly, a TDZ administrator advocates that University A's TDZ is an integral part of University A so there is no problem in management or coordination since

TDZs and universities have their own structures; University A's case is an established one where everyone knows what to do. However, another TDZ administrator believes that, horizontally, management and role distribution are too scattered, and that current management structure is too complicated, therefore roles and responsibilities need to be defined more strictly; too many positions are doing the same job, which complicates doing duties.

A university administrator complains that top administrators in universities, by default, become responsible persons for TDZs and explains that when new administration cadres come to office there is the risk of individual characteristics of the administrator affecting the management of university-industry relations. Another university administrator criticizes TDZ administration because they always complain about university administration's slowing down the operations of TDZs. Similarly, a TDZ administrator expresses complaints about university administration's slowing down the operations of TDZs, adding that university administrators' automatically becoming a member of TDZs executive committee risks professionalism in management of TDZs since they may be professional academics, which does not necessarily guarantee their becoming professional administrators for TDZs-this is the case mostly in developing TDZs. A TDZ firm administrator is critical about conflicts among university administrators and TDZ administrators; adding that the needs and expectations of firms are not communicated well to university administration; moreover, university administration and the hierarchy embedded into it hinders a better communication between these two parties. TDZ firm administrators also support the view that, excluding the truly established and leading TDZs, TDZs fail due to structural and managerial problems: unprofessional management of firms etc. A TDZ firm administrator also focuses more on the mediatory role of TDZ administration if a need or conflict arises.

Legal Gaps. Participants in the case of University A express their views and concerns about legal aspects of university-TDZ relations; they state a

misconception about the nature of research and development in that not all research and development activity will succeed but this will also bring issues of legal accountability of 'the money lost'; TDZ firms instinctively respond to survive at all costs- be it not doing real research and development but turning to projects with no real productization potential, or be it abusing the law; two separate legal entities- one with market focus and one with several missions (education, research, public service)- also create legal conflicts regarding profitability and accountability dilemma. University staffs affirm the intervention of university administration into TDZs considering the efficiency of TDZs and reputation of universities. They fear TDZs may abuse the situation and care only about maximizing their profits rather than doing research and development or producing value added products or services; therefore, they should not act independently from university administration especially in strategic decisions, adding that this may arouse concerns about liability.

A university administrator states some TDZs may be abusing the law and draining resources and that there is state supervision to eradicate this situation, warning that tax waivers do not always correspond to a resource draining profile because waivers aimed at research and development does not necessarily have to end in a product or service. Another university administrator says it is not the case for University A's TDZ but some resource draining TDZs do exist and that they need to be strictly controlled, signaling that a legal gap about lack of supervision exists. A university staff is critical and says that some firms in underdeveloped cities open offices in TDZs for the sake of benefitting tax waivers and subsidies- some of which the university staff knows personally. TDZ administrators are also convinced that there must be strict controls and punishment; however, paperwork for tax waiver or subsidy can be exhausting. A TDZ firm administrator welcomes the idea of tax waiver and subsidies especially for technology firm but questions the practicality of operating in a TDZ if no waiver or subsidy existed. The other TDZ firm administrator believes University A's TDZ is applying strict

measures against resource-draining firms but is critical that resource-draining firms always find a way to exploit legal gaps.

4.1.1.3 Zone of Influence of TDZs

Data reveal that TDZs operate in a zone of influence in which a set or category of (unidirectional, directional or multidirectional) relations exist among TDZs and the constituents of TDZs organizational environment. The superordinate theme category of 'zone of influence of TDZs' can be split into four themes; namely, entrepreneurship and innovation as drivers of transformation of higher education institutions, survival of the most institutional TDZs, patronage of knowledge and technology production policy, and patronage of higher education policy.

Entrepreneurship and Innovation as Drivers of Transformation of Higher Education Institutions. Participants emphasize that terms like entrepreneurship and innovation have been considered by many the drivers of the transformation of universities during the last few decades; and that issues such as "third mission" of universities -entrepreneurship- (Etzkowitz, 2003) challenge universities to change and adapt to interdisciplinary research and education demands, curricular demands or even more fundamental structural changes like research-intense universities. A TDZ administrator informs a third generation of universities (a more innovation driven and entrepreneurial university) is high on the agenda of higher education policy makers; this is a university model producing entrepreneurs -which is impossible without the presence and impact of TDZs. Another TDZ administrator adds that TDZs motivate involved parties to take interdisciplinary and transdisciplinary actions in that while producing a product or service engineers, designers and psychologists must be co-workers; a mutualism of social sciences and natural sciences is needed in university-industry relations; otherwise a successful firm led by a top engineer may fail due to a lack of knowledge and expertise in finance and marketing. While a university administrator fully embraces the ideas of entrepreneurship and

innovation, a university staff approaches them with caution and states that they should have little or no place in curriculum but rather they must be in the forms of centers or student clubs. However, a TDZ administrator is happy to see more students joining University A's TDZ with a notion of entrepreneurship and innovation due to University A's Entrepreneurship Center and entrepreneurship related courses in business administration department.

University staffs and university administrators object to shaping courses based on the needs of TDZs since university's mission is to generate students with fundamental knowledge and skills to adapt to any situation. A university administrator explains this objection as:

> TDZs do not have a direct influence on curriculum -they should not have. Feedback from TDZs is valuable when seeing current needs, feeling the current technology- they may have implications in the long run. However, I do not think TDZs must have strong influence. I feel a bit unsure…TDZs must not guide our teaching because we are not a vocational school and we do not produce technicians… Advising or working closely with firms that follow recent technology and produce innovative products or services makes it possible for us to become more familiar with the most recent technologies. Thus, we can reflect them into our teaching directly or indirectly especially in graduate studies, theses or projects. (Teknoparkların birebir müfredata bir müdehalesi yok ve olmamalı, tabi ki oralardan gelen feedback lerle bir takım ihtiyaçları hissetmek güncel teknolojiyi hissetmek, uzun vadede de olsa bazı yansımalar yapacaktır. Ama birebir bir etkinin olmaması gerektiğini düşünüyorum. Ben biraz arada kalıyorum, bizim eğitimimizi yönlendirmemesi lazım burası yüksekokul değil. Biz direkt birşeyler üreten teknikerler yetiştirmiyoruz ama güncel teknolojiyi takip eden yenilikçi şeyler üreten firmalarla çalışmak onlara danışmanlık yapmak bizim de güncel teknolojiye aşina olmamızı sağlıyor. Direkt veya indirekt bu kazanımları eğitimize yansıtmamıza neden olacaktır, graduate eğitime özellikle, tezlerin veya projelerin bir parçası olabiliyor burda.) - UNIADM2-

The objection of the university administrator in the above quote is mostly related to curricular pressures from TDZs and the idea that missions of universities are not limited to research only. TDZ administrators agree that it may be difficult to cause curricular changes especially at undergraduate level; however, marketing or finance kind of elective or non-technical elective courses will benefit future entrepreneurs, adding that it is relatively easier to channel masters or doctoral studies into TDZ's needs. Similarly, a TDZ firm administrator is content to see their needs are being integrated into courses or

elective courses such as behavioral economics which have started to address their firm's needs.

A university administrator notes a portion of teaching staff welcome the idea of entrepreneurship and have started their own firms in University A's TDZ. However, a university teaching staff objects to "forced" entrepreneurship in the forms of appointment criteria or performance indicator for teaching staff. A TDZ administrator suggests, on the other hand, that research and development, value-added products or academic paper can be performance indicators for teaching staff. A university administrator welcomes the idea of mission diversification of higher education institutions as long as all units or disciplines are kept intact - some disciplines may be intense such as technology or agriculture, adding that university's having a TDZ is a clear indicator that it is a research-intense university. University staffs; however, object to the idea of research-intense universities saying that such an initiative contradicts with the very existence of universities in that universities are commissioned to do both research and give education (teaching); adding that quality of education is a pre-requisite for quality research; and that mission of university is to produce master and doctoral graduates which later become scientists rather than technicians. A TDZ administrator also refuses the idea of research-intense universities since criteria to select them would be unclear, adding that universities are already doing research and giving education-TDZs is the catalyst interface for universities in regards to research and development so there is no such need.

Survival of the Most "Institutional" TDZs. As neo-institutional theory suggests, organizations - universities and TDZs in this case- adopt institutional controls prescribed by rationalizing agents in their organizational environments to gain legitimacy and, as a result, they similarize in time. Other TDZs and universities are the main constituents of the organizational field of TDZs as well as other organizations and groups such as ministries, non-governmental organizations, market, and the public. Universities and TDZs seek for

legitimacy or socio-cultural acceptance, safeguard their resources, and ensure survival that results from their adoption of institutional controls: regulatory, normative and cognitive controls. TDZs use the buffering strategy of ceremonial conformity or rationalized myths. Moreover, TDZs employ decoupling strategy and deviate from their standard formal structures and daily functions to guard their technical core and intra-organizational activities from external pressures. Finally, TDZs tend to resemble other TDZs by using three isomorphism strategies; namely, coercive, mimetic and normative.

Survival of the Most "Institutional" TDZs- Contextual Dynamics. Participants and data from document analysis reveal that TDZs are surrounded and shaped by external forces such as the state, the industry, non-governmental organizations, other universities and TDZs. State and competition from other universities and TDZs are two commonly stated external forces by the participants. In the document analysis of Technology Development Zone Law, Technology Development Zone Regulation and websites of University A and University A's TDZ, institutions of the external forces for University A's TDZ include Supreme Council for Science and Technology (BTYK), MoSIT, universities, institutes of high technology, other TDZs, research and development institutes, research and development centers, technology transfer offices, thematic TDZs, GDST, Ministry of Finance (MoF), Ministry of Environment and Urbanization (MoEU), Ministry of Development (MoD), HEC, the Scientific and Technological Research Council of Turkey (STRCT), Union of Chambers and Commodity Exchanges (TOBB- UCCE), Small and Medium Enterprises Development and Promotion Administration (SMEDPA - KOSGEB). In addition, some motives or pressures can be seen as external forces: pressures for internationalization, competitiveness, government policies and the public. Moreover, for University A, industry and non-governmental organizations are other shareholders and externally shape University A's TDZ. Also University A's TDZ reports to GDST under MoSIT. CoM supervises all activities of University A's TDZ via different ministries and councils.

Participants and data from document analysis reveal that TDZs are also shaped by internal forces or institutional norms and procedures of TDZs such as organizational structure, human resources, organizational culture etc. Data from a document analysis of Technology Development Zone Law, Technology Development Zone Regulation and websites of University A and University A's TDZ reveal that internal dynamics of TDZs include organizational structure, units, management, human resources, decision making, finance and supervision as suggested by Technology Development Zone Law. University A's TDZ is managed by an executive company which is a legal entity. University A's TDZ includes managerial units, incubators, production units and a technology transfer office. Human resources include research and development personnel, researchers, technicians, support personnel, software personnel, design technicians and designers.

Survival of the Most "Institutional"- Legitimacy. Data from interviews reveal that universities and their TDZs seek legitimacy in their organizational field and try to minimize uncertainty. A university administrator expresses that university-TDZ relations existed before TDZs in the forms of technology centers; however, it turned into a more institutionalized relation after TDZs were founded within universities. A TDZ administrator states, though, that University A's TDZ aims at becoming a visible and successful TDZ via setting an internationalization goal, becoming a member in international TDZ associations and opening offices abroad-imitating other international ones to gain legitimacy-. A university administrator mentions presence of international firms and offices abroad in Silicon Valley, Washington D.C. and believes that top five TDZs in Turkey can be considered international. TDZ administrators and a TDZ firm administrator agree that the state, STRCT and EU funding such as Horizon also motivate TDZs to internationalize. All participants are convinced that University A's TDZ is viewed, by all parties involved, as a prestigious and widely accepted TDZ; thus, a legitimate TDZ in Turkey.

Data from interviews can be merged with those from a document analysis of University A's Strategic Plan for 2011-2016 and MoSIT data for 2016. In the strategic plan, one of the main aims stated is "supporting the internationalization of University A's TDZ", and one of the strategies to reach this aim is developing concrete cooperation with successful technology parks worldwide. Moreover, in MoSIT data for 2016, one of the criteria stated in the calculation of performance index for TDZs is internationalization.

Survival of the Most "Institutional" TDZs- Buffer Strategies (symbolic coding and decoupling). Participants mention that TDZs buffer their structures and operations from their organizational environment by adopting a ceremonial adaptation to management, organizational structure, buildings and facilities; they also decouple their core activities and outcomes by diverging from their formal structures in regards to product specialization, sectorial proximity, supervision and human capital. TDZ administrators agree on the similarity of infrastructure and management across TDZs. When building new TDZs, a similar infrastructure is common. The commonality is visible in the formation of sub-units or technology transfer offices. TDZ firm administrators both stress the commonalities during the first few years or the establishment period. A university staff believes TDZ buildings, facilities inside such as socializing places, and the atmosphere inside them are similar in METU, İTU and Bilkent University in a way that one can feel the vivid dynamic atmosphere inside and feel the TDZ culture there, adding that Anadolu University's TDZ or that of Hacettepe University lacks this- the reason of which may be attributed to the importance given to TDZ by the administration. The university staff also draws attention to innovative ideas coming during a coffee break signaling the importance of socialization places within TDZs. A university administrator observes that TDZs differ when they are supervising firms or when they are accepting new firms. A TDZ administrator observes the top management - general directorship- is the same but down the chain of management the organizational structure may display differences.

Survival of the Most "Institutional" TDZs- Bridge Strategies (isomorphism). Participants state that TDZs also grow similar in time due to coercion from supervising state institutions and laws more than mimetic isomorphism. A university administrator mentions that there is prescription or pressure from CoM and MoSIT so TDZs look similar. TDZ administrators attribute coercive resemblance to TDZ Law and other state funding institutes such as STRCT. A TDZ firm administer agrees that laws are responsible for the growing similarity of technoparks. A university administrator states that TDZs try to mime exemplary TDZs such as University A's TDZ, İTÜ ARI and Bilkent Cyberpark. Even these three amongst each other look for ways to copy functional works and procedures such as setting internationalization goals, attracting foreign firms etc. A university staff is keen on the idea that TDZs copy working solutions. A TDZ administrator informs that University A's TDZ itself was designed by miming the international examples. Therefore, it is normal to expect others to follow University A's TDZ's lead. A TDZ firm administrator agrees that University A sets a good example to other TDZs.

Patronage of Knowledge and Technology Production Policy. Participants express views on influential parties (university, TDZs, state, etc.) and their complex ways of interacting with each other to impact knowledge and technology production policy makers such as direct and indirect influence, intimacy with policy makers, institutions, and proximity to the state, industry or clusters. A university administrator is suspicious about the impact TDZs may have on knowledge and technology production policy making, adding that political decisions precede decisions based on science. A university staff believes there exists a direct impact of TDZs on knowledge and technology production policy, adding that feedback from TDZs must be taken into account and that a bottom-up feedback channel must be established for a healthy relationship between policy makers and TDZs. A university TDZ administrator asserts that TDZs impact knowledge and technology production policy makers both directly and indirectly; adding that when a new fund or regulation is being

made policy-makers consult University A's TDZ; though indirectly, TDZs still impact policy making via university.

A TDZ firm administrator, on the other hand, believes TDZs have no impact at all because politicians make superficial decisions about knowledge and technology production policy and only concentrate on the output of TDZs while TDZ administrations and university administrations fail to sit together with policy makers and draft a joint plan. A university administrator thinks that policy makers such as MoSIT, MoF, MoEU, and MoD view leading TDZs like University A's TDZ, Bilkent CyberPark or İTÜ ARI as spokespersons of TDZs. TDZ administrators believe that University A's TDZ has close contact with the policy makers and that frequent visits to and from University A's TDZ by these policy makers show the intimacy between University A's TDZ and policy makers. TDZs can also be influential on policy makers via institutions. All participant groups, except for university staff, are aware of the non-governmental organization - Association of Technology Development Zones (ATDZ). They believe TDZs impact knowledge and technology production policy makers via this institution and because University A's TDZ is located close to the policy makers.

Patronage of Higher Education Policy. Participants state their views on the parties involved (university, TDZs, state, etc) in higher education policy making; they observe the influential and diverse ways they interact with each other to impact higher education policy by using strategies such as exerting direct and indirect influence, and exerting influence via universities or institutions.

A university administrator believes TDZs do not directly impact higher education policy makers; similarly, a TDZ administrator believes TDZs have little and indirect (via University A's university administration) impact on policy makers and says that:

> I believe we are not involved much in policy making. May be not much but there was something with the patent issue… There was a problematic statement in regulations. Policy makers willingly listened to our suggestions. I personally believe that we are not much related to higher education policy

> making. It's more like we communicate such a need to university administration, and they probably communicate it to policy makers. (Biz çok dahil olmuyoruz diye düşünüyorum. Çok fazla değil ama patentlerle ilgili bir mesele vardı orda kalkması gereken bazı kanunlar var ki bununla ilgili görüşlerimiz oldu sağ olsun dinlediler. Ben kişisel olarak yükseköğretim politikalarında çok fazla ilişkimiz olduğunu düşünmüyorum. Daha çok biz A üniversitesine iletiyoruz A üniversitesi oralara iletiyordur diye düşünüyorum).- TECHADM1-

A university staff and a TDZ firm administrator note the ideal is to expect such an impact, noting they have little or no information on the issue.

4.1.1.4 Suggestions for TDZs

Data reveal that there are several suggestions for TDZs. The superordinate theme category of 'suggestions for TDZs' can be split into three themes; namely, networking strategies of TDZs, ecosystems for TDZs, and other remedies or resolutions for TDZs.

Networking Strategies of TDZs. Participants mention various methods of networking with other TDZs and firms. Networks is a fundamental issue in organizational analysis especially with a focus on organizational field. From a neo-institutional perspective an analysis of complex networks of TDZs in a wider context - organizational field- may prove useful in gaining insights about how TDZs develop their structures and operations.

A university administrator and TDZ administrators are aware that ATDZ in Turkey is an active non-governmental organization within the institutional network of TDZs. TDZ administrators emphasize the international network of TDZs such as International Association for Science and Innovation Parks. On the other hand, TDZ firm administrators limit networking strategy to other firms and other TDZs. Networking via joint-projects seems to be a common well-known strategy for all four participant groups in a way that firms or TDZs work on joint-projects to benefit subsidies, form clusters and to exchange know-how. A university administrator remarks that networking via personal contact is more common than networking via institutions. TDZs also form a teaching-learning network in the sense that new firms learn from

established ones just like newly operational TDZs learn from established TDZs such as University A's TDZ as suggested by a university administrator and a university staff. A TDZ firm administrator, however, claims that a teaching-learning network arises only out of financial necessity; for example, firms subcontract firms with already existing educational services rather than setting up education units of their own. A university staff and a TDZ administrator view competition as natural and acceptable. However, another TDZ administrator prioritizes networking and enlarging the volume of production and making business over competition. A TDZ firm administrator shares a similar concern and adds that there is a vicious competition cycle and favoritism in business making:

> The large scale companies are problematic. The point is to help smaller scale firms but partly due to politicians we cannot lift barriers. Leading large scale companies get the job just because they are trademarks. Even if, as a smaller scale company you offer more efficiency, when a foreign-investment trademark is in the game, the whole picture changes against smaller scale firms. What happened to our Turkish first policy? Sometimes our firm is the only Turkish software company in a bid but just because they wish to report to their directors saying they work with HP, we lose the bid. (Büyük şirketler sorunlu. Aşağıdaki firmaları beslemek olsa da yukarıdan da siyasiler de istiyor ama bariyerimiz şu ki marka ile çalışılmak istenmesi. Bir yabancı firmanın teklifi daha verimli yerli firmaya göre, HP gelince ihale onlara gidiyor. Milli olmak nerde kaldı? Tek milli yazılım biz oluyoruz bazen mesela ihalelerde. HP ile çalıştık demek önemli rapor ettikleri yerlere diğer firma daha iyi birşey sunsa bile). - TECHFIRM2-

Ecosystems for TDZs. Participants visualize ecosystems for TDZs at regional, national and international levels to suggest a holistic look at mechanisms of university-industry relations. Some participants also depict micro ecosystems such as clusters and thematic TDZs to suggest a holistic look at mechanisms of university-industry relations at local levels.

A TDZ administrator states that TDZ ecosystem can also be at regional level such as the example of Konya Food and Agriculture University and its TDZ, and Gaziantep TDZ or be at local level like any other Anatolian TDZs. TDZ administrators and TDZ firm administrators welcome the idea of clusters within TDZs such as defense or medicine where firms from the same sector collaborate to produce products or services mainly in, for example, defense or

medicine, adding that specialized TDZs or thematic TDZs are also a new reality that feed on and reflect regional economic potential and development-TDZ in Konya's Food and Agriculture University specializes in agricultural machinery, for example. TDZ administrators believe that some truly established and leading TDZs in the three biggest cities in Turkey as well as those TDZs in Anatolia such as Gaziantep, Karadeniz Technical University, Fırat, Mersin, Kayseri can be considered functional ecosystems - this is partly due to the region's level of development, potential for industry, and potential of the university. A university staff is critical and says that some TDZs have been established in cities where industrial potential and skilled human capital is scarce. Both university staffs think that as long as a province has the potential, then setting up a TDZ there is acceptable; otherwise, disregarding the human capital and region's dynamics -just out of a mere competition with other cities- setting TDZs would not be ideal.

Other Remedies or Resolutions for TDZs. Further suggestions have been expressed in the data ranging from making TDZs more sustainable so that they can deliver what they have been originally designed for to eventually closing TDZs as punishment.

A university administrator believes a better management model is necessary and that more technology investors are needed like those in Silicon Valley. University staffs suggest that more strict supervision by the state is the key to success and that increased collaboration of university and TDZ in research and development, know-how sharing and joint production of knowledge via publications should become the priority. TDZ firm administrators believe more subsidy for firms or a research and development-only entrance criterion would work for a more functional TDZ model.

4.1.2 University B and Its TDZ

4.1.2.1 Contributions of TDZs

Based on the data, many contributions of TDZs can be extracted and categorized under five sub-themes: economic anchor or leverage for economy, showcase of country image, mutualism between university and TDZs, national or local outreach of knowledge and technology production, and socio-cultural development.

Economic Anchor / Leverage for Economy. Participants broadly voice out the belief that Turkey needs to cease to be a developing economy and become a developed country, and turn into a production economy before it is too late. A TDZ administrator comments that if Turkey wants to break its shell and develop more, knowledge and technology production must not be limited to TDZs only; there must be collective action in all layers of the society to reach 2023 ideals of the country. A university administrator exemplifies economic leverage of TDZs as:

> If you settle for less, you produce at very low profit margins. However, if you produce an item for 1 lira and sell it for let's say 180.000 liras, then you create added value. That revenue enters your economy and welfare of the public increases. TDZs are promising in that sense. (Size biçilen rolü yaparsanız düşük kar marjıyla uzun yıllar aynı tür üretim yapar durursunuz. Ama 1 liraya üretip 180.000 liraya satıyorsanız orda büyük bir ekonomik değer vardır. O para bütçeye girer toplumun refahına yansır. Teknoparklar bu anlamda gelecek vaad ediyor ...) - UNIADM3-

The university administrator here exemplifies the magnitude of how TDZs' production capacity can be channeled into national economy to achieve development. Another university administrator supports this view and adds that although direct return to university from TDZs is low, the money enters the economy; tax will be collected and will be channeled into further research, adding that it's better to see the greater picture like this. Some of the participants state that TDZs came into being as a result of the state policy. A university staff says that state asked for output or products as a result of

research at universities, adding that this is a late step from the state as the world has gone a long way in TDZs. A TDZ administrator views TDZs more than a trend but a must, adding that the state noticed this too late when others today are embracing novelties such as Industry 4.0 - which broadly refers to the fourth industrial revolution in which there is continuous communication and interaction among humans, humans and machines, and machines and other machines over the net as opposed to the earlier versions: Industry 1.0-mechanization of manual power, Industry 2.0-electrification, Industry 3.0-digitilization (Liao, Deschamps, Loures, & Ramos, 2017; Roblek et al., 2016).

Showcase of Country Image. A majority of participants believe TDZs are strategic organizations in that they contribute to Turkey's country image nationally and internationally, adding that they make Turkey more visible and competitive. For example, a TDZ administrator states that:

> TDZs act as the showcase of technology produced in Turkey. Competitive outputs of TDZs are visible not only in Turkish market but also in international markets; thus TDZs are critical and have strategic importance, they also now have better coverage in the media: products have TTO approved label in national advertisements. (Türkiye'de üretilen teknolojinin vitrini gibi oldu teknoparklar aslında. … teknoparkların çıktıları sadece yurt içi değil yurt dışı ile de rekabet edebilecek şekilde gündemde; teknoparklar bu açıdan çok kritik ve stratejik önemde. ... Basında da yer buluyor teknokentler artık, TTO onaylı ürünler denilerek). - TECHADM3-

Here, the TDZ administrator draws attention to TDZs' acceptance nationally and their international impact.

Mutualism between University and TDZs. A mutual relationship exists between universities and TDZs in which they mutually contribute to one another. Universities benefit this mutualism via income from rents, employment and internship for their students and graduates as well as income, intellectual development and applied research for academics (they keep themselves up-to-date with newest knowledge and technology) and students, while at the same time TDZs enjoy this mutualism in forms of ready-made, abundant and easily accessible highly-skilled human capital. All four groups of participants agree

that TDZs contribute to students' employment and internship. A TDZ firm administrator believes TDZs provide economic benefits both for firms and university, and the country at large. A TDZ firm administrator adds that TDZs offer education and internship opportunities and that there is a social and educational exchange in a way that academics, students, administrators interact in multiple ways. A university administrator informs that University B's TDZ helped university draft a research strategy in a state funded project via attendance of expert personnel from TDZ who know about research and development, how universities work, recent trends in industry, and those who can report data from non-governmental organizations like chambers. A TDZ administrator mentions that university staff advise and authorize TDZ projects; most recent trends and innovations come in front of them; thus they can keep themselves updated in their fields thanks to TDZs. A TDZ firm administrator complains about the high rents on campus compared to rents in the financial district of the city though it is a source of income for universities.

National Outreach of Knowledge and Technology Production. Some TDZs like that of University B's aim at reaching out nationally and locally to other TDZs for knowledge and technology production. Their local peripheral attraction can be in forms of TDZs mentoring other national TDZs in their hinterland as well as TDZs expanding into their vicinity in forms of branches, or thematic-boutique TDZs. A TDZ administrator cites noteworthy figures about spin-off firms set up by academics and a dominating rate of start-up companies within their TDZ, adding that University B's TDZ is a leading attraction site for real knowledge and technology production based on these figures. The TDZ administrator also gives the example of a mentorship program that will allow them to mentor other TDZs in terms of technology transfer.

Socio-cultural Development. Some participants mention the contribution of TDZs to social and cultural development of the society, adding that TDZs reach out to the public and interact with people in multiple ways such as connecting and exchanging with local community, providing a social and

cultural context for academics, researchers and students etc. According to a university administrator, University B's TDZ contributes to local community and the university:

> TDZs impact social life…We are in a sea-front province in Aegean Region - a potential attraction site for young entrepreneurs - they can transfer new job related ideas to other cities, or bring job opportunities and financial support. Another support would be that TDZ and university's demands from local authorities for instance helped develop the electricity grid in this region. Local shops also benefit this. Culturally, artists living here interact with the campus and give concerts in the opening ceremonies of the university. (Toplumsal açıdan teknoparklar, var tabi mesela biz …'dayız. Bu ilçe ve bu bölgeyi bir cazibe merkezi haline getirmek istiyoruz ve hem de genç girişimcilere ciddi potansiyel sağlar diye düşünüyorum. Burdaki iş fikirlerini başka şehirlere taşıyabilirler, iş imkanı ve finansman desteği sağlayabilirler. Böyle bir toplumsal faydadan söz etmek mümkün. İkincisi ise altyapı, normal şartlarda bu tarafların elektrik altyapısı çok kötü ama burda sürekli talepte bulununca üniversite ve teknokent iyileştirme söz konusu olabiliyor. Onun dışında esnafa vesaire de yararı oluyor. Kültürel katkısı çok olacaktır, örneğin, burda bir sürü sanatçılar var. O tür etkileşim de oluyor, sanatçılar okulun açılışında gelip konser verebiliyor) - UNISTAFF3-

The university administrator here refers to contributions of TDZs to a nearby community as well as to university and TDZ, implying a socio-cultural connectedness has been established after the university and TDZ came to a small town's vicinity. A TDZ administrator and a TDZ firm administrator also believe TDZs are able to reach out to public in that products approved by technology transfer offices of TDZs or universities are being advertised on the media - a clear indication for TDZs to reach out to customers or the society.

4.1.2.2 Conflicts of TDZs

Data reveal that TDZs have several conflicts in relation to their organizational structure, relationship with their universities, and their management, missions and core operations. The superordinate theme category of 'conflicts of TDZs' can be split into six themes; namely, critical mass, ownership in knowledge and technology production, cultural misfit, inadequacy of TDZs, managerial conflict, and legal gaps and political conflict.

Critical Mass. Based on participants' views, a critical mass conflict that University B is experiencing can be extracted from data, especially in regards to University B's incapability in knowledge and technology production capacity, human capital, capacity for generating value-added products or services etc.

University administrators and TDZ administrators state University B and its TDZ contribute to patents, copyrights, utility models, and industrial design and software in Turkey. A TDZ administrator also notes that more doctoral graduates would help TDZs better accomplish their mission since their theses or research studies are likely to turn easily into products or services. A university staff affirms that in order for TDZs to be in a better relationship with universities the necessities are time and qualified doctoral graduates. A TDZ administrator also warns that if critical mass is not reached until 2023- the year when state support is scheduled to end-, TDZs will risk becoming a self-sustaining organization.

Ownership in Knowledge and Technology Production. Participants express split opinions on the ownership of knowledge and technology production; when pure knowledge and technology production in universities by 'traditional' academics contradicts with the mission and perspective of TDZs and knowledge workers in regards to generating marketable knowledge, an inevitable conflict arises. In addition, issues of 'ivory-tower conservatism of academics' versus academic capitalism, and knowledge for its own sake versus commercialization of knowledge also create conflicts.

For a university administrator, pure academic knowledge and research precede marketable or innovation-driven knowledge because without quality and accurate knowledge and research no value added product or service can be possible, adding that not all academics should work with or at TDZs. A university staff exemplifies the critical role of TDZs on knowledge and technology production phenomenon:

> One of our firms was born in a university staff's laboratory. If it was not for the TDZ here, the staff would publish only one or two articles about his/her

> research which would either stay in the laboratory or on paper. The research in laboratory turned into a product and a company was set up. Then, OPET - an oil distributor in Turkey- purchased the firm. Now the firm has a production line in Ege Organized Industry District. (Bizim şirketlerimizden bir tanesi burdaki bir hocanın laboratuarında doğdu. Böyle bir girişim olmasa belki bir iki yayın yapacaktı. O bilgi birikimi yazılı olarak laboratuarda kalacaktı. Bir ürün geliştirdiler ve firmayı kurdular. Sonra firmayı OPET satın aldı, Ege OSB'de cihaz üretiyorlar.) - UNISTAFF3-

The university staff, here gives a striking example of how pure knowledge and technology can be channeled into marketable knowledge and technology instead of staying on paper or in laboratories. To a university staff, TDZs do not produce knowledge but use it ready-made by academics but they contribute at later stages when knowledge turns into a product. TDZ administrators criticize insufficient amount of knowledge created at university because when input is low, the output- value added products or services- is affected, adding that University B's TDZ is willing to exploit more of the knowledge production and research and development potential of University B.

Cultural Misfit. Some participants complain about the misfit between Turkish business model and those abroad by giving the example of a Turkish Silicon Valley dream such that business culture in the US (a free enterprise system) and Turkey (prevalence of etatism) do not converge; therefore it is a dream to imagine a Turkish Silicon Valley soon.

A university administrator criticizes the prevalence of state in TDZ matters and objects to much intervention from the state saying that TDZs must be let grow naturally. A university staff uses the analogy of crawling babies and likens Turkish TDZ model to a crawling baby in comparison to Silicon Valley, noting that the first TDZ was opened in 2001 in Turkey while Silicon Valley was operational in 1950s. A TDZ administrator comments:

> In pure theory, the system looks promising but just because it worked elsewhere does not guarantee success if you try to generalize it to all. Everywhere the dynamics are different. In Turkey, there is a dream to create a Silicon Valley and keeping this dream alive all the time actually affects TDZs- may take away its functionality and outputs. It creates various expectations; this may hinder state's taking much more effective initiatives in other forms. It's weird to see 8 TDZs in one region. People may thus see no more than

> buildings from outside (Salt kuramsal olarak sistem güzel gibi görünüyor ama bir yerde uygulanan sistemde genele yayılıp başarılı olacak diye birşey yok. Her yerin farklı dinamikleri var. Dediğim gibi Türkiye'de bir Silion Vadisi yaratma heyecanı ve bunu da hep gündemde tutma teknoparklara buyük zarar veriyor. İşlevsellik ve çıktılarını da bazen sönümleyebiliyor. İnsanların farklı beklentilere girmelerine sebep oluyor. Kamu aslında yatırımları ile çok daha efektif işler yapmasının önüne geçiyor bu. Aynı bölgede 8 tane teknopark görebiliyorsunuz. Dolayısıyla bunlar teknoparkların dış gözle bakılınca sadece bina olarak görülülebilir). - TECHADM3-

The TDZ administrator here means that keeping a Turkish Silicon Valley dream vivid does more harm than good to the natural development of Turkish TDZ model because two different designs of TDZs and making business create a conflict of cultural misfit.

Inadequacy of TDZs. Participants express views on inadequacy of TDZs in regards to functionality despite all investments such as funds, tax waivers, channeling qualified human capital etc., adding that only established TDZs are truly functional while most others have a resource draining profile.

University administrators believe TDZs, University B's TDZ in particular, are functional interfaces of university industry relations, adding that the more gray zones are cleared in the relationship between university-industry relations such as establishment of technology transfer offices, the more functional this relation may become. Annual performance index for TDZs announced by MoSIT (BSTB, 2015), and innovation-entrepreneurship index announced by TÜBİTAK are regarded by these university administrators as indicators of the functionality of university-industry relations. They also add that technoparks lack adequacy because it takes six-seven years for TDZs to become fully functional; therefore the phenomenon of university-industry relation is yet to mature.

A TDZ administrator predicts the TDZ model is evolving into one that competes with the number of firms, patents or employees; this creates an illusion since small size TDZs with quality firms can be more functional. Another TDZ administrator affirms that TDZs wish to attract more firms but this kills functionality. University B's TDZ was originally set up to serve all

city; however, inflation of TDZs in the city blocked full development of University B's TDZ and led to dysfunctionality of most TDZs set up after University B's TDZ, as affirmed by a TDZ administrator. A TDZ administrator is critical of the misconception that university-TDZ relation is that of a real estate, adding that this misconception must be reverted otherwise functionality of TDZs is impossible. TDZ firm administrators agree that most TDZs fail to accomplish what they are originally commissioned to do: connect university and industry to produce technology and services. A TDZ firm administrator suggests, though, that location, improved infrastructure and social facilities are also vital for functionality. University administrators add that that TDZs use certain resources but they also produce knowledge, technology and jobs, adding that knowledge and technology creation is priceless considering not all institutions out there are efficient in terms of resources. A TDZ administrator warns that in 2023 the subsidy-waiver system is scheduled to end as mandated by the law; if TDZs cannot find a way to become more efficient in terms of resource use and be more functional, the whole TDZ model may rot.

Managerial Conflict. Participants mention that conflicts also arise in the management of university-industry relations due to changing nature of roles and practices of university administration or manager-academics; adding that for some, 'traditional' academics are now viewed as knowledge workers, manager-academics are viewed as corporate managers, and traditional university as a community of scholars is now viewed as work places due to recent trends like New Managerialism- the power, status and role of manager-academics declined as New Managerialism found supporters and widespread practice (Deem et al., 2007) but it seems that Turkey is yet to embrace/absorb it. A university administrator explains how they structured university-TDZ relations:

> This is how we structure this relation. There is the university administration, TDZ administration, technology transfer office - an interface - and we also have a research directorate linking academics and technology transfer office and closing any gap. So far it is going well, no problem in information flow- we communicate face-to-face or on the phone if a problem exists. (Biz şöyle

> kurduk bu ilişkiyi. Üniversite yönetimi var yönetici şirket var TTO var ara bölge işte bu, biz de bu ilişkiyi sağlayacak üniversitedeki akademisyenlerle TTO arasındaki ilişkiyi de sağlayabiliecek bir de araştırmalar direktörlüğü var. O da aradaki boşlukları doldurmak. Şu ana kadar iyi gidiyor bilgi akışında sorun yok, telefonla veya yüz yüze halledebiliyoruz) - UNIADM3-

In this quote, the university administrator sketches the organization, management and coordination regarding university-TDZ relation, and reports no conflict. A university staff values the presence of rector in the executive committee and his approval of strategic decisions, adding that rector facilitates the relationship between university and TDZ. A TDZ administrator also welcomes the presence of rector in the executive committee, adding that this is not a symbolic presence since rector puts much effort into TDZs - setting up of research directorate is an example-; vice rector attends meetings in TDZs…It's more of a co-administration in the view of this TDZ administrator. Another TDZ administrator agrees and adds that rector is involved, curious, proficient and visionary in TDZ matters; setting up of innovation center exemplifies rector's efforts for TDZ. University administrators stress that characteristics of rector as well as that of TDZ executive firm and executive committee may cause or hinder administrative problems; setting the framework for how university-TDZ management should be may be acceptable but exercising power based on legislation may cause problems. The university administrator confesses that efficient use of authority may be problematic in this relationship due to low level of establishment in the university and TDZ- people are reluctant to take on the responsibility that is rooted in decisions made by others. One TDZ administrator attributes administrative problems to university administration in that rectors see TDZs as showcase of their term and a leverage to be re-elected; however, when such rector is not re-elected all his cadres leave TDZ and it takes time for the new rector and new cadres to learn operations of TDZs.

Legal Gaps and Political Conflict. Participants in the case of University B express their views and concerns about both legal and political aspects of university-TDZ relations; they state a misconception about the nature of research and development in that not all research and development activity will succeed but this will bring issues of legal accountability of 'the money lost'; TDZ firms instinctively respond to survive at all costs- be it not doing real research and development but turning to projects with no real productization potential, or be it abusing the law; two separate legal entities- one with market focus and one with several missions (education, research, public service)- also create legal gaps and political conflicts. A university administrator believes TDZs resemble state organizations and, operationally speaking, finds meeting two entities on an institutional and legal ground is difficult, adding that it is difficult to organize the togetherness of these two entities under a hierarchy because they have different organizations, units, information flow, responsibilities, risks, income and expenditures, horizontal and vertical as well as formal and informal structures. Another university administrator says that entrepreneurs face challenge in regards to paperwork by the state and that entrepreneurs tend to prefer fields that require less investment such as information technologies and software - a trend university does not favor. A university staff informs that although the neighboring TDZ prioritized medical cluster, still software is dominant due to legal ease and subsidy. A TDZ administrator adds that TDZs are deviating from their original model and mission to do research and development, and produce value added products and services; the reason for this trend can be attributed to politicians and their decisions about TDZs. A university administrator suggests that neither loosely controlled nor strictly controlled TDZs are successful, adding that a comfortable social and psychological environment is necessary for real success of TDZs. TDZ administrators believe pursuit of tax waiver, subsidy and funding is unfortunately prioritized over TDZs' original mission due to legal gaps. A TDZ administrator adds that unfortunately even in presentations delivered at ministries the slide writes "join TDZs and get waiver".

University administrators warn that when techno-entrepreneurs set up companies based on only one big idea or invention, out of survival they turn to projects with no real output; thus, become resource draining, adding that state recently imposed a change in the law making it compulsory for firms to produce a fixed number of innovation projects to maintain status on TDZ. A university staff also criticizes that subsidies or waivers precede real mission of TDZs, adding that some firms depend heavily on state funded projects. Another university staff insists that because of the nature of research and development, not all research and development project can turn into output- which must not be mistaken with a resource draining profile.

4.1.2.3 Zone of Influence of TDZs

Based on the data, TDZs are observed to operate in a zone of influence in which a set or category of (unidirectional, directional or multidirectional) relations occur among TDZs and the other parties involved in TDZs' organizational environment. The 'zone of influence of TDZs' superordinate theme can be divided into four sub-themes: entrepreneurship and innovation as drivers of transformation of higher education institutions, survival of the most institutional, patronage of knowledge and technology production policy, and patronage of higher education policy.

Entrepreneurship and Innovation as Drivers of Transformation of Higher Education Institutions. Participants emphasize that terms like entrepreneurship and innovation have been considered by many the drivers of the transformation of universities during the last few decades; and that issues such as "third mission" of universities -entrepreneurship- (Etzkowitz, 2003) challenge universities to change and adapt to interdisciplinary research and education demands, curricular demands or even more fundamental structural changes like research-intense universities. A university staff states that TDZs have the potential to impact research, -and recently- innovation and entrepreneurial missions of higher education. A TDZ administrator believes restructuring of

higher education is pressing these days in that a third generation of universities are high on higher education agenda, adding that universities used to have structures that offered technical knowledge; then came the mission to produce academics-prompting that a third mission is inevitable.

According to university administrators, University B's TDZ motivates involved parties to take interdisciplinary and transdisciplinary actions in that although absence of social sciences departments on campus is a weakness, background and potential of academics as well as their collaboration with others compensates this. University administrators add that University B's TDZ gives training on entrepreneurship and innovation which helps university cater for this weakness. University staffs and a TDZ firm administrator emphasize TDZ executive firm's efforts to link firms with academics and students via a 3+1 activity in which three academics and a TDZ firm give information and answer questions - an informal education activity for entrepreneurship and innovation.

TDZs also challenge curricular dynamics. A university administrator accepts curricular changes now that terms like Industry 3.0 or 4.0 come into existence, and internet of machines or cyber technologies are challenging education and industry. Likewise, university staffs welcome curricular influence of TDZs in that experts from TDZ firms or top management from TDZ give trainings or offer courses making it possible for students to learn from experienced and insider people- which may later even result in job opportunities. Moreover, in a university with no social sciences departments, it's especially valuable for students to learn from these TDZ professionals. These TDZ professionals also become jury members or members in advisory committees; feedback from them is valuable. TDZ administrators believe that starting from undergraduate years courses such as entrepreneurship or innovation management must be part of the curriculum. A TDZ firm administrator adds that university administration gets opinion of TDZ firms - a form of needs assessment maybe- as to which courses or modules in courses best serve their needs such as shifting from C program to Python, adding that

graduate students are also encouraged to channel their works in line with TDZ needs.

A university administrator welcomes the ideas of Higher Education Council's selecting certain universities as research-intense universities, though, with caution:

> Higher Education Council (HEC) has a new initiative about research-intense universities. HEC wishes to showcase some universities as research-intense universities based on qualitative and quantitative measures, and some basic indicators- which is a good cause. Well, if you set the system free, this is the eventual destination; the basic mission of university here is to facilitate the transformation of pure academic knowledge into industrial production, where HEC is a catalyst. Universities must act autonomously even if HEC does not say so… A purely "education university" is not much acceptable though there is also need for them. (Araştırma üniversiteleri ile ilgili şimdi bir girişim var YÖK'te. YÖK temel değerlere nicel ve nitel değerlere de dayanan bazı endeksler çıkarıp bazı üniversiteleri de araştırma üniversitesi diye vitrine çıkarma düşüncesi var bu iyi birşey. Sistemi kendi başına bırakınca doğru veri ile buraya gidiyor zaten. Zaten teknokentlerin amacı nedir işi kolaylaştırmak burdaki akademik bilgiyi sanayiye ve üretime dönüştürmek. YÖK'ün de böyle katalizör bir görevi var. Üniversiteler kendi yolunu çizmek zorunda YÖK öyle demese de. Sürekli eğitim odaklı bir üniversite de çok kabul edilebilir değil. Ama ona da ihtiyaç var....) - UNIADM3-

The university administrator in this quote means if the process is not intervened, certain universities will eventually evolve into research-intense universities based on pillars of entrepreneurship and innovation.

Survival of the Most "Institutional" TDZs. As neo-institutional theory suggests, organizations - universities and their TDZs in this case- adopt institutional controls prescribed by rationalizing agents in their organizational environments to gain legitimacy and, as a result, they similarize in time. Other TDZs and universities are the main constituents of the organizational field of TDZs as well as other organizations and groups such as ministries, non-governmental organizations, market, and the public. Universities and TDZs seek for legitimacy or socio-cultural acceptance, safeguard their resources, and ensure survival that results from their adoption of institutional controls: regulatory, normative and cognitive controls. TDZs use the buffering strategy of ceremonial conformity or rationalized myths. Moreover, TDZs employ

decoupling strategy and deviate from their standard formal structures and daily functions to guard their technical core and intra-organizational activities from external pressures. Finally, TDZs tend to resemble other TDZs by using three isomorphism strategies; namely, coercive, mimetic and normative.

Survival of the Most "Institutional" TDZs- Contextual Dynamics. Participants and data from document analysis reveal that TDZs are surrounded and shaped by external forces such as the state, the industry, non-governmental organizations, other universities and TDZs. State and competition from other universities and TDZs are two commonly stated external forces by the participants.

In the document analysis of TDZ Law, TDZ Regulation and websites of University B and University B's TDZ, institutions of the external forces for University B's TDZ include BTYK-SCST, MoSIT, universities, institutes of high technology, other TDZs, research and development institutes, research and development centers, technology transfer offices, thematic TDZs, GDST, MoF, MoEU, MoD, HEC, TÜBİTAK, TOBB- UCCE, SMEDPA-KOSGEB. In addition, some motives or pressures can be seen as external forces: pressures for internationalization, competitiveness, government policies and the public. Moreover, for University B, another university in the city, industry and non-governmental organizations are other shareholders and externally shape University B's TDZ. Also University B's TDZ reports to GDST under the MoSIT. CoM supervises all activities of University B's TDZ via different ministries and councils.

Participants and data from document analysis reveal that TDZs are also shaped by internal forces or institutional norms and procedures of TDZs such as organizational structure, human resources, organizational culture etc.

Data from a document analysis of TDZ Law, TDZ Regulation and websites of University B and University B's TDZ reveal that internal dynamics of TDZs include organizational structure, units, management, human resources, decision making, finance and supervision as suggested by TDZ Law.

University B's TDZ is managed by an executive company which is a legal entity. University B's TDZ includes managerial units, incubators, production units and a technology transfer office. Human resources include research and development personnel, researchers, technicians, support personnel, software personnel, design technicians and designers.

Survival of the Most "Institutional" TDZs- Legitimacy. Data from interviews reveal that universities and their TDZs seek legitimacy in their organizational field and try to minimize uncertainty. Most participants are convinced that University B's TDZ is viewed, by all parties involved, as a prestigious; thus, a legitimate TDZ in Turkey. University administrators state that TDZs are set up by universities because they see all others have it; or sometimes just like a new unit or department is planned on campus, TDZs enter the agenda of universities - TDZs are believed to be indicators of being a good university. A university staff states that during the past few years, university-TDZ administration turned into a more institutionalized relation. A TDZ firm administrator predicts university and TDZ establish an institutional relation based on laws. University administrators note that University B's TDZ is interested in design which is even more popular in research and development centers and design centers than TDZs since design - an interdisciplinary design in particular- is a critical issue in international funded projects like Horizon 2020 or a trend in third generation of universities.

Survival of the Most "Institutional" TDZs- Buffer Strategies (symbolic coding and decoupling). Participants mention that TDZs buffer their structures and operations from their organizational environment by adopting a ceremonial adaptation to management, organizational structure, buildings and facilities; they also decouple their core activities and outcomes by diverging from their formal structures in regards to product specialization, sectorial proximity, supervision and human capital.

As a university administrator lists, traces of commonalities (rational myths) or differences (decoupling) among TDZs may be observed in terms of

sectorial distribution of firms, magnitude of firms (big, medium, small enterprises), and services provided such as basic and innovative services. To start with symbolic coding, the university administrator believes structure and location are similar in that half of TDZs have a similar structure - setting technology transfer offices for example- and most are on campus, adding that all get funds, subsidy or tax waiver; software, information technologies and electronics are dominant across TDZs- University B' TDZ is no exception to this. TDZ administrators believe core activities or units such as giving trainings, mentorship or incubators are the same across TDZs, one of them adding that executive structure is the same with presence of rectors or vice-rectors. A TDZ firm administrator criticizes that in all universities TDZs are located in remote parts of the campus and that in terms of operations and management TDZs are similar. University administrators believe TDZs differ in product specialization and how outputs fit or integrate into regional characteristics, adding that other differences can be listed: location, management structure, distance to city, number of TDZ affiliated academics, number of academics-led firms, efficiency, input-output, volume of cooperation, speed of development. A university staff lists dissimilarities as clusters, supervision, rent, and intimacy with policy makers. A TDZ administrator says that TDZs differ in terms of their management structure, giving the example of technology transfer offices- organized under TDZ or belonging to a university. A TDZ firm administrator says that TDZs are different based on infrastructure and quality of services.

Survival of the Most "Institutional" TDZs- Bridge Strategies (isomorphism). Participants state that TDZs also grow similar in time due to coercion from supervising state institutions and laws more than mimetic isomorphism.

A university administrator states that supervising institutions like HEC set the standards based on developments in the world and lets university administrators do the rest. TDZ administrators are convinced that the TDZ Law is binding and coerces TDZs to resemble each other. A TDZ firm administrator

affirms the coercion of the law so that TDZs are made to look similar. Yet, a TDZ administrator and a TDZ firm administrator accept that TDZs take leading ones as role models and try to imitate things that work.

Patronage of Knowledge and Technology Production Policy. Participants express views on influential parties (university, TDZs, state, etc.) and their complex ways of interacting with each other to impact knowledge and technology production policy makers such as direct and indirect influence, intimacy with policy makers, institutions, and proximity to the state, industry or clusters.

A university administrator strongly believes there is a multi-lateral influence among university, TDZ, knowledge and technology policy makers and the state:

> TDZs have impact on ministries such as MoSIT or on STRCT, much impact actually. We sometimes attend meetings, these are focus groups sometimes, and opinion leaders also attend. State takes notes and drafts stated opinions into projects by the ministry or STRCT. I trust this mechanism. (Bakanlıklarda teknoparkların etkisi var bence, Sanayi Bakanlığında var TÜBİTAK'ta var, çok etkisi var. Zaman zaman toplantılara katılıyoruz, değişik odak gruplarıdır, kanaat önderleri gibi katılırlar. Devlet not tutar, sonra süreç içinde değerlendiriliyor ve bir metne dönüşüyor biz bu bilgileri daha sonra TÜBİTAK veya bakanlıkların projeleri olarak önümüzde buluyoruz veya bir çağrıya dönüşüyor. Benim bu bahsettiğim etkileşime mekanizmaya güvenim var). - UNIADM3-

The university administrator also adds that TDZs impact knowledge and technology policy making via technology transfer office, TDZ executive management, ATDZ; some formers students of University B have become experts in ministries; databases and documents have been formed as a result of contribution from stakeholders. TDZ administrators state that ATDZ can both organize activities to bring TDZs together and initiate national and international organizations - an effective tool for TDZs. Another university administrator advocates that there is mutual impact if certain channels such as State-University-Industry Cooperation as well as GDST under the ministry are used efficiently to exchange information, adding that STRCT does not communicate well and that TDZs even use MoSIT as a mediator. A university

staff is pessimistic about the impact TDZs may have on knowledge and technology policy makers; policy makers pretend they listen to TDZs but actually they do not; they expect TDZs to obey only, adding that TDZs and firms fear expressing their real opinions in university-industry related media or in magazines so as not to make ministries angry. A university staff believes for such impact on policy makers, TDZs must approach policy makers with some success stories. A TDZ administrator states that TDZ executives should take an active role in communicating with policy makers. A TDZ administrator believes impact on policy makers is only indirectly possible via some umbrella organizations such as ATDZ. A TDZ firm administrator believes in the impact of TDZs on knowledge and technology policy makers in that activities and outputs of TDZ guide policy making as long as they do not contradict with national strategies like defense projects, for instance. Success stories are effective for TDZs to be heard.

Patronage of Higher Education Policy. Participants express views on influential parties (university, TDZs, state, etc.) and their complex ways of interacting with each other to impact higher education policy makers such as direct and indirect influence, and influence via universities or institutions.

University administrators believe TDZs have impact on higher education policy makers, adding that HEC recently established some channels to communicate with TDZs via academics- no direct impact is possible. A university staff mentions a zero direct impact but says that via rector - as the executive head of TDZs- TDZs may voice out their opinions. However, another university staff gives the example of intellectual property rights of academics in which TDZs had a remarkable impact in guiding policy makers. A TDZ administrator affirms University B's TDZ, for instance, can impact policy makers at ministries or HEC only through Directorate of Research of University B- vice-rector in particular.

4.1.2.4 Suggestions for TDZs

Data reveal that there are several suggestions for TDZs. The superordinate theme category of 'suggestions for TDZs' can be split into three themes; namely, networking strategies of TDZs, ecosystems for TDZs, and other remedies or resolutions for TDZs.

Networking Strategies of TDZs. Participants mention various methods of networking with other TDZs and firms. TDZ administrators are aware that ATDZ in Turkey is an active non-governmental organization within the network of TDZs. One TDZ administrator names University-Industry Relations Centers Platform (USİMP) and Alliance of Technology Transfer Professionals (TTP), City's Universities Platform (University B's rector attends) as other networking institutions helping TDZs and firms establish relations among themselves. Networking via joint projects and networking via personal contact seem to be common well-known strategies from the perspective of a university administrator, a university staff and a TDZ firm administrator. A university administrator and a university staff believe that TDZs form a teaching-learning network in the sense that they exchange experiences but a TDZ firm administrator thinks firms do not learn much from each other adding that a teaching-learning network arises only out of satisfying a certain need in part of a project. University administrators see competition as a threat especially when there are more TDZs than needed in this Aegean city, adding that enlarging the volume of production and making business is prior to competing for scarce potential of the city. As a result of competition, firm transfers between TDZs occur. A university staff warns that especially after the research and development centers law recently, big firms started to leave TDZ and open their own research and development centers, which even adds up to this competition. TDZ administrators believe that competition is quite unfair considering the small size of University B and other big universities. One university staff adds that intra-TDZ level networking with neighboring TDZs

or the ones in neighboring cities is sacrificed for competition in the city that has scarce potential for the many TDZs present today.

Ecosystems for TDZs. Participants visualize ecosystems for TDZs at regional, national and international levels to suggest a holistic look at mechanisms of university-industry relations. Some participants also depict micro ecosystems such as clusters and thematic TDZs to suggest a holistic look at mechanisms of university-industry relations at local levels.

University administrators inform that University B was founded in 2004 and that three other universities in the city were shareholders together with industry; thus, University B was a regional TDZ at first. A TDZ firm administrator adds that University B's TDZ started as a regional TDZ but evolved into a national ecosystem. University administrators advocate that University B should be a main TDZ (University B's TDZ) but thematic TDZs in other parts of the city should flourish. A university staff informs that University B preferred to form a renewable energy cluster, which Turkey lacks for the moment, as opposed to dominant software clusters. A TDZ administrator welcomes clusters proposing that a bio-technology and a nanotechnology cluster would be logical as they are accepted as research priorities, approving the defense cluster in Ankara and medical cluster in a neighboring TDZ in the same city, adding that other TDZs are better at clustering. A TDZ firm administrator explains that clustering has to do with regional realities and resources in the region in that the city lacks business potential and therefore clustering is limited in the city, adding rather in a pessimistic fashion that thematic TDZs or clustering has no place and future in their city except for medicine. TDZ administrators also call for an internationalization goal which may help TDZs break their shells and save them from useless national competition; TDZs thus can go back to their original mission to produce knowledge and technology.

Other Remedies or Resolutions TDZs. Further suggestions have been expressed in the data ranging from making TDZs more sustainable so that they can

deliver what they have been originally designed for to eventually closing TDZs as punishment. A university administrator gives some suggestions as to making university-TDZ relations more dynamic: (1) university-TDZ must be well-grounded in that parties must understand each other, negotiate and be accountable, and (2) regulations must better clarify duties, roles and responsibility so that gray regions between two entities can be cleared. A TDZ administrator suggests that a mission diversification of TDZs is needed so that established TDZs can be restructured into a more industry-oriented TDZ 2.0 or InnovaPark 2.0 as opposed to TDZ 1.0 (those closer to university and still developing their infrastructure and continuing their development). A university staff assert that TDZs must return to their factory settings and prioritize function over prestige.

4.1.3 University C and Its TDZ

4.1.3.1 Contributions of TDZs

Data reveal that TDZs have several contributions. The superordinate theme category of 'contributions of TDZs' can be split into four themes; namely, national or local economic anchor or leverage for local economy, showcase of country image, mutualism between university and TDZs, and social development.

National or Local Economic Anchor / Leverage for Local Economy. Most of the participants are convinced that TDZs cater for the state policy to develop economically at national level and also locally.

A TDZ administrator affirms that TDZs emerged as a state policy, adding that there was no other practical way than creating a university-TDZ joint mission; a state policy which turned to agriculture and industry now gives priority to TDZs and universities to produce value added products and services. The TDZ firm administrator sees this purely as a state policy to generate more value added tax - a very late move from the state. A university administrator states that TDZs may also have a role in eradicating regional differences in

terms of economy and development, and also asserts that TDZs impact economy more locally implying that University C's TDZ is a local economic value that helps regional development of the city rather than producing strategic and international added value products like leading TDZs in Turkey, adding that:

> I believe TDZs have a big share in compensating for the loss in underdeveloped areas; areas where Turkey is highly dependent on imports and thus cannot compete… Defense industry, software or electronics are sectors that contribute much to Turkey's development. (Teknoparkları, Türkiye'nin geri kalmış olduğu, rekabet edemediği ve dışa bağımlı olduğu alanlarda eksiği tamamlama anlamında büyük bir pay sahibi olarak görüyorum. Savunma sanayi olsun, yazılım, elektrik-elektronik olsun, bu yapıların Türkiye'ye önemli bir getirisi olduğunu düşünüyorum). - UNIADM5-

From the university administrator's point of view, it is seen that TDZs do impact economy and development; however, the volume of contribution can only compensate the loss of from certain fields that Turkey suffer such as fierce competition or dependence on others. A TDZ administrator believes that TDZs have economic importance especially when they have some success stories, adding that TDZs have tremendous strategic importance but the point here must be to develop this strategic response - TDZs- in a way that more research and development focused firms must be admitted to TDZs and thus TDZs can contribute to country's development more. Likewise, TDZ firm administrators state University C's TDZ contributes to economy by producing value added products (compared to firms outside the TDZ), adding that the reverse scenario increases imports.

Showcase of Country Image. Most participants imply the relatively small size effect that University C has on Turkey's country image as a more visible, competitive and knowledge-based economy. For instance, a university staff questions the desired level of visibility of TDZs saying that only top performing TDZs such as METU's Technopolis and İTU's Arı can produce products or services that are visible in the world, though efforts in University C do not suffice to do so.

Mutualism between University and TDZs. A mutual relationship exists between universities and TDZs in which they mutually contribute to one another. Universities benefit this mutualism via employment and internship for their students and graduates as well as income, applied research for academics and students, while at the same time TDZs enjoy this mutualism in forms of ready-made, abundant and easily accessible highly-skilled human capital and knowledge. All participants confirm the role and contribution of TDZs on employment and internship. A TDZ administrator believes TDZs are becoming a source of motivation for academics in that producing patents has become a promotion and academic incentive criterion for academics - may be as valuable as publishing papers. A university staff, on the other hand, sees TDZs as invaluable opportunity for students to do internship and later become employees, adding that students are required to apply what they have learnt to solve a real world problem such as a stock program for a small size market or that of a TDZ firm.

Socio-cultural Development. Some participants mention the contribution of TDZs to social and cultural development of the society, adding that TDZs reach out to the public and interact with people in multiple ways such as connecting and exchanging with local community, providing a social and cultural context for academics, researchers and students etc. TDZ firm administrators stress the services out of TDZs reach out to public, adding that orientation visits of students or regular people to TDZs must be encouraged for a better link to the public. A university staff mentions that one way to reach out to the public and contribute to the region is to offer entrepreneurs in a region opportunities like TDZs within campuses.

4.1.3.2 Conflicts of TDZs

Data reveal that TDZs have several conflicts in relation to their organizational structure, relationship with their universities, and their management, missions and core operations. The superordinate theme category of ‘conflicts of TDZs’

can be split into five themes; namely, critical mass, ownership in knowledge and technology production, inadequacy of TDZs, managerial conflict, and legal gaps and political conflict.

Critical Mass. Participants express views on their universities' and TDZs' inability to reach a critical mass of generating value-added products or services etc. A TDZ firm administrator confesses that in University C's TDZ there are few products that can open to the world market but a huge problem lies with marketing as affirmed by a university staff's view that for products to hit the world market, funds, subsidies, and advertisement are all crucial. A more explicit opinion comes from a TDZ firm administrator who affirms that the number of products from University C's TDZ are insufficient, adding that more research and development and innovation would be of help in this problem- the inability to reach a critical mass of capacity for generating value-added products or services.

Ownership in Knowledge and Technology Production. Participants broadly state that, from the 'ivory tower' perspective of academics and university, the phenomenon of knowledge and technology is owned up to a point where pure knowledge and technology can be generated in labs and disseminated via publications and conferences; however, TDZs are criticized to own only the productization phase of this knowledge and technology production phenomenon- as a result, a conflict of ownership arises where academics and university blame TDZs for not investing in this phenomenon but expecting ready-made graduates or ready-made knowledge and technology that can easily be turned into value-added products or services while TDZs are heavily dependent on scarce marketable knowledge and technology pouring into TDZs-which is a frequent complaint of TDZs; some adding that academics are hesitant to involve into TDZs and that some academics still do not see it ethical.

A university staff welcomes the idea of pure academic knowledge and research by academics turning into a product, which is much more possible thanks to TDZs, adding that within the scope of a theoretical course the only application can be a - hypothetical- project, or a master's thesis at best; however, seeing ideas turn into tangible products or services is priceless especially in engineering departments like theirs. A TDZ firm administrator likens TDZs to a laboratory of universities in that academics are doing research and creating knowledge and technology but that stays in theory and on paper, adding that since academics are hesitant to work in the field and with the field they cannot see the real product or service in real life- TDZs are a mechanism to help with this problem. A TDZ administrator adds that intellectual property rights enable academics to turn their knowledge and research into products - what used to be a shame for academics to work outside the campus is now encouraged by the state. A university staff states that now academics are encouraged to involve in TDZs, which used to be considered unethical. A university administrator complains that the industry makes not much investment in producing more qualified human capital but expects ready-made or tailor-made human capital to serve the needs of the industry at as low as minimum wage. A TDZ administrator, however, complains that the output of university - graduates- does not match with what the industry expects. TDZ firm administrators agree and say that interns know much in theory but they fail in practice during their internship, adding that it may take up to one or two years for a student to mature in engineering after graduation.

Inadequacy of TDZs. Participants express views on inadequacy of TDZs in regards to functionality despite all investments such as funds, tax waivers, channeling qualified human capital etc., adding that only established TDZs are truly functional while most others have a resource draining profile.

A university administrator claims that top national level TDZs can produce economic value from value added products three or four times the total investment (buildings, infrastructure, human capital, funds etc.); however, still

these numbers from top TDZs are unsatisfactory- they can only decrease Turkey's dependence on imports. The university administrator is also critical in that TDZ scenario seems a very functional one but it must be questioned whether TDZs are much functional in practice, adding that approaching TDZs as indispensable institutions is a fallacy because if they are resource draining despite all investments the TDZ model can be reconsidered. A TDZ administrator comments on functionality of TDZs saying that GDST is working on a performance system for TDZs just like the academic incentive program for academics, adding that in order to increase functionality, more funds can be given or TDZs can be closed.

Managerial Conflict. Participants mention that conflicts also arise in the management of university-industry relations due to changing nature of roles and practices of university administration or manager-academics; adding that for some, 'traditional' academics are now viewed as knowledge workers, manager-academics are viewed as corporate managers, and traditional university as a community of scholars is now viewed as work places due to recent trends like New Managerialism- the power, status and role of manager-academics declined as New Managerialism found supporters and widespread practice (Deem et al., 2007) but it seems that Turkey is yet to embrace/absorb it.

The university administrator questions the presence of state representative in the executive management of University C's TDZ - namely governor of the city, adding that non-governmental organizations are welcome to be shareholders in a legal entity but in presence of a state shareholder- the governor- not all opinions can be voiced out; the duty of state can only be building infrastructure and buildings, attracting foreign investment -not interfering with strategic decisions with TDZs, which kills the dynamism of TDZs. A TDZ administrator shares the same worry about the presence of state representative in the executive management of University C's TDZ - the governor- in executive management, which may slow down operations and

decision making. A university staff thinks that the vision of university management is critical as it may either create or solve problems; previous rector's approach to university-TDZ relations and that of the current one are different, adding that personal characteristics or conflict of interest must not precede a functioning university-TDZ relation. A TDZ firm administrator criticizes that things seem to work well on paper since they report to the rector in the executive management but outputs do not say so. A TDZ administrator states that university administration slows down the operations of TDZs; university believes it has a say over TDZs because TDZs use the infrastructure, land and human capital of university, adding that professional management of university-TDZ relations is necessary. A TDZ firm administrator complains that university administration does not control TDZ administration much and acts like a real estate collecting rent from the TDZ; university administration approaches this problem from a financial perspective. The TDZ firm administrator draws attention to outputs of TDZs, adding that reports are prepared to please upper level managers or authorities.

Legal Gaps and Political Conflict. Participants express their views and concerns about legal and political aspects of university-TDZ relations; they state a misconception about the nature of research and development in that not all research and development activity will succeed but this will bring issues of legal accountability of 'the money lost'; TDZ firms instinctively respond to survive at all costs- be it not doing real research and development but turning to projects with no real productization potential, or be it abusing the law; two separate legal entities- one with market focus and one with several missions (education, research, public service)- also create legal gaps and political conflicts.

A university administrator informs clustering is related to sectors and in the city logistics and agriculture are local realities, adding that inevitably software is still a dominant cluster like in all TDZs partly due to its ease to start a company in this sector and the higher subsidy for this sector, criticizing that it

is never facilitated for social science departments like business administration to operate in TDZs exemplifying this in a way that social sciences must fit software into their projects to operate in TDZs - a legal barrier in the view of the university administrator. A TDZ firm administrator adds that things seem perfect and legal but the TDZ does not have an established structure. A TDZ administrator also comments that a legal problem arises in university-TDZ relations as to university's technology transfer office which functions under TDZ with a special protocol with the university- this creates problems like incompatibility and accountability. A university staff agrees that in most TDZs some firms abusing the law exist. The TDZ administrator also confirms that there are empty offices just with a tag on their door. A university administrator believes TDZs have turned into places where Turkey's economic, developmental and financial policies are sacrificed or abused though it is not the original intention of the state, adding that that subsidies or waivers have become the reason for firms to enter TDZs rather than producing value added products or services- implying that the resource draining ones must be closed because funds go in vain. The university administrator also believes law is abused especially in medical or pharmaceutical firms in TDZs where no real research and development is taking place. The TDZ administrator also admits that some firms can maintain status on TDZ with little or no research and development therefore some legislation for structural changes is needed to correct this, adding that this has become even more pressing after the Research and Development Centers Law which led the way for medium-size or big firms to open their own centers in their work places rather than staying in TDZ area.

4.1.3.3 Zone of Influence of TDZs

Data reveal that TDZs operate in a zone of influence in which a set or category of (unidirectional, directional or multidirectional) relations exist among TDZs and the constituents of TDZs organizational environment. The superordinate theme category of 'zone of influence of TDZs' can be split into four themes; namely, entrepreneurship and innovation as drivers of transformation of higher

education institutions, survival of the most institutional TDZs, patronage of knowledge and technology production policy, and patronage of higher education policy.

Entrepreneurship and Innovation as Drivers of Transformation of Higher Education Institutions. Participants emphasize that terms like entrepreneurship and innovation have been considered by many the drivers of the transformation of universities during the last few decades; and that issues such as "third mission" of universities -entrepreneurship- (Etzkowitz, 2003) challenge universities to change and adapt to interdisciplinary research and education demands, curricular demands or even more fundamental structural changes like research-intense universities. A TDZ administrator criticizes that the notion of entrepreneurship was missing in the past in higher education, adding that today would have been very different if entrepreneurship had been taught to students long before. Similarly, a university staff informs that:

> Another contribution of TDZs is on entrepreneurship which used to be a neglected and unknown issue. Unlike my undergraduate years, now entrepreneurship has become a separate two-term must course offered by Small and Medium Enterprises Development and Promotion Administration. The most relevant platform for students to apply what they have learnt is University C's TDZ; therefore TDZs have a direct contribution to our teaching. (Diğer bir katkısı da girişimcilik. Eskiden girişimcilik bu kadar değildi. Benim okuduğum dönemde girişimcilik dersi yoktu bizim müfredatlarımızda, şuan var. Bunun en önemli nedeni teknopark ve KOSGEB. KOSGEB 'den aldığımız ve iki dönem olarak zorunlu olarak verdiğimiz bir ders haline geldi girişimcilik şu an. Bu dersleri alıp uygulayabilecekleri en yakın yer teknopark o yüzden, doğrudan bizim eğitimimize etkisi var). -UNISTAFF5-

The university staff in the quote above emphasizes the late adoption of entrepreneurship in the academia and that it contributes now to their curriculum. A university administrator believes TDZs do not impact curriculum at all citing the example of SAN-TEZ - master or doctoral theses focused on industrial production. However, for a university staff a new curriculum based on application of theoretical knowledge and production is pressing since access to information is easier today citing the example of open

courseware around the world. A TDZ firm administrator calls for a curricular change- one that teaches marketing, business administration, personnel management, accounting, entrepreneurship, and even introduction to law to engineers so that their companies can survive. A TDZ firm administrator calls for immediate action for a formal entrepreneurship education from higher education, adding that rather than making innovation or entrepreneurship terms empty slogans, fundamental formal education must be given otherwise entrepreneurs will have to continue self-educating themselves by asking others. A university administrator believes restructuring of higher education is pressing these days in that quality and accreditation kind of novelties are high on higher education agenda, adding that a new approach and cadre is present in HEC that have started to value quality over quantity.

Survival of the Most "Institutional" TDZs. As neo-institutional theory suggests, organizations - universities and their TDZs in this case- adopt institutional controls prescribed by rationalizing agents in their organizational environments to gain legitimacy and, as a result, they similarize in time. Other TDZs and universities are the main constituents of the organizational field of TDZs as well as other organizations and groups such as ministries, non-governmental organizations, market, and the public. Universities and their TDZs seek for legitimacy or socio-cultural acceptance, safeguard their resources, and ensure survival that results from their adoption of institutional controls: regulatory, normative and cognitive controls. TDZs use the buffering strategy of ceremonial conformity or rationalized myths. Moreover, TDZs employ decoupling strategy and deviate from their standard formal structures and daily functions to guard their technical core and intra-organizational activities from external pressures. Finally, TDZs tend to resemble other TDZs by using three isomorphism strategies; namely, coercive, mimetic and normative.

Survival of the Most "Institutional" TDZs- Contextual Dynamics. Participants and data from document analysis reveal that TDZs are surrounded and shaped by external forces such as the state, the industry, non-governmental organizations, other universities and TDZs. State and competition from other universities and TDZs are two commonly stated external forces by the participants.

In the document analysis of TDZ Law, TDZ Regulation and websites of University C and University C's TDZ, institutions of the external forces for University C's TDZ include BTYK-SCST, MoSIT, universities, institutes of high technology, other TDZs, research and development institutes, research and development centers, technology transfer offices, thematic TDZs, GDST, MoF, MoEU, MoD, HEC, STRCT, TOBB-UCCE, KOSGEB-SMEDPA. In addition, some motives or pressures can be seen as external forces: pressures for internationalization, competitiveness, government policies and the public. Moreover, local government, University C, industry and non-governmental organizations are other shareholders and externally shape University C's TDZ. Also University C's TDZ reports to GDST under MoSIT. CoM supervises all activities of University C's TDZ via different ministries and councils.

Participants and data from document analysis reveal that TDZs are also shaped by internal forces or institutional norms and procedures of TDZs such as organizational structure, human resources, organizational culture etc. Data from a document analysis of TDZ Law, TDZ Regulation and websites of University A and University A's TDZ reveal that internal dynamics of TDZs include organizational structure, units, management, human resources, decision making, finance and supervision as suggested by TDZ Law. University A's TDZ is managed by an executive company which is a legal entity. University A's TDZ includes managerial units, incubators, production units and a technology transfer office. Human resources include research and development personnel, researchers, technicians, support personnel, software personnel, design technicians and designers.

Survival of the Most "Institutional" TDZs- Legitimacy. Data from interviews reveal that universities and their TDZs seek legitimacy in their organizational field and try to minimize uncertainty. A university administrator states that TDZs are set up by universities because they see all others have it - TDZs are indicators of being a good university. Participants are convinced that University C's TDZ is barely a prestigious TDZ in Turkey, however, they state that among TDZs in Anatolia, after top performing ones, University C's TDZ is a legitimate one.

Data from interviews can be associated with the ones from a document analysis of University C's Strategic Plan for 2013-2017, in which a current-status SWOT analysis states the inability of university-industry relations to institutionalize as a weakness. However, no other specific aim, strategy or performance indicator has been referred to neither in University C's Strategic Plan 2013-2017 nor in University C's Activity Report 2017.

Survival of the Most "Institutional" TDZs- Buffer Strategies (symbolic coding and decoupling). Participants mention that TDZs buffer their structures and operations from their organizational environment by adopting a ceremonial adaptation to management, organizational structure, buildings and facilities; they also decouple their core activities and outcomes by diverging from their formal structures in regards to product specialization, sectorial proximity, supervision and human capital. A TDZ administrator believes that structurally TDZs are similar as the modules or units within them are quite similar- University C's TDZ and technology transfer office are no exceptions to this. A university staff observes that product specialization and funding, human capital characteristics, sectorial proximity are dissimilarities.

Survival of the Most "Institutional" TDZs- Bridge Strategies (isomorphism). Participants state that TDZs also grow similar in time due to coercion from supervising state institutions and laws more than mimetic isomorphism. A university staff says the law is binding so TDZs grow similar because the laws says so. A TDZ administrator views laws as very dominating and says that the

motivation behind TDZs' developing so similar is laws. Likewise, a TDZ administrator mentions laws and regulations as the motivating factors for TDZs to look similar.

Patronage of Knowledge and Technology Production Policy. Participants express views on influential parties (university, TDZs, state, etc.) and their complex ways of interacting with each other to impact knowledge and technology production policy makers such as direct and indirect influence, intimacy with policy makers, institutions, and proximity to the state, industry or clusters.

A university administrator is pessimistic and critical about the impact of TDZs on knowledge and technology production policy makers in that policy makers can express their views on research mission of universities but they cannot set or change missions of universities because universities have naturally evolved into what they are today - no external prescription of missions is acceptable. Unlike this university administrator, a university staff believes feedback from TDZs may have a direct impact on those who set knowledge and technology production policy, especially in matters like funding, adding that TDZs can provide policy makers with invaluable real-time data. A TDZ administrator believes TDZs have great potential to impact knowledge and technology production policy but this potential cannot be much channeled into practice. TDZ firm administrators agree that feedback channels do not work well that results in little impact of TDZs on knowledge and technology production policy. One TDZ firm administrator adds that TDZ administration must be more involved to activate these channels and report real data and problems to policy makers rather than reporting data that will please their line managers. A TDZ administrator complains that ATDZ - a non-governmental organization- can be a relevant mechanism to reach out to policy makers. However, the TDZ administrator says that the association fails to communicate their needs because there are always grand issues or other priorities on their agenda to communicate to policy makers.

Patronage of Higher Education Policy. Participants express views on influential parties (university, TDZs, state, etc.) and their complex ways of interacting with each other to impact higher education policy makers such as indirect or little influence, and influence via universities or institutions. A university staff mentions that TDZs may impact higher education policy makers via university administration because HEC now has a supportive approach to university-industry relations, adding that some pressing issues like decreasing student quotas or curricular change to open more space for internship must be communicated to higher education policy makers. A TDZ administrator believes that TDZs may both directly and indirectly impact higher education policy because they provide valuable data. However, TDZ administrators believe TDZs have either no impact or some indirect effect.

4.1.3.4 Suggestions for TDZs

Data reveal that there are several suggestions for TDZs. The superordinate theme category of 'suggestions for TDZs' can be split into three themes; namely, networking strategies of TDZs, ecosystems for TDZs, and other remedies or resolutions for TDZs.

Networking Strategies of TDZs. Participants mention various methods of networking with other TDZs and firms. A TDZ firm administrator believes that as success stories of TDZ firms increase, it turns into a more institutional network. A TDZ firm administrator names Turkish Exporters Assembly as a mentor institution in their network, adding that TDZ administration refers them to such institutions. Networking via personal contact seems to be a common and dominant strategy from the perspective of a university administrator:

> TDZs and firms establish both institutional and personal networks. They formally call for partners or cooperation. However, personally, I observed personal contacts play a more important role. Networking is crucial; even if you start via an institutional network, later it turns into a personal network. (Teknoparklar ve şirketler, hem kurumsal hem de kişisel ilişkiler network kuruyorlar. Daha formal kurumsal düzeyde partner bulma veya işbirliği niyetlerini ilettikleri oluyor. Ama ben yine de şahsi ilişkilerin baya bir ağırlıklı olduğunu gördüm. Network çok önemli ama network içinde bile yani

kurumsal network oluyorsunuz ama sonrasında iş yine şahsi ilişki düzeyine kalıyor.) - UNIADM5 -

A TDZ firm administrator agrees that personal contacts are more frequently used than institutional networks. Another TDZ firm administrator confirms dominance of organic or personal network, adding that this is due to inefficiency of TDZ administration. A university administrator believes in order for regional and international competitiveness, TDZs play an important role, adding that it may also have a role in eradicating regional differences in terms of economy and development. A university staff believes that TDZs compete more than they network to work together or learn from each other, adding that except for METU, İTÜ or Bilkent University and their TDZs, other Anatolian TDZs such as Kayseri, Mersin or Konya are in a fierce competition; firms also compete much to share what is left in the market from firms in İstanbul and Ankara. A TDZ administrator also states firms network and learn much from each other like a school.

Ecosystems for TDZs. Participants visualize ecosystems for TDZs at regional, national and international levels to suggest a holistic look at mechanisms of university-industry relations. Some participants also depict micro ecosystems such as clusters and thematic TDZs to suggest a holistic look at mechanisms of university-industry relations at local levels. A university administrator observes that TDZ ecosystem in the city depends heavily on local potential and realities of the city where industry and port of the city are drivers of economy. A TDZ administrator disagrees with the misconception of sectorial clustering, adding that clustering has to do more with operations or products of TDZs; clustering is more like a togetherness of firms from different disciplines to produce for instance an LCD panel - which also encourages interdisciplinary work. A TDZ administrator, however, believes it is difficult to cluster around production of a product when companies, for instance a TV manufacturer, prefer to produce an LCD panel all by themselves. A university staff favors thematic TDZs that take

into account regional or local realities, like agriculture or marine sciences, describes a future for themed and small size TDZs in the city.

Other Remedies or Resolutions for TDZs. Further suggestions have been expressed in the data ranging from making TDZs more sustainable so that they can deliver what they have been originally designed for to eventually closing TDZs as punishment. A university administrator suggests that TDZs must be vivid places where research becomes a lifestyle in a workable atmosphere - which is absent in most TDZs in Turkey, adding that the number of TDZs can be limited to five to ten so that TDZs can really work and produce citing very few numbers of TDZs in a huge country like the United States. A TDZ firm administrator complains that industry prefers the easy way to export huge volumes of materials or raw materials rather than investing in and producing more tech-driven value added products, adding that they have a very superficial vision, as a result of which they turn to heavy industry though profit is much more in producing high-tech products; investors in industry are hesitant to face the challenges to form a market first as they are highly obsessed with profit-loss, which kills the very nature of research and development.

4.1.4 Summary of Within-case Results

Summary of within-case findings have been presented for each of the three cases below with a focus on the four broad categories of superordinate theme categories; namely, contributions of TDZs, conflicts of TDZs, zone of influence of TDZs, and suggestions for TDZs.

Table 4. *Summary table for within-case results*

Superordinate Themes	Themes	University A and its TDZ	University B and its TDZ	University C and its TDZ
Contributions of TDZs	*Economic Anchor / Leverage for Economy*	export booster, future lies with value-added products, only leading TDZs contribute nationally, TDZs-a state investment policy, leverage for technological and developmental leap for Turkey, catalyst for local development	TDZs a tool for Turkey to break its shell, collective action-not only TDZs, helps maximizing profit margin, production channeled back to economy-welfare, TDZs a state policy,	shifting state policy, eradicate regional differences, value-added products for tax revenue, local economy and development, only leading TDZs international products, compensate loss from other fields (imports), success stories needed
	Showcase of Country Image	contribution to Turkey's visible, competitive knowledge-based-economy country image internationally	make Turkey internationally visible and competitive, contribute to country image nationally and internationally	relatively small size contribution to visibility, competitiveness, knowledge-economy transformation internationally-only top TDZs do so,
	Mutualism between University and TDZs	employment, internship, chances for applied research, little social sciences employment a weakness,	employment, internship, TDZs provide social and educational exchange setting, university benefits expertise from TDZ personnel, university staff advise/authorize projects/learn from this, rent income for university	employment, internship, incentive for academics like patents,
	International Outreach of Knowledge and Technology Production,	international outreach with its defense, software, ICT clusters, know-how sharing with TDZs abroad (Turkey's region or hinterland), business model for franchising in other regions or abroad	regional/local outreach for knowledge and technology production, mentorship program for other TDZs in city/city's vicinity	NA

	Socio-cultural Development	create a socio-cultural environment, products and services reach out to public, improve socio-cultural development by channeling welfare and skilled human capital-this ignites socio-cultural exchange	nearby sea-front town attraction for entrepreneurs, TDZ and university force local authorities to take action for town's problems, cultural exchange-concerts by artists in town, ties with local community, products from TDZ reach out to public	services out of TDZ reach out to public, orientation visits from students and regular people reinforces to connectedness with the community, reach out to public synonymous with reaching out to entrepreneurs
Conflicts of TDZs	*Critical Mass*	critical mass achieved; not much conflict; figures from Ministry of Development approve critical mass	*University:* more doctoral graduates needed for critical mass; *TDZ:* if critical mass not reached until 2023, TDZs may not be self-sustaining; figures from university show relatively small number of doctoral programs and doctoral students	*TDZ:* few worldwide products, marketing problem, more research and development, innovation *State:* more funds, subsidies; Strategic plan-SWOT- TDZ not reached critical mass of producing technology
	Ownership in Knowledge and Technology Production	*TDZ:* much market focus, not much investment in pure knowledge and technology production - a prerequisite for marketability, much dependence on university -human capital, research and knowledge; financial pressures *University:* additional mission for university-other missions also, dominance over TDZ, academics conservatism regarding pure knowledge and technology over marketable ones	*TDZ:* no self-production of knowledge and technology- get ready-made from university *University:* pure knowledge and technology production precedes marketable ones -a prerequisite, pressures to work at TDZ, the low amount marketable knowledge and technology fails to feed TDZs	*University:* limitations for applied research at university in absence of TDZs, hesitance of academics to involve in TDZs, TDZ affiliation used to be shame for academics, quality of graduates not matching expectations of industry-extra in-service training needed Industry: reluctant to invest in time-consuming projects and human capital but expects much

	Cultural Misfit	*TDZs:* organizational structure and management cultures different, *University:* interventionism via membership in executive committees of TDZs *State:* interventionism via membership in executive committees of TDZs	*TDZs:* still at early developmental phase compared to Silicon Valley, increased expectations form TDZs if this dream kept alive - functionality decreased *State:* too much intervention, let TDZs grow naturally, must make other investments-TDZs not only saviors	NA
	Inadequacy of TDZs	*TDZ:* companies more focused on research and development now, only 10-15 TDZs truly operational and functional, developmental problems: 6-10 years to be fully operational; *Industry*: TDZs were not understood much at first *Society*: TDZs were not understood much at first	*TDZ:* grey zones cleared with TTOs, developmental problems: 6-7 years to be fully operational, quality versus quantity, admission criteria lowered to attract firms, real-estate misconception, by 2023 if not functional TDZ model may rot *University*: poor location of TDZs on campus, poor infrastructure, lack of social facilities *State*: annual performance index for TDZs, entrepreneurship and innovation index - indicators (?), inflation of TDZs in the city-state policy- led to lower functionality or dysfunctionality	*TDZ:* only top performing TDZs can produce economic value - value added products or services however they can only compensate for import-export imbalance *State*: TDZs as indispensable institutions is a fallacy - if resource draining must be reconsidered

	Managerial Conflict	*TDZ:* horizontal management and role distribution too scattered and vague, firms' needs not communicated to university administration, *University*: strategic issues by university-daily operations by TDZs, intervention by presence of academic managers in executive board of TDZ, landlord attitude towards TDZs, lack of professionalism of academic-managers, slows down operations of TDZs, hierarchy in university administration hinders communication channels, managerial problems partially lead to TDZs' failure	*TDZ:* individual characteristics of TDZ managers, *University*: individual characteristics of academic-managers, exercising legal authority on TDZs, rectors' seeing TDZ a showcase of their term-change of cadres if rector not re-elected	*TDZ:* individual characteristics of TDZ managers, failure to report problems to university administration, *University*: lack of vision of university management, individual characteristics of university managers, slows down the operations of TDZ, landlord attitude towards TDZs, lack of supervision on TDZs *State*: presence of state representative in executive committees of TDZs-group think-slows down operations /kills dynamism
	Legal Gaps and Political Conflict	*TDZ:* firms forced to succeed in research and development though it, by its nature, may fail, firms abuse the law (benefit tax waiver or funds etc.) and maximize their profits rather than doing research and development or producing value added products or services, *University*: intervention to TDZs to maintain efficiency and save reputation,	*TDZ:* entrepreneurs prefer investment-free fields like ICT or software, loose admission criteria, firms forced to succeed in research and development though it, by its nature, may fail; firms abuse the law (benefit tax waiver or funds etc.) and maximize their profits *State*: vague hierarchy of two separate legal entities, paperwork	*TDZ:* legal gap for dominant software cluster, firms abuse the law (benefit tax waiver or funds etc.) and maximize their profits *University*: hierarchical organization of university versus TDZ *State*:, social sciences disadvantaged- a legal barrier, legal gap for, recent Research and

		State: liability in failure- university or TDZ?, loose state supervision	exhausts entrepreneurs, ministry's slides " join TDZs and get waiver" *Politicians:* TDZs deviate from original mission due to superficial decisions by politicians- the TDZ model needs legal amendment,	Development Centers Law challenges existence of TDZs
Zone of Influence of TDZs	*Entrepreneurship and Innovation as Drivers of Transformation of Higher Education Institutions*	entrepreneurial and innovation-driven university impossible without TDZs; TDZs motivate interdisciplinary actions by universities, Entrepreneurship Centers opened in universities, more events/activities to teach entrepreneurship and innovation; entrepreneurship and innovation-curricular pressures, entrepreneurship and innovation-drivers of mission diversification	TDZs motivate interdisciplinary actions by universities; TDZs teach/give training on entrepreneurship and innovation, curricular pressures by TDZs, entrepreneurship and innovation-drivers of mission diversification	late introduction of entrepreneurship and innovation into higher education- late transformation; curricular pressures by TDZs (formal entrepreneurship training needed), entrepreneurship and innovation-drivers of mission diversification
	Survival of the Most Institutional	*External forces:* such as the state, the industry, non-governmental organizations, other universities and TDZs. State and competition from other universities and TDZs -two commonly stated external forces *Internal forces:* organizational structure, units, management, human resources, decision making, finance and supervision	*External forces:* such as the state, the industry, non-governmental organizations, other universities and TDZs. State and competition from other universities and TDZs -two commonly stated external forces *Internal forces:* organizational structure, units, management, human resources, decision making, finance and supervision	*External forces:* such as the state, the industry, non-governmental organizations, other universities and TDZs. State and competition from other universities and TDZs -two commonly stated external forces *Internal forces:* organizational structure, units, management,

		Legitimacy: spreading the image of a prestigious university and a prestigious TDZ, internationalization goal: a quest for legitimacy nationally, international rankings also help with prestige (legitimacy) *Buffer Strategies*: infrastructure, management, formation of sub-units or TTOs, early period development - (rationalized myths) & supervision, middle-management structures - (decoupling) *Bridge Strategies*: coercive isomorphism over mimetic; mimes international examples or other top performing ones in Turkey	*Legitimacy*: spreading the image of a prestigious university and a prestigious TDZ, prestige nationally *Buffer Strategies*: structure, location, funds/subsidy/tax waiver, dominant clusters (software, information technologies and electronics), core activities or units, executive structure - (rationalized myths) & product specialization, proximity, involvement of academics, services, rent, supervision, business volume, speed of development - (decoupling) *Bridge Strategies*: coercive isomorphism over mimetic; mimes national top performing TDZs in Turkey	human resources, decision making, finance and supervision *Legitimacy*: spreading the image of a prestigious university and a prestigious TDZ, low prestige nationally *Buffer Strategies*: structure, sub-units, buildings, facilities, management - (rationalized myths) & product specialization, funding, human capital, sectorial proximity - (decoupling) *Bridge Strategies*: coercive isomorphism; mimes national top performing TDZs in Turkey
	Patronage of Knowledge and Technology Production Policy	political decisions precede decisions based on science, direct impact on policy makers, bottom-up feedback channels vital, in the making of a new or regulation University A's TDZ consulted, outputs/success stories can talk, leading TDZs seen as spokespersons for all TDZs by	via top university administrators (assuming role of directorate of research), via TTOs, via TDZ executive management, intimacy with policy makers (former students), diverse opinions oppressed-fear of business making, outputs/success stories by TDZs	influence over funding issues, great potential for influence but not in practice, real bottom-up data and open feedback channels key for influence, via Association of Technology Development Zones

		policy makers, intimacy and proximity to policy makers is key for influence, influence via Association of Technology Development Zones	can talk, via Association of Technology Development Zones	
	Patronage of Higher Education Policy	either indirect or little influence, influence over patent issue, via university administration,	better communication channels with higher education policy makers than before, via executive committee of TDZs, influence over intellectual property rights, via directorate of research of university	better communication channels with higher education policy makers than before, via university administration, indirect or little influence
Suggestions for TDZs	*Networking Strategies of TDZs*	*Quality networks*: institutional network via Association of Technology Development Zones, networking via joint projects-formation of clusters and exchange of know-how→a teaching-learning network; personal networks more active	*Quality networks*: institutional network via Association of Technology Development Zones, USİMP, TTP, City's Universities Platform; networking via joint projects and personal networks more common, a teaching-learning network	*Quality networks*: more institutionalized network due to success stories, institutional network via Association of Technology Development Zones and Turkish Exporters Assembly, personal networks common, a teaching-learning network
		Vicious competition: networking just out of necessity; bigger firms subcontract smaller ones, networking and enlarging the volume of production sacrificed for competition, favoritism of the state for bigger firms	*Vicious competition*: networking just out of necessity, inflation of TDZs in the area a threat- firm transfers, intra-TDZ level network sacrificed for competition,	*Vicious competition*: competition in the country failure in international markets, Anatolian TDZs (after top performing ones) in fierce competition

	Ecosystem for TDZs	*A working ecosystem*: local level ecosystems welcome-Konya or Gaziantep examples, clusters such as defense work, thematic TDZs welcome- that feed on and reflect local realties (not everyone must be software producers) *A failing ecosystem*: mistake to open TDZs in ecosystems with low industrial potential and scarce human capital,	*A working ecosystem*: University B's TDZ started as a regional ecosystem for the Aegean region, evolves and joins into the national ecosystem, thematic TDZs or clusters develop ecosystem, *A failing ecosystem*: too many TDZs in the same region-ecosystem fails, lack of business potential kills clusters,	*A working ecosystem*: thematic TDZs that exploit city's less-cultivated potential in marine sciences or agriculture→a working ecosystem *A failing ecosystem*: ecosystem depends heavily on local potential and realities
	Other Remedies or Resolutions for TDZs	*Other suggestions (+)*: a better management model, investors like in Silicon Valley needed, joint-publication criterion for university and TDZs for knowledge production; *Resolutions for TDZ (-):* more strict supervision by the state, research and development-only criterion to evict abuse by firms	*Other suggestions (+):* well-grounded relation based on clearer roles and coordination, negotiation and accountability; classification for TDZs: TDZ 1.0 and TDZ 2.0 *Resolutions for TDZ (-)*	*Other suggestions (+)*: research and their venues must be a lifestyle for Turkey; *Resolutions for TDZ (-)*: limiting total number of TDZs in Turkey to 5-10, resolutions for industry to invest more in TDZs - not always ask from TDZs

University A and its TDZ

The first subtitle is "contributions of TDZs". Under that, the first heading is TDZs' being an economic anchor or leverage for economy. Data reveal that University A's TDZ contributes to this ideal by generating value-added products and services and contributing to national export-import balance. The second heading is TDZs' being a showcase of country image'. University A's TDZ with its high volume of value-added product and service generation, and an internationalization goal is believed to be on display in the showcase of Turkey; and thus, it contributes to Turkey's visible, competitive and knowledge-based country image. The third heading is 'mutualism between university and TDZs', in which University A and its TDZ mutually benefit employment, internship, and chances for applied research; however, little social sciences employment is a stated weakness. The fourth heading is University A's TDZ's international outreach of knowledge and technology production' via tools of franchising and mentoring other TDZs or the ones abroad. The fifth heading is 'socio-cultural development' in which University A's TDZ contributes to socio-cultural development via products and services that reach out to public.

The second subtitle is "conflicts of TDZs". Under that, the first heading is 'critical mass'. Data reveal that University A's TDZ has actually reached a significant amount of critical mass of knowledge and technology production capacity, human capital, capacity for generating value-added products or services; thus, not much conflict arises as to critical mass; figures from MoD approve it. The second heading is 'ownership in knowledge and technology production'. University A's TDZs is part of the conflict due to its being much market focused but investing little in pure knowledge and technology production, and its much dependence on human capital from University A. On the other hand, university is part of the conflict due to its reluctance to adopt an additional mission, dominance over its TDZ and academic conservatism over pure knowledge and technology. The third heading is 'cultural misfit' between Turkish TDZ business model and those abroad. University A's TDZ is no

exception to this conflict in which organizational structure and management cultures are different, interventionism via membership in executive committees of TDZs are also the drivers of the conflict. The fourth heading is 'inadequacy of TDZs'. Top performing TDZs in Turkey like that of University A's are observed to be truly functional while most others have a resource draining profile. The fifth heading is 'managerial conflict'. Due to recent trends like New Managerialism- the power, status and role of manager-academics declined and this creates managerial conflicts between University A and its TDZ in issues like horizontal management, role distribution, communication of needs, a lack of professionalism, slowing down of operations, and intervention by presence of manager-academics in the executive board of TDZ. The sixth heading is 'legal gaps'. University A and its TDZ have misconception about the nature of research and development in that not all research and development activity will succeed, which brings issues of legal accountability; TDZ firms instinctively respond to survive at all costs- be it not doing real research and development but turning to projects with no real productization potential, or be it abusing the law; two separate legal entities- one with market focus and one with several missions (education, research, public service) - bring issues of liability; loose state supervision also create legal gaps.

The third subtitle is "zone of influence of TDZs". Under that, the first heading is 'entrepreneurship and innovation as drivers of transformation of higher education institutions'. Data reveal that TDZs like that of University A's potentially challenge universities to change and adapt to interdisciplinary research and education demands, curricular demands or even more fundamental structural changes like research-intense universities; Entrepreneurship Center was opened in University A, more events/activities to teach entrepreneurship and innovation are being organized. The second heading is 'survival of the most institutional TDZs'. For University A's TDZ, external forces include the state, the industry, non-governmental organizations, other universities and TDZs; state and competition from other universities and TDZs are two commonly stated external forces. Internal forces or institutional

norms and procedures of TDZs include organizational structure, units, management, human resources, decision making, finance and supervision. University A and its TDZ seek legitimacy in its organizational field and try to minimize uncertainty by spreading the image of a prestigious university and a prestigious TDZ that sets an internationalization goal. University A's TDZ buffers its structures and operations from its organizational environment by adopting a ceremonial adaptation to common management styles, organizational structure, buildings and facilities; it also decouples its core activities and outcomes by diverging from its formal structure in regards to supervision and middle-management structures. University A's TDZ is subject to prescription and pressure from supervising state institutions and laws more than mimetic isomorphism- but it still mimes international examples. The third heading is 'patronage of knowledge and technology production policy'. University A's TDZ interacts with influential parties (university, TDZs, state, etc.) to impact knowledge and technology production policy makers such as direct and indirect influence, via intimacy with policy makers, via institutions, and by using its proximity to the state, industry or clusters. The fourth heading is 'patronage of higher education policy'. University A's TDZ interacts with influential parties (university, TDZs, state, etc.) to impact higher education policy makers such as either indirect or little influence, or via university administration.

The fourth subtitle is "suggestions for TDZs". Under that, the first heading is 'networking strategies of TDZs'. Data reveal that University A's TDZ establishes various methods of networking with other TDZs and firms such as institutional network, networking via joint projects and dominantly personal networks although its networks may not be productive because of the fierce competition among TDZs, and favoritism of the state. The second heading is 'ecosystem for TDZs'. University A's TDZ forms clusters such as defense and welcomes local level ecosystems and thematic TDZs that feed on and reflect local realties, while it warns against opening TDZs in ecosystems with low industrial potential and scarce human capital. The third heading is

‘other remedies or resolutions for TDZs’ that include a better management model, investors like in Silicon Valley needed, joint-publication criterion for university and TDZs for knowledge production as well as a more strict supervision by the state, research and development-only criterion to evict abuse by firms.

University B and Its TDZ

The first subtitle is “contributions of TDZs”. Under that, the first heading is TDZs’ being an economic anchor or leverage for economy. Data reveal that University B’s TDZ partially contributes to this ideal by generating value-added products and services; in order for Turkey to become a knowledge economy, knowledge and technology production must not be limited to TDZs only; there must be collective action in all layers of the society. The second heading is TDZs’ being a showcase of country image’. University B’s TDZ with its volume of value-added product and service generation is believed to partially contribute to showcase of Turkey- contributes more to nationwide image. The third heading is ‘mutualism between university and TDZs’, in which University B and its TDZ mutually benefit employment, internship, chances for applied research, intellectual development for staff and income for university. The fourth heading is University B’s TDZ’s regional or local outreach of knowledge and technology production via the tool of mentoring’ in a way that it mentors other TDZs in their local hinterland as well as expanding into its vicinity in forms of branches. The fifth heading is ‘socio-cultural development’ in which University B’s TDZ creates a socio-cultural environment, products and services that reach out to public in addition to TDZs’ connectedness to the local community in the nearby sea-front town which is an attraction for entrepreneurs; TDZ and university force local authorities to take action for town’s problems; cultural exchange is maintained via concerts by artists living in town.

The second subtitle is “conflicts of TDZs”. Under that, the first heading is ‘critical mass’. Data reveal that University B’s TDZ has not fully reached a

critical mass of knowledge and technology production capacity, human capital, and capacity for generating value-added products or services; some conflict arises as to critical mass-especially human capital. The second heading is 'ownership in knowledge and technology production'. University B's TDZs is part of the conflict due to its being much market focused but investing little in pure knowledge and technology production, and its much dependence on human capital from University B. On the other hand, university is part of the conflict due to low generation of input to feed the TDZ, and academic conservatism over pure knowledge and technology. The third heading is 'cultural misfit' between Turkish TDZ business model and those abroad. University B's TDZ is no exception to this conflict in which TDZs must take years to develop and produce more compared to international counterparts; university's interventionism via membership in executive committees of TDZs is also the driver of the conflict. The fourth heading is 'inadequacy of TDZs'. Top performing TDZs in Turkey are observed to be truly functional while most others have a resource draining profile; University B's TDZ is observed to be a functional one; however, less functional compared to top performing ones. The fifth heading is 'managerial conflict'. Due to recent trends like New Managerialism- the power, status and role of manager-academics declined and this creates managerial conflicts between University B and its TDZ in issues like individual characteristics of manager-academics and TDZ managers blocking a functional management, manager-academics' use of legal authority over TDZs, and rectors' making TDZs a showcase of their terms, and intervention by presence of manager-academics in executive board of the TDZ. The sixth heading is 'legal gaps and political conflict'. The conflict areas in University B and its TDZ are entrepreneurs' preference over investment-free fields like ICT or software, loose admission criteria, firms being forced to succeed in research and development, vague hierarchy of two separate legal entities, much paperwork and superficial decisions taken by politicians.

The third subtitle is "zone of influence of TDZs". Under that, the first heading is 'entrepreneurship and innovation as drivers of transformation of

higher education institutions'. Data reveal that University B's TDZ has the potential to challenge universities to change and adapt to interdisciplinary research and education demands, curricular demands or even more fundamental structural changes like research-intense universities; University B's TDZ organizes events/activities to teach entrepreneurship and innovation. The second heading is 'survival of the most institutional TDZs'. For University B's TDZ, external forces include the state, the industry, non-governmental organizations, other universities and TDZs; state and competition from other universities and TDZs are two commonly stated external forces. Internal forces or institutional norms and procedures of TDZs include organizational structure, units, management, human resources, decision making, finance and supervision. University B and its TDZ seek legitimacy in its organizational field and try to minimize uncertainty by spreading the image of a nationwide prestigious university and a nationwide prestigious TDZ. University B's TDZ buffers its structures and operations from its organizational environment by adopting a ceremonial adaptation to common dominant clusters, core activities and units, executive structures, and funding procedures; it also decouples its core activities and outcomes by diverging from its formal structure in regards to product specialization, proximity, involvement of academics, services, rent, supervision, business volume, and speed of development. University B's TDZ is subject to prescription and pressure from supervising state institutions and laws more than mimetic isomorphism- but it still mimes national top performing TDZs in Turkey. The third heading is 'patronage of knowledge and technology production policy'. University B's TDZ interacts with influential parties (university, TDZs, state, etc.) to impact knowledge and technology production policy makers such as direct and indirect influence, via intimacy with policy makers, via institutions; and via top university administrators (those assuming the role of directorate of research), via TTOs, and via TDZ executive management. The fourth heading is 'patronage of higher education policy'. University B's TDZ interacts with influential parties (university,

TDZs, state, etc.) to impact higher education policy makers such as either indirect or little influence, or via university administration.

The fourth subtitle is "suggestions for TDZs". Under that, the first heading is 'networking strategies of TDZs'. Data reveal that University B's TDZ establishes various methods of networking with other TDZs and firms such as institutional network, networking via joint projects, dominantly personal networks and a teaching-learning network although its networks may not be productive because of local competition among TDZs in the city. The second heading is 'ecosystem for TDZs'. University B's TDZ started as a regional ecosystem for the Aegean region, now evolves and joins into the national ecosystem, it welcomes thematic TDZs or clusters that develop city's ecosystem and feed on and reflect local realties, while it also warns against an inflation of TDZs that the ecosystem cannot accommodate. The third heading is 'other remedies or resolutions for TDZs' that include a well-grounded relation based on clearer roles and coordination, negotiation and accountability; and a classification for TDZs as TDZ 1.0 and TDZ 2.0 based on its degree of development and functionality.

University C and Its TDZ.

The first subtitle is "contributions of TDZs". Under that, the first heading is TDZs' being a national or local economic anchor or leverage for local economy. Data reveal that University C's TDZ caters for the state policy to develop economically at national level and also locally; it fails to contribute much to Turkey's ideal of shifting into a knowledge-based economy with its low volume of generating value-added products and services. The second heading is TDZs' being a showcase of country image'. Relatively small size effect of University C's TDZ on Turkey's country image of a more visible, competitive and knowledge-based economy has been observed. The third heading is 'mutualism between university and TDZs', in which University C and its TDZ mutually benefit employment, internship, and incentive for academics in forms of patents. The last heading is 'socio-cultural development'

in which University C's services reach out to public; orientation visits of students or regular people to TDZs is seen as a prime need for a better link with the public and thus contribute to socio-cultural development.

The second subtitle is "conflicts of TDZs". Under that, the first heading is 'critical mass'. Data reveal that University C's TDZ fails to reach a critical mass of knowledge and technology production capacity, human capital, and capacity for generating value-added products or services with its few internationally marketable products due to marketing problems and insufficient magnitude and quality of research and development. The second heading is 'ownership in knowledge and technology production'. University C is part of the conflict due to limitations for applied research at university, hesitance of academics to involve in TDZs and quality of graduates not matching an entrepreneur profile; industry is also part of this conflict due to its reluctance to invest in time-consuming projects and human capital but it always expects more and shortly.

The following heading is 'inadequacy of TDZs'. Top performing TDZs in Turkey are observed to be truly functional while most others have a resource draining profile but top performing ones are believed to only compensate for import-export imbalance; considering TDZs as indispensable institutions is a fallacy; University C's TDZ is observed to be a low functional one compared to top performing ones. The next heading is 'managerial conflict'. Due to recent trends like New Managerialism- the power, status and role of manager-academics declined and this creates managerial conflicts between University C and its TDZ in issues like individual characteristics of manager-academics and TDZ managers blocking a functional management, failure to report problems to university administration, lack of vision of university management, university management's slowing down operations of the TDZ, and intervention by presence of state representatives and manager-academics in executive board of TDZ. The last heading is 'legal gaps and political conflict'. The conflict areas in University C and its TDZ are the legal gap for dominant software cluster, firms' abuse of the law, hierarchical organization of university

versus TDZ, social sciences' being disadvantaged in TDZ- a legal barrier, and recent Research and Development Centers Law's challenging the very existence of TDZs.

The third subtitle is "zone of influence of TDZs". Under that, the first heading is 'entrepreneurship and innovation as drivers of transformation of higher education institutions'. Data reveal that University C's TDZ has some potential to challenge universities to change and adapt to interdisciplinary research and education demands, and curricular demands. The second heading is 'survival of the most institutional TDZs'. For University C's TDZ, external forces include the state, the industry, non-governmental organizations, other universities and TDZs; state and competition from other universities and TDZs are two commonly stated external forces. Internal forces or institutional norms and procedures of TDZs include organizational structure, units, management, human resources, decision making, and finance and supervision. University C and its TDZ seek legitimacy in its organizational field and try to minimize uncertainty by spreading the image of a prestigious university and a prestigious TDZ but it is observed to have low prestige nationally. University C's TDZ buffers its structures and operations from its organizational environment by adopting a ceremonial adaptation to common structures, sub-units, buildings, facilities, and management; it also decouples its core activities and outcomes by diverging from its formal structure in regards to product specialization, funding, human capital, and sectorial proximity. University C's TDZ is subject to prescription and pressure from supervising state institutions and laws more than mimetic isomorphism- but it still mimes national top performing TDZs in Turkey. The third heading is 'patronage of knowledge and technology production policy'. University C's TDZ interacts with influential parties (university, TDZs, state, etc.) to potentially impact knowledge and technology production policy makers but it fails to put this into practice due to its degree of impact on policy makers. However, it has certain impact via institutions. The fourth heading is 'patronage of higher education policy'. University C's TDZ interacts with influential parties (university, TDZs, state, etc.) to impact

higher education policy makers by exerting either indirect or little influence, or via university administration.

The fourth subtitle is "suggestions for TDZs". Under that, the first heading is 'networking strategies of TDZs'. Data reveal that University C's TDZ establishes various methods of networking with other TDZs and firms such as institutional network, networking via joint projects, dominantly personal networks, and a teaching-learning network although its networks may not be productive because of fierce competition among Anatolian TDZs ranking after top performing TDZs. The second heading is 'ecosystem for TDZs'. University C's TDZ welcomes thematic TDZs that can exploit the city's less-cultivated potential in marine sciences or agriculture; however, its ecosystem depends heavily on local potential and realities- which is a caveat. The third heading is 'other remedies or resolutions for TDZs' that include research and their venues becoming a lifestyle for Turkey as well as limiting the total number of TDZs in Turkey to 5-10, and resolutions for industry to invest more in TDZs so that they do not always ask from TDZs but give to TDZs.

4.2 Cross-case Findings

After presenting within-case results for each of the three cases, now cross-case findings across three cases have been categorized under four superordinate theme categories; namely, levels of contributions (macro and micro levels), sources of conflicts (TDZs being the subject or object of conflicts), pathways of influence (TDZs' being agent or recipient of the influence), and suggestions (suggestions for a sustainable TDZ and the worst-case scenario for TDZs).

4.2.1 Levels of Contributions

TDZs provide contributions to Turkey's economy and development, Turkey's country image, and Turkey's international outreach of knowledge and technology production at macro level; at micro level, TDZs mutually benefit university and TDZs, and aid social development.

4.2.1.1 Macro-level Contributions of TDZs

Economic Anchor / Leverage for National Economy. Participants hold the view that Turkish TDZs have been attributed a mission to help transform Turkey into a knowledge economy. Powell and Snellman (2004, p. 199) define and explain the knowledge economy as:

> …production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources.

A university staff from University C explains TDZs' knowledge economy mission by saying that:

> It's all about the perspectives of states; pure industrial production used to be popular. Especially in the city, following death of Sabancı - a leading industrialist in the region- factories were shut down and capital moved to İstanbul. State is observing the changing trends in the world; seeing that TDZs and value added products are becoming new trends and human capital is scarce in Turkey, the state turned to universities and gave them a new mission. This is clear from the funds that became available during the last ten years or so- state plays the biggest role here. (Tamamen devletlerin bakış açısından ortaya çıkıyor bu. Önceden sanayi revaçtaydı. Özellikle burda Sabancı'nın vefatı ile fabrikalar kapandı ve sermaye İstanbul'a kaydı. Devlet de eğilime bakıyor dünyada ve teknopark katma değerli ürünlere doğru gidiyor eğilim. Bir avuç yetişmiş insan var, bunu kim yapabilir diye bakınca devlet, üniversitelere böyle bir yetki ve misyon verildi. Son on yılda TÜBİTAK destekleri SAN-Tez vs hep son 10 yılda çıkmıştır. Devlet büyük bir rol üstleniyor burda.) - UNISTAFF5-

As clear from the above quotation, Turkey has commissioned an interface organization of university-industry relations - TDZs- to contribute to transformation of Turkish economy into a knowledge-based one.

Data from the interviews reveal that across all three cases participants believe that TDZs are export boosters; the future lies with value-added products, only leading TDZs contribute national economy and development; TDZs are a state investment policy and act as a leverage for technological and developmental leap for Turkey. However, some diverse opinions have also been voiced out by the participants. TDZs are also viewed as the catalyst for

local development; a collective action by all segments of the society is needed- not only TDZs are responsible for this ideal; via TDZs' production and profit, taxes can be channeled back to economy to increase welfare of all; TDZs can also eradicate regional differences and compensate for the loss from other fields such as imports.

Data from document analysis of Turkey Industry Strategy Document 2015-2018 may supplement arriving at more precise findings as to TDZs' being an economic anchor or leverage for Turkish national economy and Turkey's development. Turkish industry policy makers list some strategies to advance the efficiency and competitiveness of Turkish industry and accelerate the transformation of industry into one that takes a greater share from world export by mainly producing high value added and high-tech products and employing skilled human capital. It seems that the success of these strategies owe much to success stories from TDZs and the direction of key informants in the study and the strategies set by industry policy makers converge on TDZs' being an anchor or leverage for national economy.

Showcase of Country Image. Participants believe that TDZs are the showcase of Turkey's country image. Data from the interviews reveal that some commonalities exist in that TDZs contribute to Turkey's visibility, competitiveness and knowledge economy transformation; thus, they polish Turkey's country image. However, some participants slightly think differently as to TDZs' contribution to country image nationally as well; and state that TDZs such as that of University C's have small size contribution to enhancing Turkey's country image because only top TDZs can do so.

International Outreach of Knowledge and Technology Production. Participants hold the view that with its TDZs Turkey is reaching out internationally to other countries or regions in regards to knowledge and technology production.

Data from the interviews show that knowledge and technology production is at the core of this spread. However, some diverse opinions have also been voiced out such as franchising University A's TDZ's business model

in Turkey and abroad or University B's mentorship program for other TDZs in the city/city's vicinity. University C and its TDZ lack this notion of TDZs' international outreach of knowledge and technology production.

Data from document analyses of University A's Strategic Plan for 2011-2016, and University B's Strategic Plan for 2014-2018 may help reach more precise findings as to TDZs' reaching out nationally and locally regarding knowledge and technology production. In University A's strategic plan, internationalization of its TDZ is a primary goal with the strategies to support the processes of establishing new technology parks, particularly in Turkic republics and the Middle Eastern countries, and taking initiatives to enable the commercial use of the University A's TDZ model (franchising, etc.) in other technology parks. Likewise, University B's strategic plan envisions setting up a contact office in downtown and in organized industry districts around the city, and setting up an additional branch of University B's TDZ in organized industry districts outside the city. It is likely to state that data from document analyses from both universities approve their efforts to reach out internationally regarding knowledge and technology production by using tools of mentoring and franchising.

4.2.1.2 Micro-level Contributions of TDZs

Mutualism between University and TDZ. Participants believe that universities and TDZs mutually benefit their togetherness within the context of university-industry relations such as materialistic, educational and intellectual benefits. Data from the interviews reveal some common views in terms of employment, internship, chances for applied research and university staff's advising/authorizing projects while at the same time learning from such projects. However, some diverse opinions have also been voiced out such as the weakness of little social sciences employment at TDZs, TDZs' providing a social and educational exchange atmosphere for academics, students and TDZ workers, and also university's benefitting expertise from TDZ personnel, rent

income for university, and incentives for academics like patents produced at TDZ.

Data from document analyses of Technology Development Zone Law and Technology Development Zone Regulation and strategic plans and activity reports of the three universities may help reach more precise findings as to TDZs' and universities' mutually benefitting the relation between each other. The law and regulation writes that among qualified personnel to be employed at TDZs are research and development personnel, researcher, software personnel, designers and design personnel- which are readily available at universities; and it also says that TDZ executive firm rents the TDZ area-thus, generates income for the university. The strategic plans, activity reports and websites reveal that University A's TDZ, University B's TDZ, and University C's TDZ host highly-skilled workforce mainly from their own students and graduates. In addition, University C's Strategic Plan for 2013-2017 presents a stakeholder/ product-service matrix which shows the type of interaction that university has with stakeholders. In this matrix University C interacts with its TDZ in terms of published papers, graduates, and knowledge under products category. As for services, University C and its TDZ interact in terms of research and development, consulting, and technical and laboratory services. It is likely to state that the document analyses above prove the bilateral contribution among TDZs and universities.

Socio-cultural Development. Participants hold the view that TDZs also contribute to social and cultural development of the society by connecting to the community directly or via products and services. According to a university administrator, regarding contribution of their TDZ to socio-cultural development of a nearby community, University B's TDZ is an integral part of the local community:

> When many skilled and innovative people are brought together, a social atmosphere is created; they expect social facilities. When you set up a campus and TDZ here near a small village, some unforeseen but mutually beneficial interaction occurs. TDZ contributes to social development in this seafront small town. This is a mutual social exchange between me and the villagers.

> Teaching staff, students and workers at TDZ live here. Bir sürü nitelikli insanı bir araya getiriyorsunuz, inovatif kişiler orda bir sosyal ortam yaratılıyor tabi onların talep ettiği sosyal imkanlar oluyor. Burdaki gibi bir köyün yanına teknopark kurulunca öngörülmeyen etkileşimler başlıyor herkesin yararına.. Burda denize yakın bir köy var. Teknoparkın burda yarattığı bir sosyal olgunun üzerinden analiz edersek bu bölgeye sosyal açıdan da katkısı var yani işte köyün yanındayız. Akşam ben köye gidiyorum yumurtamı ordan alıyorum sosyal hayatım veya köyün sosyal hayatı da bundan etkileniyor. .Öğrencilerimizin önemli bir kısmı burda köyde yaşıyor. Hoca ve idari personeller var. Bir tarafta deniz. ....) - UNIADM3-

Data from the interviews demonstrate that TDZs commonly create a socio-cultural environment, and through their products or services they reach out to public.

However, some differing opinions have also been stated in that TDZs are believed to improve socio-cultural development by channeling welfare and skilled human capital-which ignites socio-cultural exchange; a nearby sea-front town attracts more entrepreneurs to settle in; TDZ and university force local authorities to take action for town's problems; concerts are given by artists living in town, also orientation visits from students and regular people can connect TDZs with the community; for some participants reaching out to public is synonymous with reaching out to entrepreneurs.

Data from document analyses of Technology Development Zones Law, Turkey Industry Strategy Document 2015-2018, University A's strategic plan and University B's mission statement may help reach more accurate findings as to TDZs' being a contributor to socio-cultural development. In the law there is reference to TDZs' "…contributing to the development of the area and area located inside of nearby of the collaborating university, technology institute or R&D center, integrating academic, economic and social structures"; the strategy document also refers transforming industry into "one that is sensitive towards the environment and the society"; in University A's strategic plan one of the main aims stated is "enhancing and rendering widespread the contribution of University A, University A's TDZ and the university-industry collaboration to the society and country" via the strategy of "raising awareness in the importance of the cooperation between university and industry and

ensuring that its impacts are transferred to the society". Similarly, in University B's mission statement one of the main aims stated is to "inform Turkish industry with its knowledge and experience as well as research and development outputs; work with the industry to contribute to economic and social transformation". It is likely to state that TDZs contribute to the society in various ways as prescribed by the documents above and as mentioned by the participants in the interviews.

4.2.2 Sources of Conflicts

Conflicts arise in university-industry relations in relation to their organizational structure, relationship with their universities, and their management, missions and core operations, the sources of which can be attributed to TDZs, universities, the industry or the state. Such conflicts can be listed as critical mass, ownership in knowledge and technology production, cultural misfit, inadequacy of TDZs, managerial conflict, and legal gaps and political conflict.

Critical Mass. Participants think that a critical mass conflict arises as to knowledge and technology production capacity, human capital and quality of technological products etc.

Data from the interviews show that sources of conflict regarding critical mass can be attributed to TDZs, university and the state. In University B and University C, failure to reach critical mass is voiced by the participants. It is believed that if TDZs cannot find ways to reach a critical mass until 2023, they will risk being self-sustaining. Moreover, TDZs can produce few worldwide products; marketing is a serious problem; and more research and development, and innovation are needed to reach critical mass. Universities must produce more doctoral graduates to reach critical mass. State, on the other hand, must provide more funds and subsidies so TDZs can reach a critical mass. In the case of University A, it is reported that critical mass has been achieved; not much conflict is observed.

Data from document analyses of figures from MoD, activity reports of universities and strategic plans of universities help reach more precise findings as to TDZs' ability or inability to reach a critical mass. For University A, figures from Ministry of Development (Cansız, 2016) approve critical mass has been achieved; University A and its TDZ' critical mass accounts for more than any other TDZ in the city regarding indicators of critical mass such as number of TDZ enterprises, number of employees in TDZs, number of patents produced in TDZs, share in total TDZ origin export, total TDZ origin sales, and number academic entrepreneurs in TDZs. Likewise, University A and its TDZ' critical mass accounts for around one quarter to one third of Turkey' total number of TDZ enterprises, number of employees in TDZs, number of patents produced in TDZs, share in total TDZ origin export, total TDZ origin sales, and number academic entrepreneurs in TDZs.

As for University B, figures from university's activity report show relatively small number of doctoral programs and doctoral students; University B and its TDZ seem to partially generate value-added products or services because a critical mass of human capital is yet to develop- which is evident in a comparison of number of doctoral programs (University A- 69 versus University B-17); and a comparison of number of graduate students (University A- 8448 versus University B-1568) between University A and University B in their annual activity reports. When it comes to University C, in its strategic plan a SWOT analysis reports that its TDZ has not reached a critical mass of producing technology under the heading of weaknesses. It is likely to state that sources of critical mass conflict may be attributed more to TDZs, then universities and finally to the state.

Ownership in Knowledge and Technology Production. Participants believe some conflicts occur over ownership of knowledge and technology production between university and academics, and entrepreneur academics and TDZ. Entrepreneur academic is someone who involves in "any activity that occurs beyond the traditional academic roles of teaching and/or research, is

innovative, carries an element of risk, and leads to financial rewards directly or indirectly, via an increase in reputation, prestige, influence or societal benefits, for the individual academic or his/her organization" (Abreu & Grinevich, 2013). A university administrator describes this dichotomy between these parties as:

> TDZs are more dynamic as opposed to universities which are much bigger structures in terms of management. The two have different missions. TDZs are more innovation focused; universities have missions like education, research, public service while TDZs have a mission to turn pure knowledge and technology into value added products or services - something universities cannot do. Therefore, TDZs and universities are in an inseparable relationship with each other. (Teknoparkların avantajı dinamik bir yapı olmaları; üniversiteler daha hantal bir yapı. Daha büyük yapılar idari anlamda da...Farklı misyonları olan bir yapı… Daha inovasyon odaklı teknoparklar; üniversitenin eğitim misyonu var, araştırma misyonu var, topluma hizmet misyonu var… ama teknoparkların o temel araştırmanın üstüne inşa edilen kullanımı ve katma değeri olacak uygulamalı araştırmalar sonucunda ortaya çıkacak ürünleri bulma konusunda büyük rolü var. Üniversiteler bunu yapamaz dolayısıyla, teknoparksız üniversite ve üniversitesiz teknopark düşünmek zor) - UNISTAFF3-

Data from the interviews reveal that sources of conflict regarding ownership in knowledge and technology production can be attributed to TDZs, university and the industry. To start with, in the view of the participants, TDZ are much market focused; they do not make much investment in pure knowledge and technology production which is a prerequisite for marketability; they depend much on university in terms of human capital, research and knowledge; they succumb to financial pressures; they have no self-production intention of knowledge and technology but get them ready-made from university.

Participants also think conflicts emerge from university in that at universities, there are limitations for applied research in absence of TDZs; academics are hesitant to involve in TDZs; TDZ affiliation used to be a shame for academics; and quality of graduates do not match expectations of industry as a result extra in-service training is needed for graduates. Universities see entrepreneurship as an additional mission for university in addition to other missions; universities display dominance over TDZs; academic conservatism

regards pure knowledge and technology over marketable ones; academics feel pressures to work at TDZ; the low amount marketable knowledge and technology from university fails to feed TDZs. Lastly, participants also state that conflicts due to industry is reluctance to invest in time-consuming projects and human capital but expecting much in a short time.

Data from document analyses of strategic plans from University A and University B, and Technology Development Zones Law may help reach more precise findings as to conflicts in ownership in knowledge and technology production. The law allows for academics to start, work at or become shareholders of firms in TDZs. One of the main aims in University A's strategic plan is synchronizing University A and its TDZ within the scope of conversion of knowledge into economic benefit and cooperation between university and industry via some strategies such as ensuring the protection of intellectual property rights. In University B's Strategic Plan for 2011-2016, one of the main aims is strengthening the relationship between University B's academics and TDZ firms. It can be concluded that data from the interviews and the ones from document analyses help close the gap in the understanding of this conflict - ownership in knowledge and technology production.

Cultural Misfit. Participants state that there exists a cultural misfit between Turkish business model for TDZs and the ones abroad, which is embodied in an ever-failing dream of Turkish Silicon Valley. Aksan (2012) informs that TDZs in the US fall into Private Sector-Based Model while Turkish TDZs fall into the Mixed Model (a hybrid of State or Local Government Based Model and University-Based Model). In other words, business culture in the US is a free enterprise system and the one in Turkey yields to prevalence of etatism, which eventually creates a conflict of cultural misfit.

Data from the interviews reveal that sources of conflict regarding cultural mismatch can be attributed to TDZs, university and the state. Participants believe that TDZs in Turkey and those in the US have different organizational structure and management cultures- in Silicon Valley there is a

‘no management’ style unlike TDZ executive firms in Turkey; TDZs in Turkey are still at early developmental phase compared to Silicon Valley; expectations are increasing form TDZs when this dream is perpetually kept alive, which may end in dysfunctionality. Participants also believe part of conflict stems from universities and the state in that they have an interventionist approach towards TDZs via membership in executive committees of TDZs; TDZs must be let grow naturally; state must make other investments in order not to depend much on TDZs to save the country.

Inadequacy of TDZs. Participants believe that a conflict of inadequacy of TDZs arises; despite all investments most TDZs seem to have a dysfunctional and resource-draining profile except for top performing ones.

Data from the interviews reveal that sources of conflict regarding inadequacy of TDZs can be attributed to TDZs, universities, state, industry and society. Participants state a series of items as to sources of conflict due to TDZs; they believe that TDZ firms are only now more focused on research and development; only 10-15 TDZs in Turkey are truly operational and functional; developmental problems of TDZs exist since it takes 6-10 years for a TDZ to be fully operational; gray zones in university-industry relations have been cleared with establishment of TTOs; quantity of firms and employees precede quality; admission criteria are lowered to attract more firms due to profit concerns; there is a real-estate misconception of TDZs; if, by 2023 TDZs are not functional, then the TDZ model may rot; only top performing TDZs can produce economic value - value added products or services- however they can only compensate for import-export imbalance. Participants also believe that universities usually allocate poor locations on campus with relatively poor infrastructure; there is a lack of social facilities. Participants say that that the state adopts only two major indicators for functionality of TDZs: annual TDZPI, and annual entrepreneurship and innovation index (EII); there is an inflation of TDZs in the Aegean city-a state policy- which led to lower functionality or dysfunctionality of TDZs; viewing TDZs as indispensable

institutions is a fallacy - if they are resource draining then they must be reconsidered. Participants also attribute source of the conflict- inadequacy of TDZs to the industry and the society in that neither the industry nor the society understood what TDZs are at first.

Data from document analyses of URAP's (2017b) ranking for universities, entrepreneurship and innovation index for 2016 (TÜBİTAK, 2016), and MoSIT's annual performance index (BSTB, 2015) for TDZs may help reach more precise findings as to the conflict of TDZs' inadequacy. University A ranks in 1-10 band on URAP's (2017b) ranking for universities while also ranking in 1-10 band on entrepreneurship and innovation index. It is likely to state that University A's TDZ is a functional TDZ which also ranks in 1-10 band on MoSIT's annual performance index for TDZs. University B ranks in 10-20 band on URAP's (2017b) ranking for universities while ranking in 1-10 band on entrepreneurship and innovation index. It is likely to state that University B's TDZ may lack functionality on certain fields although it ranks in 1-10 band on MoSIT's annual performance index for TDZs. Moreover, University C ranks in 50-60 band on URAP's (2017b) ranking for universities while ranking in 30-40 band on entrepreneurship and innovation index. It is likely to state that University C's TDZ may not be a functional one although it ranks in 1-10 band on MoSIT's annual performance index for TDZs- which also threatens the credibility of this indicator.

Managerial Conflict. Participants hold the view that some conflicts arise among 'traditional manager-academics' and a new line of university managers referred to as 'corporate managers' due to recent trends like New Managerialism. While the contemporary university has become entrepreneurial or marketized, academic-managers have started to lose their power, status and impact on university governance and management due to managerialism (Amaral et al., 2002) which "entails the progressive and intensifying expansion of market forces, performance measurement and control, and consumer populism into the public sphere, then it inevitably involves the enhanced

cultural power and increasing political reach of an instrumental/market rationality that 'gnaws away' at professional autonomy and control" (Deem et al., 2007). A TDZ firm administrator also points to managerial conflicts in TDZs and states that:

> TDZs are far apart from their original mission. Why don't we have hit products or services like the Silicon Valley? In fact, there is potential but the management of the firms include people who have already accepted the country's failing way of doing business. Software can be an exception, though. They can see the situation from an American point of view- there are more horizontal relations and management but in most others it's vertical: hierarchy of management and status quo prevail. What the skilled human force inside firms do is to save the day rather than reach their full potential and be more productive. Personnel turnover is also critical especially when they see no future in that firm - turnover is usually 1-2 years. (Teknoparklar gerçek işlevlerinden çok uzaklaşmış oluyor. Mesela neden Silikon Vadisi gibi ürünler birden patlayamıyor değil mi? Aslında potansiyel var ama günün sonunda yönettiğiniz firma da bu ülkenin profilini kabullenmiş yöneticilerle yönetiliyor burda şirketler. Yazılım belki ayrı tutulabilir. Yazılım firma yöneticileri biraz daha Amerikanvari bakabiliyor, daha yatay ilişkiler var ama diğerlerinde hep hiyerarşik yönetim hala statükocu yapı çoğu şirkette. İçerideki nitelikli yetişmiş insan napıyor o zaman, haa tamam o zaman olduğu kadar abi diyor...Olmuyorsa öbür gün gidiyor. Personel turnover a bakmak lazım. Turnover çok fazla 1-2 yıl). - TECHFIRM2-

Data from the interviews reveal that sources of conflict regarding managerial conflict can be attributed to TDZs, university and the state. Participants state that horizontal management and role distribution in TDZs are too scattered and vague; firms' needs are not communicated to university administration; individual characteristics of TDZ managers may create conflict; TDZ administration fails to report all problems to university administration. Participants also state that universities tend to hold power by taking strategic decisions and leaving daily operations to TDZs; intervention of universities by presence of manager-academics in executive board of TDZ creates a conflict, universities have a landlord attitude towards TDZs; manager-academics lack professionalism, university is blamed to slow down operations of TDZs; hierarchy in university administration hinders communication channels; managerial problems partially lead to TDZs' failure; individual characteristics of manager-academics and their exercising legal authority on TDZs create

conflicts; rectors see TDZ a showcase of their term but if rector is not re-elected TDZ affiliated cadres change quickly; manager-academics lack vision; universities do not supervise TDZs much. Participants also attribute some conflict to the state; presence of state representative in executive committees of TDZs may lead to group think, slow down operations and kill dynamism.

Interview data can be linked with data from document analyses of TDZ Law, TDZ Regulation and websites of the three universities and their TDZs. In TDZ Law, there is a vague reference to the management of university-TDZ relations- it mentions the composition of TDZ executive committee and that of shareholders. In the case of University A and its TDZ, university representative (University A's rector) and University A's advisor to the rector (vice-chair) are members of the executive committee in University A's TDZ. It is likely to state that there exists a conflict when manager-academics influence university-TDZ relations with their presence in executive committee of TDZs where they potentially and overtly display their power and status.

In the case of University B and its TDZ, university representative (University B's rector) is a natural member of the executive committee in University B's TDZ. It is likely to state that there exists less conflict in University B since participants welcome the current situation in which the manager-academic influences university-TDZ relations with presence and strategic guidance in executive committee of University B's TDZ.

In the case of University C and its TDZ, state representative (governor or director for supervision and coordination of investments) is the chairperson while university representative (University C's rector) is the vice-chair in the executive committee in University C's TDZ. It is likely to state that there exists a conflict when state representatives or manager-academics influence university-TDZ relations with their presence in executive committee of TDZs where they potentially and overtly display their legal power and status, which may leave little room to voice out different opinions and this may result in group think.

Legal Gaps and Political Conflict. Participants believe that legal gaps and political conflict occur due to misconception about the nature of research and development, TDZ firms' instinctive response to survive at all costs, and TDZs' and universities' being two separate legal entities.

Data from the interviews reveal that sources of conflict regarding legal gaps and political conflict can be attributed to TDZs, universities, the state and politicians. Participants believe that firms are forced to succeed in research and development though it, by its nature, may fail; firms abuse the law (benefit only tax waiver or funds etc.) and maximize their profits rather than doing research and development or producing value added products or services; entrepreneurs prefer low investment or investment-free fields like ICT or software; there is loose admission criteria; there is legal gap for dominant software cluster. Participants also say that universities intervene operations of TDZs to maintain efficiency and save their reputation; in the hierarchical organization of university, it is hard to locate TDZs. Participants also think that conflicts arise due to the state and politicians; there is a vague hierarchy of two separate legal entities; paperwork exhausts entrepreneurs; even on ministry's slides it says "join TDZs and get waiver"; social sciences are disadvantaged and cannot involve in TDZs easily as opposed to natural sciences- a legal barrier; recent Research and Development Centers Law challenges existence of TDZs- amendments are needed.

Data from interviews and the ones from document analyses of TDZ Law and TDZ Regulation can be combined to address legal gaps and political conflicts. The law envisions a mixed TDZ model for Turkey in which (1) universities host and feed TDZs with knowledge and technology as well as human capital, and in a way exert control over TDZs via top university administrator's chairperson role in TDZ executive committee. The law, in its mixed TDZ model for Turkey, also gives responsibility to the state (2) to set policies, fund and supervise TDZs. It can be concluded that there may be structural roots of legal conflicts in the TDZ model for Turkey.

4.2.3 Pathways of Influence

There exist multiple pathways of influence among TDZs, universities, the state, the industry and the public at large in university-industry relations, which can be listed as entrepreneurship and innovation as drivers of transformation of higher education institutions, survival of the most institutional TDZs, patronage of knowledge and technology production policy, and patronage of higher education policy. TDZs, universities, the state, the industry and the public may be the agents of influence, the recipient of influence or both.

Entrepreneurship and Innovation as Drivers of Transformation of Higher Education Institutions. Participants believe that TDZs have become drivers of the transformation of universities following the phenomenon that higher education has been commissioned a "third mission" to accommodate changes in interdisciplinary research and education, curricular adaptations or even more fundamental structural changes like research-intense universities. Fayolle and Redford (2014) explain this pathway of influence between TDZs and universities as:

> It is clear that universities need to become more entrepreneurial, changing their strategies, their structures and their practices, changing their culture and helping students and faculty members to develop their entrepreneurial mindsets and entrepreneurial actions. But universities are professional bureaucracies focused on core missions and values in relation to education and research. Consequently, their ability/capacity to change and adopt new behaviors seems low. This creates a paradox and tension between what universities are and what they should be to deal with the evolutionary trends and the complexity of the world.

As it is understood from this quote, through demands of entrepreneurship and innovation, TDZs have become more of an agent of influence over universities to adapt to an 'entrepreneurial university'.

Data from the interviews reveal that through TDZs entrepreneurship and innovation have become agents of influence over higher education. Participants state that an entrepreneurial and innovation- driven university is impossible without TDZs; TDZs motivate interdisciplinary actions by

universities; Entrepreneurship Centers have been opened in universities; more events/activities to teach entrepreneurship and innovation are taking place on campuses; entrepreneurship and innovation press curricular changes; entrepreneurship and innovation have also become drivers of mission diversification: research-intense universities; TDZ experts teach/give training on entrepreneurship and innovation; late introduction of entrepreneurship and innovation into higher education meant late transformation of higher education.

Data from document analyses of 10th Development Plan, strategic plans of University A and University B, and activity report of University C may help reach more precise findings as to entrepreneurship and innovation being drivers of transformation in higher education institutions. Knowledge and technology production section in 10th Development Plan calls for (1) taking precautions to facilitate and urge university and private sector cooperation- motivating academics and students to join in research and development and entrepreneurial activities, and (2) making the structure and operation of technology development zones (TDZs) more efficient by advancing university-industry relations, joint research and development and innovation activities. In addition, higher education section in 10th Development Plan calls for (1) diversifying higher education institutions, (2) transforming the structure of higher education into one that is autonomous based on the accountability principle, and competitive based on quality and mission diversification principles, and (3) encouraging the transformation of higher education structure into an output oriented one that cooperates with industry and prioritizes technology production; its resources will be diversified via entrepreneurship activities.

University A's strategic Plan names a strategy to "develop online, lessons, workshops and courses such as …innovativeness, entrepreneurship… that students can take as an elective or undertake as an extracurricular activity". University B's strategic Plan under entrepreneurship and innovation theme, that University B's TDZ is located on campus is listed as a strength. University C's activity report cites relevant science, technology and innovation policy

statements from the 10th Development Plan, and lists university-TDZ relations under University C's fundamental policies and priorities. It seems that the three universities envision and display attempts to integrate entrepreneurship and innovation terms into its structure and operations.

Survival of the Most Institutional TDZs. As neo-institutional theory suggests, organizations - universities and their TDZs in this case- adopt institutional controls prescribed by rationalizing agents in their organizational environments to gain legitimacy and, as a result, they similarize in time. Other TDZs and universities are the main constituents of the organizational field of TDZs as well as other organizations and groups such as ministries, non-governmental organizations, market, and the public. Universities and their TDZs seek for legitimacy or socio-cultural acceptance, safeguard their resources, and ensure survival that results from their adoption of institutional controls: regulatory, normative and cognitive controls. TDZs use the buffering strategy of ceremonial conformity or rationalized myths. Moreover, TDZs employ decoupling strategy and deviate from their standard formal structures and daily functions to guard their technical core and intra-organizational activities from external pressures. Finally, TDZs tend to resemble other TDZs by using three isomorphism strategies; namely, coercive, mimetic and normative. In their organizational field, TDZs interact with other TDZs, universities, the state, the industry and the public in complex ways and may become both agents of influence and the recipient of influence.

Survival of the Most Institutional TDZs- External Forces in Organizational Field. Participants and data from document analyses reveal that TDZs are surrounded and shaped by external forces such as the state, the industry, non-governmental organizations, other universities and TDZs. State and competition from other universities and TDZs are two commonly stated external forces by the participants; thus TDZs become the recipient of influence from the organizational field.

Survival of the Most Institutional TDZs- Institutional Norms and Practices. Participants and data from document analyses reveal that TDZs are also shaped by internal forces or institutional norms and procedures of TDZs such as organizational structure, units, management, human resources, decision making, and finance and supervision; thus TDZs become the recipient of influence from within the organization.

Survival of the Most Institutional TDZs- Legitimacy. Data from the interviews reveal that universities and their TDZs try to legitimize their actions in their socio-cultural environment to survive by spreading the image of a prestigious TDZ and a prestigious university; thus they become both an agent of influence and a recipient of influence in the organizational field.

Data from the interviews reveal that in the organizational field, universities and TDZs are spreading the image of a prestigious university and a prestigious TDZ; universities and TDZs set internationalization goals which may be considered a quest for legitimacy nationally; participants from University A and University B label their university and TDZ as being prestigious nationally, while participants from University C label their university and TDZ as having regional or local prestige.

Survival of the Most Institutional TDZs- Buffer Strategies. Data from the interviews reveal that TDZs use buffering strategies to safeguard their structures and operations from their organizational environment by adopting a ceremonial adaptation to management, organizational structure, buildings and facilities; they also decouple their core activities and outcomes by diverging from their formal structures in regards to product specialization, sectorial proximity, supervision and human capital; thus TDZs become both agents of influence and the recipient of influence.

Data from the interviews reveal that University A rationalizes similar structures or operations in regard to infrastructure, management, formation of sub-units or TTOs; while decoupling supervision and middle-management structures. University B rationalizes similar structures or operations in regard

to structure, location, funds/subsidy/tax waiver, dominant clusters (software, information technologies and electronics), core activities or units, executive structure while decoupling in regards to product specialization, proximity, involvement of academics, services, rent, supervision, business volume, and speed of development. University C rationalizes similar structures or operations in regard to structure, sub-units, buildings, facilities, and management while decoupling in regards to product specialization, funding, human capital, and sectorial proximity.

Survival of the Most Institutional TDZs- Bridge Strategies. Data from the interviews reveal that TDZs grow similar in time due to coercion from supervising state institutions and laws more than mimetic isomorphism-imitating working solutions and operations of one another; thus TDZs become both agents of influence (when others imitate) and the recipient of influence (when law or state coerces).

Data from document analyses of TDZ Law, TDZ Regulation, and strategic plans and activity reports from University A and University B may help reach more precise findings as to buffer and bridge strategies of TDZs. The law and its regulations outline the foundation, operation, management, supervision of TDZs, and responsible persons, their duties, authority and responsibilities. These documents are a form of coercion for TDZs to resemble one another. The law, particularly, lists the core activities of a TDZ as research and development, innovation, software, technological product, and research and development project; given TDZs focus on these core activities.

University A's Strategic Plan 2011-2016 informs that one major aim is to increase the research and development potential of university by using all means and revenues from University A's TDZ. This aim is also affirmed in the TDZ Law. Besides, in University A's Activity Report 2016, for instance, University A is reported to rank in 1-10 band on MoSIT annual performance index for 2015 (BSTB, 2015), which can be regarded as an indicator that among TDZs this performance index is a rationalized myth, and that University

A's TDZ decouples from mainstream TDZ operations to rank high on this ranking; and University A's TDZ is a TDZ that others potentially mime. University A's Strategic Plan 2011-2016 informs that new units and structures were set up such as University A's Project Support Office, University A's TDZ's Project Office, Information Technologies and Innovation Center. With these new units and structures University A not only resembles international examples (mimetic isomorphism) but also decouples from the common operational styles of TDZs in Turkey.

University B's Strategic Plan 2014-2018 informs one major aim is to make it possible for University B and University B's TDZ to maintain closer, stronger and more intense relationships with industry. This aim is also affirmed in the TDZ Law. Besides, in University B's Activity Report 2016, for instance, University B is reported to rank in 1-10 band of MoSIT annual performance index for 2015 (BSTB, 2015), which can be regarded as an indicator that among TDZs this performance index is a rationalized myth, and that University B's TDZ decouples from mainstream TDZ operations to rank high in this ranking; and University B's TDZ is a regional TDZ that others potentially mime in the city. University B's Strategic Plan 2014-2018 informs that new units and structures are planned to be set up such as contact offices in organized industry districts, branches of University B's TDZ's vicinity and University B's Science Polis. With these new units and structures University B not only plans to resemble national examples (mimetic isomorphism) but also decouples from the common operational styles of other TDZs in and outside the city.

Patronage of Knowledge and Technology Production Policy. Participants express views on pathways of influence among university, TDZs, knowledge and technology policy makers in the state, and other parties involved. They interact with each other in complex ways to impact knowledge and technology production policy makers such as direct and indirect influence, intimacy with policy makers, via institutions, and via proximity to the state, industry or

clusters; thus TDZs become both agents of influence and the recipient of influence in these complex pathways of influence.

Data from the interviews reveal diverse opinions that political decisions precede decisions based on science; TDZs have direct impact on policy makers; bottom-up feedback channels is vital; in the making of a new or regulation University A's TDZ is consulted; outputs/success stories by TDZs can talk to policy makers; leading TDZs are seen as spokespersons for all TDZs by policy makers; intimacy and proximity to policy makers is key for influence; TDZs have influence via ATDZ, via top university administrators (those assuming the role of directorate of research), via TTOs, and via TDZ executive management; intimacy with policy makers (former students) is vital for influence; divergent opinions are oppressed due to fear of business making; TDZs have influence over funding issues; TDZs have great potential for influence but not in practice; real bottom-up data and open feedback channels key for influence.

Patronage of Higher Education Policy. Participants express views on pathways of influence among university, TDZs, higher education policy makers in the state, and other parties involved. They interact with each other in complex ways to impact higher education policy makers such as indirect or little influence, via institutions, and via universities; thus TDZs mostly become the recipient of influence in these complex pathways of influence. Data from the interviews reveal that TDZs have either indirect or little influence; they may have influence over patent issues or intellectual property rights, via university administration; better communication channels with higher education policy makers is possible than before; TDZs may have influence via executive committee of TDZs or via directorate of research of university.

4.2.4 Suggestions

Suggestions for university-industry relations by the participants fall under two broad categories: suggestions for a sustainable TDZ, and the worst-case

scenario for TDZs. For a sustainable TDZ, quality networks, a working ecosystem, and some other suggestions have been provided. As to the worst-case scenario for TDZs, vicious competition, a failing ecosystem, and resolutions for TDZs have been provided.

4.2.4.1 Suggestions for a Sustainable TDZ

Suggestions for a Sustainable TDZ - Quality Networks. Data from the interviews reveal that for a sustainable TDZ a quality network is prime for TDZs. Participants state that TDZs have an institutional network via Association of Technology Development Zones (ATDZ), USİMP, TTP, City's Universities Platform and Turkish Exporters Assembly; they also network via joint-projects through which they form clusters and exchange of know-how; some participants refer to this as a teaching-learning network; however, personal networks seem to be more active. TDZ networks are more institutionalized due to success stories. It is likely to state that TDZs establish networks in various forms and degrees to reach sustainability.

Suggestions for a Sustainable TDZ - A Working Ecosystem. Data from the interviews reveal that for a sustainable TDZ a working ecosystem is needed. Participants believe that local level ecosystems like Konya or Gaziantep are working examples; TDZs also form clusters such as defense and can work as thematic TDZs that feed on and reflect local realties (not everyone must be software producers). University B's TDZ started as a regional ecosystem for the Aegean region; now it evolves and joins into the national ecosystem. Participants in University C note that thematic TDZs or clusters develop the ecosystem giving way to exploiting city's less-cultivated potential in marine sciences or agriculture. It is likely to state that TDZs establish working ecosystems to become sustainable.

Data from document analyses of 10th Development Plan, State-University-Industry Relations Strategy and Action Plan 2015-2018, and Higher Education Council Strategic Plan 2016-2020 may help reach more precise

findings as to sustainable ecosystems for TDZs. In these strategy documents there are specific references to ecosystems. 10th Development Plan mentions sustaining the cooperation and specialization of research centers, incubators, technology transfer offices, innovation centers and technology development zones. State-University-Industry Relations Strategy and Action Plan 2015-2018 calls for increasing the cooperation in national innovation ecosystem- TDZs a part of this formation. Higher Education Council Strategic Plan 2016-2020 calls for using the interfaces of higher education institutions (centers, institutes, technology transfer offices etc.) within the context of university-industry relations and encouraging formation of such structures and their sustainability. It is likely to say that these strategy documents envision a national ecosystem that maximizes the potential of university-industry relations.

Suggestions for a Sustainable TDZ - Other Suggestions. Data from the interviews show that for a sustainable TDZ a better management model and investors like in Silicon Valley are needed as well as joint-publication criterion for university and TDZs for knowledge production. Participants also mention that there must be a well-grounded relation between university and TDZs based on clearer roles and coordination, negotiation and accountability. One participant offers a classification for TDZs in which TDZ 1.0 refers to mainstream TDZs that are still developing and TDZ 2.0 or InnovaPark 2.0 that refers to top performing and research and development-intense TDZs, adding that they can be funded and treated differently. Another participant suggests that research and their venues must be a lifestyle for Turkey.

4.2.4.2 The Worst-case Scenario for TDZs

The Worst-case Scenario for TDZs - Vicious Competition. Data from the interviews show that a worst-case scenario is also valid if TDZs cannot become self-sustaining soon, the reason of which can be attributed mostly to a vicious circle of competition.

Some participants state that TDZs establish networks just out of necessity but there is more of a competition; the business model is that bigger firms subcontract smaller ones; networking and enlarging the volume of production sacrificed for competition; also state favors bigger firms mostly and neglects smaller firms. Participants also say that inflation of TDZs in the same area is actually a threat because it may end in firm transfers; intra-TDZ level network is sacrificed for competition. Some other participants comment that competition in the country leads to failure in international markets adding that Anatolian TDZs (after top performing ones) are in fierce competition to exploit scarce leftover resources from top performing ones. It is likely to depict a worst-case scenario if fierce competition blocks development of TDZs into a sustainable structure.

The Worst-case Scenario for TDZs - A Failing Ecosystem. Data from the interviews show that a worst-case scenario is inevitable if TDZs cannot become self-sustaining soon, the reason of which can also be attributed mostly to a wrong decision to open TDZs in certain regions.

Some participants mention that a failing ecosystem may be possible if mistakes to open TDZs in ecosystems with low industrial potential and scarce human capital are continued. They say that due to too many TDZs in the same region TDZ ecosystem may fail the reason of which can be related to lack of business potential. Another participant states that overdependence of ecosystem on local potential and realities may block development of TDZs and that TDZs must search for other niches.

The Worst-case Scenario for TDZs - Resolutions for TDZs. Data from the interviews reveal that a worst-case scenario may eventually lead to some resolutions or punishments. Some participants believe that more strict supervision by the state is prime; a research and development-only criterion must be put into practice to evict abuse by firms. Another participant is more radical and says that total number of TDZs in Turkey must be limited to 5-10;

resolutions for industry to invest more in TDZs is also voiced out because they are considered to always ask from TDZs but always give less.

4.2.5 Summary of Cross-case Results

Summary of cross-case findings have been presented under four headings; namely, levels of contributions of TDZs, sources of conflicts in university-industry relations, pathways of influence among stakeholders in university-industry relations, and suggestions for TDZs.

Results for Levels of Contributions of TDZs. Findings from a cross-case analysis of the data yield two broad categories of contributions: macro-level contributions of TDZs and micro-level contributions of TDZs. Macro-level contributions of TDZs can be listed as TDZs' being an economic anchor or leverage for national economy, TDZs' being a showcase of Turkey's country image and TDZs' reaching out internationally concerning knowledge and technology production via tools of mentoring and franchising. Micro-level contributions of TDZs come under the categories of mutualism between university and TDZ, and socio-cultural development.

At macro-level, Turkish TDZs have been attributed a mission to help transform Turkey into a knowledge economy. TDZs also contribute to Turkey's visibility, competitiveness and knowledge economy transformation; thus, they polish Turkey's country image. Moreover, with its top performing TDZs Turkey is reaching out both internationally and nationally regarding knowledge and technology production.

At micro-level, universities and TDZs mutually benefit from their togetherness within the context of university-industry relations such as materialistic, educational and intellectual benefits. In addition, TDZs also contribute to social and cultural development of the society by connecting to the community directly or via products and services.

Results for Sources of Conflicts in University-Industry Relations. Findings from a cross-case analysis of the data yield six broad categories for sources of

conflicts in university industry relations: critical mass, ownership in knowledge and technology production, cultural misfit, inadequacy of TDZs, managerial conflict, and legal gaps and political conflict.

A critical mass conflict arises as to knowledge and technology production capacity, human capital and quality of technological products. Also, some conflicts occur over ownership of knowledge and technology production between university and academics, and entrepreneur academics and TDZ. In addition, there exists a cultural misfit between Turkish business model for TDZs and the ones abroad, which is embodied in an ever-failing dream of Turkish Silicon Valley. Moreover, a conflict of inadequacy of TDZs arises; despite all investments most TDZs seem to have a dysfunctional and resource-draining profile except for top performing ones. Some conflicts arise among 'traditional manager-academics' and a new line of university managers referred to as 'corporate managers' due to recent trends like New Managerialism. Lastly, legal gaps and political conflicts occur due to misconception about the nature of research and development, TDZ firms' instinctive response to survive at all costs, and TDZs' and universities' being two separate legal entities.

Results for Pathways of Influence among Stakeholders in University-Industry Relations. Findings from a cross-case analysis of the data yield four broad categories for pathways of influence among stakeholders (TDZs, universities, the state, the industry and the public) in university-industry relations. These categories are entrepreneurship and innovation as drivers of transformation of higher education institutions, survival of the most institutional TDZs, patronage of knowledge and technology production policy, and patronage of higher education policy.

TDZs have become drivers of the transformation of universities following the phenomenon that higher education has been commissioned a "third mission" to accommodate changes in interdisciplinary research and education, curricular adaptations or even more fundamental structural changes like research-intense universities. Thus, TDZs have become more of an agent

of influence over universities to adapt to an ‘entrepreneurial university’. Moreover, TDZs are surrounded and shaped by external forces such as the state, the industry, non-governmental organizations, other universities and TDZs. State and competition from other universities and TDZs are two commonly stated external forces by the participants; thus, TDZs have become the recipient of influence from the organizational field. Moreover, TDZs are also shaped by internal forces or institutional norms and procedures of TDZs such as organizational structure, units, management, human resources, decision making, and finance and supervision; thus TDZs have become the recipient of influence from within the organization. Also universities and their TDZs try to legitimize their actions in their socio-cultural environment to survive by spreading the image of a prestigious TDZ and a prestigious university; TDZs have become both an agent of influence and a recipient of influence in their organizational field. Next, TDZs use buffering strategies to safeguard their structures and operations from their organizational environment by adopting a ceremonial adaptation to management, organizational structure, buildings and facilities; they also decouple their core activities and outcomes by diverging from their formal structures in regards to product specialization, sectorial proximity, supervision and human capital; thus TDZs have become both agents of influence and the recipient of influence. Lastly, TDZs grow similar in time due to prescription and pressure from supervising state institutions and laws more than mimetic isomorphism- imitating working solutions and operations of one another; thus TDZs have become both agents of influence (when others imitate) and the recipient of influence (when law or state coerces).

University, TDZs, knowledge and technology policy makers in the state, and other parties involved interact with each other in complex ways to impact knowledge and technology production policy makers such as direct and indirect influence, intimacy with policy makers, via institutions, and via proximity to the state, industry or clusters; thus TDZs have become both agents of influence and the recipient of influence in these complex pathways of influence. In addition, university, TDZs, higher education policy makers in the

state, and other parties involved interact with each other in complex ways to impact higher education policy makers such as indirect or little influence, via institutions, and via universities; thus TDZs have mostly become the recipient of influence in these complex pathways of influence.

Results for Suggestions for University-Industry Relations. Findings from a cross-case analysis of the data yield two broad categories of suggestions: suggestions for a sustainable TDZ, and the worst-case scenario for TDZs. Suggestions for a sustainable TDZ fall under the following sub-headings: quality networks, a working ecosystem, and some other suggestions. The worst-case scenario for TDZs have the following sub-headings: vicious competition, a failing ecosystem, and resolutions for TDZs.

For a sustainable TDZ, a quality network is prime for TDZs. TDZs establish networks in various forms and degrees which include institutional network, network via joint-projects, and personal networks. A working ecosystem is also needed for a sustainable TDZ ecosystem that welcomes not only international and national ecosystems but also local level ecosystems, clusters, thematic TDZs that feed on and reflect local realties or exploit TDZs' city's less-cultivated potential.

Some further suggestions have been proposed to make TDZ ecosystem more sustainable; a better management model, investors like in Silicon Valley, joint-publication criterion for university and TDZs, a well-grounded relation between university and TDZs, a classification for TDZs as TDZ 1.0 (low achievers) and TDZ 2.0 or InnovaPark 2.0 (top performers) are necessary as well as the proposition that research and their venues must be a lifestyle for Turkey.

In regards to the worst-case scenario for TDZs, a vicious circle of competition is responsible. In this scenario, networks are established just out of necessity; the state and the common business model favor bigger firms over small size firms. Inflation in the number of newly established TDZs and inability to compete in the international market fuel the worst-case scenario. A

failing ecosystem also hints the worst-case scenario in a way that TDZs' inability to become self-sustaining in the near future, establishment of new TDZs in regions without consideration of local potentials-industry, business or human capital- and overdependence on certain local niches may lead to a failing ecosystem of TDZs.

Some further resolutions or punishments have been proposed by the participants incase TDZs fail to become a sustainable model for university-industry relations such as a more strict supervision by the state, a research and development-only criterion to evict abuse by firms as well as some more radical ones like limiting the total number of TDZs in Turkey to 5-10 and resolutions for industry to invest more in TDZs.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

This chapter covers the discussions and implications of the study. Particularly, discussion on results of the study have been presented with reference to data, literature and previous research, and research questions. Second, implications of this study have been discussed. Finally, recommendations for further research have been given.

5.1 Discussion of Results

This section provides a discussion of the findings in this study with reference to its theoretical basis. The sub-sections include a discussion on cross-case findings of contributions, a discussion on cross-case findings of conflicts, a discussion on cross-case findings of pathways of influence, and finally a discussion on suggestions and implications for TDZs.

5.1.1 Discussion on Contributions of TDZs

TDZs, at macro level, may have the potential to contribute to Turkey's economy and development, Turkey's country image, and Turkey's international and regional outreach of knowledge and technology production; at micro level, TDZs and universities may mutually benefit the relationship between each other, and TDZs may aid social development.

From a macro-level perspective, the results of the study reveal that TDZs are a state investment policy which has the potential to contribute to Turkey's transformation into a knowledge economy. Powell and Snellman (2004, p. 199) define and explain knowledge economy as:

> …production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources.

Parallel to Powell and Snellman's (2004) definition and explanation, in all three cases, participants refer to TDZs as export boosters adding that the future lies with value-added products. Moreover, Turkey Industry Strategy Document for 2015-2018 confirms participants as it sets the grand goal of advancing the efficiency and competitiveness of Turkish industry and accelerating the transformation of industry into one that takes a greater share from world export by mainly producing high value added and high-tech products and employing skilled human capital. However, the results also demonstrate that only leading TDZs actually contribute to economy and development at national level; a majority of TDZs in Turkey are viewed as the catalyst for local economy and local development only. In short, TDZs have great potential to act as a leverage for technological and developmental leap for Turkey but their potential cannot be fully channeled into practice except for a few internationally competitive TDZs. As a result, the current state of TDZs initiative as a whole in Turkey in regard to its being an economic anchor is limited; TDZs can help eradicate regional differences and compensate for the loss from other economic indicators such as imports. However, due to TDZs' failure to meet expected levels of high-tech and value added production, and their low levels of expected profit, taxes from TDZs initiative cannot be satisfactorily channeled back into Turkish economy to increase welfare of all citizens. Data from MoSIT show that the grand total of exports from TDZs as of November 2017 equals to approximately 3 billion dollars (BSTB, 2017). However, when this is compared to Turkey's total annual export in 2016 - approximately 143 billion dollars- and 3% share of high technology products in all industrial production according to Turkish Statistics Institute (2016), TDZs in Turkey, in fact, fail to become an economic anchor for Turkish economy and national development at the moment.

The study shows that participants view TDZs as the showcase of Turkey's country image because they believe that TDZs contribute to Turkey's visibility, competitiveness and knowledge economy transformation; thus, they polish Turkey's country image; however, this is limited to only three top performing TDZs in Turkey because these three top performing TDZs combined according to MoSIT data (BSTB, 2017) account for over 2 billion dollars of total exports from all TDZs in Turkey -3 billion dollars-. In addition, the results also show that top performing TDZs in Turkey have started to take on the role and contribute to Turkey's international and regional outreach of knowledge and technology production in its periphery and less developed regions. In this emerging approach to knowledge and technology production, Turkey is at the core of this production where, through its top performing TDZs, it franchises working TDZ models and offers mentorship to nearby countries and zones such as Turkic Republics, the Middle East or South Asia, as evidenced by the interviews and a document analysis of strategic plans and annual activity reports of the two participating TDZs in this study. It can be concluded that TDZs do not satisfactorily leverage Turkey's knowledge economy ideals; they do not necessarily contribute to Turkey's country image but it is likely to mention that they have started to contribute to Turkey's outreach of knowledge and technology production for less developed countries and regions in Turkey's periphery. These findings invalidate with the widespread assumption that TDZs in Turkey are an economic anchor to contribute to knowledge economy transformation of Turkey and that they are the showcase of Turkey's country image.

From a micro-level perspective, the results of the study reveal that universities and TDZs mutually benefit from their togetherness within the context of university-industry relations in terms of materialistic, educational and intellectual benefits. In particular, these mutual benefits can be listed as employment, internship, chances for applied research and university staff's advising/authorizing projects while at the same time learning from such projects. Data also reveal that the mutualism between university and TDZ

provides a social and educational exchange atmosphere for academics, students and TDZ workers, and also allows for university's benefitting expertise from TDZ personnel, rent income for university, and incentives for academics like patents produced at TDZs. Hursh (2008) touches on the introduction of neoliberal policies in markets and education, and comments that state has a regulatory role for markets to operate; and adds that neoliberal education policy favors entrepreneurial individuals who are educated to benefit personally from the neoliberal configuration of the public domain and its services like education. Neoliberal policy towards higher education, in particular, meant cutting public spending; and "the subsequent decline of public funding for universities has led to intense institutional competition, increased neo-liberal discussions, and trends such as industry – university partnerships and the commercialization of research." Balyer (2011, p. 139) Thus, it can be concluded that with the introduction of neoliberalism, universities started to revert cuts on budgets by embedding TDZs in their campuses and, as a result, received rent from TDZs and obtained increased funds from the state and private sector for research; academics and students started to adopt a neoliberal mindset to become competitive individuals and produce marketable knowledge and technology which made it possible for them to secure jobs and internships. It can be stated that neoliberalism allowed for TDZs to exploit ready-made skilled human capital from universities, use the physical infrastructure and research facilities of universities, and get a continuous in-flow of pure knowledge and technology from university that can be channeled into marketable value added products and services - which is, in a way, mandated in favor of TDZs by TDZ Law and TDZ Regulation, and also evidenced by strategic plans and activity reports of the three cases in this study.

In addition, results of the study also demonstrate that TDZs may contribute to social and cultural transformation of the society by connecting to the community directly or via products and services. To be specific, data reveal that TDZs commonly create a socio-cultural environment, and through their products or services they reach out to public; they also improve socio-cultural

development by channeling welfare and skilled human capital into nearby communities-which ignites socio-cultural exchange; and finally they also contribute to social and cultural development of the society via orientation visits from students and regular people to TDZs, and by reaching out to entrepreneurs in the community. This socio-cultural development aided by TDZs seems to approve the immersion of neoliberalism in society; however, in the case of higher education, TDZs actually act as a means of neo-liberalization of Turkish higher education. McClure (2016) states that neoliberal state encourages citizens to adapt to a mindset of rational, self-enterprising, and free individuals who self-manage based on market principles like discipline, efficiency, and competitiveness. Knowledge society ideals of the state is reflected in this social development initiative of TDZs but this seems rather a limited, rational and market-oriented one because the data in this study point to social development in the forms of creating jobs, producing goods and services, channeling welfare and skilled human capital into community, orientation visits from students and regular people to TDZs, and by reaching out to entrepreneurs. The point here is whether TDZs serve the socio-cultural development of the nearby community and the nation, and thus serve for the good of the society or they help characterize the whole society as a knowledge society to serve the greater good of markets as imposed by the rise of neoliberal ideals. The results in this study seem to favor the latter because the former seems a secondary or indirect objective for TDZs. As a result, findings in this study invalidate the sweeping assumption that TDZs contribute to social and cultural development of the society. Additionally, university-industry joint ventures like TDZs actually act as a tool for neo-liberal ideals; TDZs as a neoliberal tool also make universities deviate from their traditional missions as asserted by Olssen and Peters (2005).

5.1.2 Discussion on Sources of Conflicts

The university-industry relations in Turkey as modelled with TDZs generate some conflicts, the sources of which can be attributed to TDZs, universities,

the industry or the state. These conflicts of university-industry relations can be categorized as critical mass conflict, ownership conflict in knowledge and technology production, cultural misfit conflict, conflict regarding inadequacy of TDZs, managerial conflict, and legal gaps and political conflict.

Data from the study reveal that the issue of critical mass arises as to knowledge and technology production capacity, human capital and quality of technological products etc., the sources of which can be attributed to TDZs, university and the state. Participants in this study observe that TDZs fail to produce more research and development-oriented products, and that more innovation is needed to fulfill their potential; universities must produce more doctoral graduates while the state must provide more funds and subsidies so a critical mass can be reached within the context of university-industry relations. The results also show that not all TDZs in Turkey have reached a critical mass to be self-sustaining which is evident in the few worldwide products coming from the majority of the TDZs as opposed to most technology production capacity, human capital and quality of technological products belonging to few top performing TDZs. Only one of the cases in this study has proven to have reached a significant degree of critical mass as evidenced by figures from Ministry of Development (Cansız, 2016); critical mass of the first case in this study accounts for more than any other TDZ in its city regarding indicators of critical mass such as number of TDZ enterprises, number of employees in TDZs, number of patents produced in TDZs, share in total TDZ origin export, total TDZ origin sales, and number of academic entrepreneurs in TDZs. Likewise, critical mass of the first case in this study accounts for around one quarter to one third of Turkey' total number of TDZ enterprises, total number of employees in TDZs, total number of patents produced in TDZs, share in total TDZ origin export, total TDZ origin sales, and total number of academic entrepreneurs in TDZs. It can be concluded that some very few TDZs in Turkey have reached a critical mass to fulfill the role of a truly operational TDZ while most others lack certain indicators of critical mass for knowledge and technology production such as knowledge and technology production

capacity, human capital etc. Thus, these findings invalidate with the widespread belief that TDZs have the necessary critical mass to fulfill their roles in knowledge and technology production phenomenon within the context of university-industry relations.

Regarding ownership conflict in knowledge and technology production, results of the study reveal that some conflicts arise between university and traditional academics on one side, and entrepreneur academics and TDZ on the other. Based on the findings, conflict regarding ownership in knowledge and technology production can be attributed to TDZs, university and the industry. The data from participants show that TDZs are partly held responsible for the conflict because they are much market-focused; they do not make much investment in pure knowledge and technology production; they depend much on university in terms of human capital, research and knowledge; they succumb to financial pressures; they have no self-production intention of knowledge and technology but show a greater tendency to get them ready-made from university. The data from participants also show that part of the conflict arises from university and academics in that at universities there are limitations for applied research in absence of TDZs; academics are hesitant to involve in TDZs; TDZ affiliation has ethical connotations for academics; and the quality of graduates does not match expectations of industry. Besides, universities see entrepreneurship as an additional mission for university in addition to their other missions; universities display dominance over TDZs; academic conservatism regards pure knowledge and technology over marketable ones; academics feel pressures to engage in TDZs; the low amount of marketable knowledge and technology from university fails to feed TDZs. The data from participants also demonstrate that part of the conflict belongs to industry in that it is reluctant to invest in time-consuming projects and generation of human capital but expects much in a short time. Regarding ownership conflict in knowledge and technology production, Lam's (2010) study may be highlighted here in which she touches on the entrepreneurial approach to higher education. She investigates how the ambiguous boundary

between university and industry is perceived and can be formed by academic scientists; and seeks to answer the question of how academics try to protect and negotiate their positions, and also how they make sense of their professional role identities. She confirms the taxonomy of traditional academics and entrepreneurial academics but also adds two more categories of academics: traditional hybrid and entrepreneurial hybrid - those who benefit the conflict of ownership in knowledge and technology production more compared to purely traditional and purely entrepreneurial academics. It is likely to conclude that the ownership conflict is destined to continue because "the move from the 'traditional' to the 'entrepreneurial' mode is not necessarily a linear process as it can be halted, or even reverted" (p. 335), as stated in Lam' study, who also advocates that academics especially at research-intense universities "have relatively strong bargaining power and varied resource options to have control over knowledge and technology production phenomenon"; however, "in smaller or newer universities with less reputational and institutional resources" academics may have difficulty defending their positions. It can be concluded that the vague boundary between university and traditional academics versus entrepreneurial academics and TDZs is hard to locate, which pours conflict into this ambiguous zone between TDZs (which display overdependence on university and are vulnerable to market pressures and profitability)and entrepreneurial academics, and universities and traditional academics who are reserved and hesitant to involve in university-industry relations and are conservative about core missions of universities- education and research- and have the mindset of knowledge for its own sake.

In regards to cultural misfit conflict, the results of the study reveal that Turkish business model for TDZs and most others abroad differ remarkably but the dream of creating a Turkish Silicon Valley is still kept alive- which is at the core of this conflict because it creates a mismatch between the reality and the expectations. According to Aksan (2012), TDZs in the US fall into Private Sector-Based Model but Turkish TDZs fall into the Mixed Model (a hybrid of State or Local Government Based Model and University-Based Model).

Specifically, the business model in the US is a free enterprise system but the one in Turkey is highly dependent on the state and universities, which eventually creates a conflict of cultural and business model misfit. Results of the study demonstrate that the conflict regarding cultural mismatch is related to cognitive categories created and shared in Turkey on TDZs, university and the state. TDZs are responsible for part of the conflict because TDZs in Turkey and those in the US have different organizational structure and management cultures; TDZs in Turkey are still at early developmental phase compared to Silicon Valley but Turkish TDZs are continuously prescribed the mission to be like Silicon Valley. Part of conflict stems from universities and the state in that they have an interventionist approach towards TDZs via membership in executive committees of TDZs; participants believe that TDZs must be let grow naturally, and the state must make other investments in order not to depend much on TDZs to 'save' the country**.** It can be concluded that, Turkish TDZs need more 'native', achievable and long-term goals in parallel with the business model encrypted in the DNA of TDZs in Turkey.

As for the conflict regarding inadequacy of TDZs, the results reveal that despite all investments, most TDZs in Turkey have rather a dysfunctional and resource-draining profile except for a few top performing ones. Conflict regarding inadequacy of TDZs can be attributed to TDZs, universities, state, industry and society. Data from this study demonstrate that TDZs are partly responsible for the conflict because TDZ firms are only now more focused on research and development; only a handful of TDZs in Turkey are truly operational and functional; developmental problems of TDZs exist since it takes 6-10 years for a TDZ to be fully operational; gray zones in university-industry relations have only recently been cleared with establishment and spread of TTOs; quantity of firms and employees precede quality; admission criteria have been lowered to attract more firms due to profit concerns; there is a real-estate misconception of TDZs; if, by 2023 TDZs are not functional, then the TDZ model may rot; only top performing TDZs can produce economic value - value added products or services- however they can only compensate

for import-export imbalance. Moreover, universities are partly responsible for the conflict regarding inadequacy of TDZs because they usually allocate poor locations on campus with relatively poor infrastructure; there is a lack of social facilities. State is also partly responsible for the conflict regarding inadequacy of TDZs because the state policy to establish more and more TDZs lowers the functionality of TDZs; that state views TDZs as indispensable institutions is a fallacy - if they are resource draining then they must be reconsidered. Finally, the conflict of inadequacy of TDZs can be partly attributed to the industry and the society in that neither the industry nor the society understood what TDZs are at first. Three indicators have been cited in the data from this study to rank order universities and TDZs which may help arrive at conclusions in regards to their adequacy or functionality: URAP's (2017b) ranking for universities, entrepreneurship and innovation index for 2016 (TÜBİTAK, 2016), and MoSIT's annual performance index (BSTB, 2015). First two cases in this study rank either in the highest band or in the second highest band on these three indicators. However, the last case ranks far below the list on URAP's ranking and on entrepreneurship and innovation index for 2016 but it still ranks in the highest band on MoSIT's annual performance index for TDZs. This creates a credibility problem on the MoSIT's annual performance index for TDZs because it is inconceivable to imagine a TDZ that operates within a low ranking university among others and in entrepreneurship and innovation index but ranks in the highest band on the MoSIT's annual performance index for TDZs. In their study, Baykul et al. (2016) categorized and ranked TDZs in Turkey as technically efficient, pure technically efficient, and scale efficient based on an analysis of multiple input (capacity development activities, total number of cooperation, total number of key personnel) and output (number of academic spin-offs, total number of firms, total number of foreign investment firms and total employment). Baykul et al. found similar results with the three indicators above - the first two cases in this study mentioned above were found to be technically efficient and non-resource draining. However, the third case in this study mentioned above was found to be less technically efficient due to

external factors. In short, it can be concluded from a cross-check of the data, three commonly accepted indicators and a research study that only the first case was free from the conflict regarding inadequacy of TDZs while the second case experienced this conflict to a certain extent. The third case, on the other hand, experienced this conflict the most by displaying a less functional and resource-draining profile.

When it comes to managerial conflict, the findings in the study reveal that some conflicts arise among 'traditional manager-academics' and a new line of university managers who are referred to as 'corporate managers'. Amaral et al. (2002) explain this conflict such that while the contemporary university has become entrepreneurial or marketized, manager-academics have started to lose their power, status and impact on university governance and management. The data in this study demonstrate that the managerial conflict can be attributed to TDZs, university and the state. TDZs are partly responsible for this conflict because individual characteristics of TDZ managers may create part of the conflict; TDZ administration fails to report all problems to university administration. Universities are partly responsible for this conflict because they tend to hold power by taking strategic decisions and leaving daily operations to TDZs; intervention of universities by presence of manager-academics in executive board of TDZ creates part of the conflict; universities have a landlord attitude towards TDZs; manager-academics lack professionalism, university is blamed to slow down operations of TDZs; hierarchy in university administration hinders communication channels; managerial problems partially lead to TDZs' failure; individual characteristics of manager-academics and their exercising legal authority on TDZs create conflicts; rectors see TDZ a showcase of their term but if a rector is not re-elected TDZ-affiliated cadres change quickly; manager-academics lack vision; universities do not supervise TDZs much. State is partly responsible for this conflict because presence of state representative in executive committees of TDZs may lead to group think, slow down operations and kill dynamism. In parallel to these findings, Martin (2000) reports how to manage university-

industry relations, particularly, innovative management practices. The study concludes that as universities are getting more involved in their relationships with enterprises, they act proactively and display more control in management. Likewise, Baykul et al. (2016) examined management effectiveness of Turkish TDZs and classified the first and second cases in this study as effectively managed; however, the third case needs improvement in management of TDZ in regards to attracting more firms to TDZ, creating more spin-off firms, increasing employment and foreign investment on TDZ campus. In addition, McClure (2016) analyzed the roles of top university administrators in executive and managerial positions via an analytical framework of administrative academic capitalism and extended managerial capacity. The results of the study show that deviation of university to commodification of knowledge and 'knowledge for sale' stems largely from administrators' initiatives; and that promotion of innovation and entrepreneurship in academy produced some conflicts with academics showing that this inflicts production mechanisms due to extended managerial control over academic work. It is likely to conclude that as universities involve more into university-industry relations manager-academics tend to exercise power and authority over TDZs to maintain their power and status; however, this creates a managerial conflict with TDZ administrators who are naturally more entrepreneurial in profit oriented TDZs as well as it causes strain on academics.

Finally, with respect to legal and political conflict, the findings in the study reveal that the conflict results from misconception about the nature of research and development and accountability concerns, TDZ firms' instinctive response to survive at all costs and make profit, and TDZs' and universities' being two separate legal entities. The conflict can be attributed to TDZs, universities, the state and politicians. TDZs are partly held responsible for the conflict because firms are forced to succeed in research and development though it, by its nature, may fail; firms abuse the law (benefit only tax waiver or funds etc.) and maximize their profits rather than doing research and development or producing value added products or services; entrepreneurs

prefer low investment or investment-free fields like ICT or software; there is loose admission criteria; there is legal gap for dominant software clusters. Universities are also partly responsible for the conflict because they intervene operations of TDZs to maintain efficiency and save their reputation; in the hierarchical organization of university, it is hard to locate TDZs. The state and politicians are partly responsible for the conflict in that there is a vague hierarchy of two separate legal entities; paperwork exhausts entrepreneurs; even on ministry's slides it says "join TDZs and get waiver"; social sciences are disadvantaged and cannot involve in TDZs easily as opposed to natural sciences- a legal barrier; recent Research and Development Centers Law challenges existence of TDZs as firms started to move there- amendments are needed. These findings can be supplemented with Peker et al.'s study (2014) in which they determined the barriers in university-industry cooperation; they found that structural problems were stated as the most cited barrier to university-industry cooperation; and bureaucratic problems were also listed as another barrier to university-industry cooperation. It can be concluded that legal gaps and political conflict rests on structural and bureaucratic problems in their study, which is parallel to the findings in this study.

5.1.3 Discussion on Pathways of Influence

Despite the several inherent conflicts existent in the organizational field of TDZs, university-industry relations also accommodate multiple pathways of influence among TDZs, universities, the state, the industry and the public. In other words, TDZs operate in a zone of influence in which a set or category of (unidirectional, directional or multidirectional) links exist among TDZs and the constituents of TDZs' organizational field. These pathways of influence include entrepreneurship and innovation being drivers of transformation of higher education institutions, survival of the most institutional TDZs, patronage of knowledge and technology production policy, and patronage of higher education policy. TDZs, universities, the state, the industry and the

public may be the agents of influence, the recipient of influence or both in this zone of influence.

The results of the study reveal that TDZs have become drivers of the transformation of universities following the phenomenon that higher education has been commissioned a "third mission" to accommodate changes in interdisciplinary research and education, curricular adaptations or even more fundamental structural changes like research-intense universities. Data from the study confirm that through TDZs, entrepreneurship and innovation have become agents of influence over higher education because participants state that an entrepreneurial and innovation- driven university is impossible without TDZs; TDZs motivate interdisciplinary actions by universities; Entrepreneurship Centers have been opened in universities; more events/activities to teach entrepreneurship and innovation are taking place on campuses; entrepreneurship and innovation press curricular changes; entrepreneurship and innovation have also become drivers of mission diversification: research-intense universities; TDZ experts teach/give training on entrepreneurship and innovation; late introduction of entrepreneurship and innovation into higher education meant late transformation of higher education. These findings have been supplemented by the literature on entrepreneurial university. For example, as a result of university-industry partnership, university has aligned with an entrepreneurial design as evidenced in Huyghe and Knockaert' s (2016) study in which an entrepreneurial mindset adopted by a university affects academics' entrepreneurial intention to spin off a firm. Their findings demonstrate that the degree a university includes entrepreneurship in its mission statement increases academics' spin-off intentions; the existence of a role model around an academics affects the academic's tendency to involve in entrepreneurship directly and indirectly via the mediation of entrepreneurial self-efficacy; finally, if a university explicitly rewards academics for their entrepreneurial outputs, the likelihood of academics' starting a spin-off firm increases. Another example would be Link and Scott's (2003) study that examines TDZ-university links. The findings of

their study show that a formal (institutional) relationship between university and TDZ means improved research output, funding etc.; and an applied research driven curriculum. Çetinsaya (2014) and Erdoğan (2014) both add that a decades-long restructuring debate is still on the agenda of Turkish higher education together with other challenges such as research and development, entrepreneurship, innovation, etc. Likewise, Bousquet (2008) refers to this entrepreneurial divergence of higher education as the corporate university which also brings concerns regarding intellectual property, market-oriented education, control of curriculum and research. Slaughter and Rhoades (2005), on the other hand, call this entrepreneurial phenomenon "an academic capitalist knowledge/learning regime that is known to introduce commercialization of colleges and universities; they add that commercialization spreads to curriculum, intellectual property, and patents. Some others call it an entrepreneurial university or University 3.0. - commercialization of knowledge is added to the previous two missions: education and research (Karpov, 2016). This new entrepreneurial design for university may provide support and funding for more research, a closer operation with industry and rapid developments and products; on the other hand, this entrepreneurial twist for universities may also mean commodification of knowledge, interference of markets into research ethics, and alter traditional academic missions of universities (Zusman, 2005). It may be concluded that, through demands of entrepreneurship and innovation, TDZs have become more of an agent of influence over universities to adapt to an 'entrepreneurial university' especially in matters such as interdisciplinary research and education, curricular adaptations or even more fundamental structural changes like research-intense universities. This transformation of higher education via entrepreneurship and innovation is multi-faceted in that it may motivate universities to take more interdisciplinary steps in research and education, help universities find more funds for research, and produce more than publications. However, it may also bring curricular pressures, ownership and ethics of research, commodification

of knowledge and radical changes in missions, organizational structures and operations of universities.

The results of the study also reveal insights into neo-institutional theory and the development of TDZs in that in their organizational field; TDZs interact with other TDZs, universities, the state, the industry and the public in complex ways. Accordingly, TDZs may become both agents of influence and the recipient of influence. In this study, universities and TDZs adopt the institutional controls in their organizational field and grow similar in time because their survival and success are contingent or dependent on internalizing these institutional controls which are widely accepted to lead the way to socio-cultural acceptance or legitimacy (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Scott, 2001). External forces in the organizational field such as the state, the industry, non-governmental organizations, other universities and TDZs shape TDZs in this study. TDZs are also shaped by internal forces or institutional norms and procedures of TDZs such as organizational structure, units, management, human resources, decision making, and finance and supervision. Thus, due to external and internal factors TDZs become the recipient of influence from the organizational field and from within themselves. Likewise, Armenakis and Bedeian (1999) provide a review of organizational studies that examine contextual issues, "which principally focus on forces or conditions existing in an organization's external and internal environments." They state that studying organizational environment presents deeper understanding of external forces (regulatory bodies, changing technology etc.) and internal forces, and how they impact and shape an organization and its effectiveness. Lunenburg (2010) highlights educational organizations and adds to external and internal dynamics of organizations by listing marketplace, government laws and regulations, technology, labor markets and economic changes under external forces; and by listing administrative processes and people problems under internal forces.

Regarding legitimacy, results of the study demonstrate that although they may lack the mindset and infrastructure, some universities establish TDZs.

TDZs and universities try to legitimize their actions in their socio-cultural environment to survive by spreading the image of a prestigious TDZ and a prestigious university; thus they become both an agent of influence and a recipient of influence in the organizational field. Based on the literature regarding legitimacy (DiMaggio & Powell, 1983; Meyer & Rowan, 1977), the more universities and their TDZs conform to institutional controls in their organization field, the more legitimate they become as opposed to the drive for technical efficiency. Legitimacy of TDZs and universities here refers to their being reliable and accountable due to conformity with the widely accepted rules in the organizational field. Data from this study show an example to legitimacy in which universities and TDZs set internationalization goals which is indeed a quest for legitimacy nationally. Moreover, international rankings also help with prestige (legitimacy) as advocated by Pusser and Marginson (2012) who state that "rankings legitimate the purposes, choices and outcomes generated by post-secondary organizations…" Participants from the first two cases label their university and TDZ as being prestigious nationally, while participants from the third case label their university and TDZ as having regional or local prestige.

Regarding buffer strategies, results of this study demonstrate that universities and TDZs use these strategies to safeguard their structures and operations from their organizational environment by adopting a ceremonial adaptation to management, organizational structure, buildings and facilities; they also decouple their core activities and outcomes by diverging from their formal structures in regards to product specialization, sectorial proximity, supervision and human capital; thus TDZs become both agents of influence and the recipient of influence. Literature is aligned with these findings in that according to Scott (2001) organizations need ceremonial conformity that is regarded the common strategy to gain acceptance and reach resources. Meyer and Rowan (2006) also explain that rationalized myths or ceremonial conformity help organizations stay intact in that they provide explanations for situations that do not reflect, in reality, what is happening in the organization or

in the organizational field, through which they can reassure themselves and others that they are legitimate organizations in the organization field. Toma (2012) adds that universities and colleges ceremonially adapt to these rationalized myths but are loosely coupled organizations; their different parts may decouple from the technical core and operate with little consistency and coordination. Likewise, in a comparative study of university-industry relations, Guerrero et al. (2014) show that the two universities in their study operated dissimilarly regarding their attitudes to entrepreneurship; and that universities react similarly to internal factors regarding financial resources, and display differences in human capital; and that differences in external and internal factors directly affected entrepreneurial outputs of universities. Data from this study are parallel with the literature in that the first case in this study rationalizes similar structures or operations in regard to infrastructure, management, formation of sub-units or TTOs; while decoupling supervision and middle-management structures. The second case in this study rationalizes similar structures or operations in regard to structure, location, funds/subsidy/tax waiver, dominant clusters (software, information technologies and electronics), core activities or units, executive structure while decoupling in regards to product specialization, proximity, involvement of academics, services, rent, supervision, business volume, and speed of development. Finally the third case rationalizes similar structures or operations in regard to structure, sub-units, buildings, facilities, and management while decoupling in regards to product specialization, funding, human capital, and sectorial proximity.

In regards to bridging strategies, data reveal that TDZs grow similar in time due to prescription and pressure from supervising state institutions and laws more than mimetic isomorphism- imitating working solutions and operations of one another; thus TDZs become both agents of influence (when others imitate) and the recipient of influence (when law or state prescribes or presses). Literature cites DiMaggio and Powell (1983) who put forward the idea of isomorphism – organizations have a tendency to resemble one another

as they function in the organizational field. DiMaggio and Powell proposed three isomorphism strategies; namely, coercive, mimetic and normative. Similarly, in a recent study of university-industry relations, Guerrero et al. (2014) show that the two universities in their study grow similar as a reaction to environmental factors such as organizational structure, support mechanisms and formal entrepreneurial education.

To conclude the discussion on institutionalization process of TDZs, it can be stated that with the introduction of neoliberalism there has been a paradigm shift in roles and structures of higher education that challenged universities to align their formal structures and operations with the demands of markets to safeguard their institutional structures via growing similar with other universities - by exercising isomorphism- to maintain their legitimacy in their organizational field. As a result, university-industry relations has become common practice with the mediating role of TDZs.

When it comes to patronage of knowledge and technology production policy, the results reveal that multiple degrees and pathways of influence exist among university, TDZs, knowledge and technology policy makers in the state, and other parties involved. They interact with each other in complex ways to impact knowledge and technology production policy makers such as direct and indirect influence, intimacy with policy makers, via institutions, and via proximity to the state, industry or clusters; thus TDZs become both agents of influence and the recipient of influence in these complex pathways of influence. The data show that TDZs have direct impact on policy makers; bottom-up feedback channels are vital; in the making of a new or regulation top performing TDZs are consulted; outputs/success stories by TDZs can talk to policy makers; leading TDZs are seen as spokespersons for all TDZs by policy makers; intimacy and proximity to policy makers is key for influence; TDZs have influence via Association of Technology Development Zones (ATDZ), via top university administrators (those assuming the role of directorate of research), via TTOs, and via TDZ executive management; intimacy with policy makers (former students) is vital for influence; TDZs

have influence over funding issues; TDZs have great potential for influence but not all potential is channeled into practice; real bottom-up data and open feedback channels are key for influence. It can be concluded that TDZs are actively and directly involved in the making and implementation of knowledge and technology production policy - as they relate to the very existence of TDZs- as long as they come up with success stories; in the absence of a direct contact, university and ATDZ act as mediators of the relationship among TDZs and knowledge and technology production policy makers; however, a discriminatory spokesmanship exist between top performing TDZs and the rest.

In regards to patronage of higher education policy, the results reveal that multiple degrees and pathways of influence exist among university, TDZs, higher education policy makers in the state. They interact with each other in complex ways to impact higher education policy makers such as indirect or little influence, via institutions, and via universities; thus TDZs mostly become the recipient of influence in these complex pathways of influence. Findings in the study demonstrate that TDZs have either indirect or little influence; they may only have influence over patent issues or intellectual property rights, TDZs may influence policy makers via university administration; better communication channels with higher education policy makers is possible than before; TDZs may have influence via executive committee of TDZs or via directorate of research of university. It may be concluded that there is low degree and mostly vague pathways of influence among university, TDZ and the higher education policy makers because TDZs tend to use university as a mediator of the relationship with higher education policy makers. It seems that TDZs do not consider themselves and higher education policy makers as direct interlocutors in the making and implementation of higher education policy.

5.1.4 Discussion on Suggestions and Implications for TDZs

Suggestions and implications for TDZs fall under two broad categories: suggestions and implications for a sustainable TDZ, and the worst-case scenario and implications for TDZs. For a sustainable TDZ, quality networks, a

working ecosystem, and some other suggestions have been provided. As to the worst-case scenario for TDZs, vicious competition, a failing ecosystem, and resolutions for TDZs have been provided.

In regards to suggestions and implications for a sustainable TDZ, data from this study suggest that first a quality network is prime for TDZs which may come under an institutional network, a network via joint-projects and personal networks. Greenwald (2008) describes how organizations network in their organizational field. Organizations network if they depend on a single agency for a vital resource; networks may be based on exchanges of information and resources in forms of collaborative projects; networks can also refer to relations between units of an organization or even individuals within an organization; networks may also refer to clusters, adding that "interpersonal networks within organizations have value for the organization as they facilitate communication and collaboration. Likewise, Lune (2010) describes the relations among organization by listing two commonly used terms: inter-organizational network, and inter-organizational linkages or relations, adding that organizations establish exchange relationships such as a contract, and also that organizational network is not a hierarchy unlike in formal organizations with authority. In line with the literature, data in this study reveal that TDZs have a commonly accepted institutional network via ATDZ; they also network via joint-projects through which they form clusters and exchange of know-how; some participants refer to this as a teaching-learning network; however, personal networks seem to be more active.

Second, a working ecosystem is vital for a sustainable TDZ. Mars and Bronstein (2017, p. 1) explain that "an organizational ecosystem implies that human and organizational systems function much as a biological ecosystem does, and exhibit desirable properties that are similar to what one would see in nature." Ecosystem is used in organizational terms with reference to "networked social structures in which units are linked by loose or tight ties that enable or enhance the interactions and exchanges among diverse organizations and actors". Mars, Bronstein and Lusch (2012) exemplify organizational

ecosystem with ‘an innovation ecosystem’ to give a description of multifaceted network of actors like private sector industries, financing bodies, higher education, and governmental bodies which are connected to accomplish joint technological and economic objectives in line with societal goals. This study relates to Mars et al.’s description of an innovation ecosystem in that TDZs are part of this innovation ecosystem together with other research centers, other universities and TDZs etc. In this study the data reveal not only a national ecosystem for TDZs but also one that is at local level. Ecosystems for TDZs at national level as well as those at local level can be sustainable; specialized clusters such as energy or biomedical can work as thematic TDZs that feed on and reflect local potential and realties. For instance, Turkey’s first ever thematic TDZ has been officially established in Dokuz Eylül University that is specialized in medicine and is put into operation to cultivate region’s local potential in medicine sector (BSTB, 2017). In addition, 10th Development Plan, State-University-Industry Relations Strategy and Action Plan 2015-2018, and Higher Education Council Strategic Plan 2016-2020 envision a national ecosystem that maximizes the potential of university-industry relations.

Finally, some other suggestions include a better management model and investors like in Silicon Valley, joint-publication criterion for university and TDZs for knowledge production, a well-grounded relation between university and TDZs based on clearer roles and coordination, negotiation and accountability as well as a classification for TDZs in which TDZ 1.0 refers to mainstream TDZs that are still developing and TDZ 2.0 or InnovaPark 2.0 that refers to top performing and research and development-intense TDZs.

In regards to the worst-case scenario and implications for TDZs, data from this study suggest that a worst-case scenario is also valid if TDZs cannot become self-sustaining soon, the reason of which can be attributed mostly to a vicious circle of competition. First, in such fierce competition, TDZs establish networks just out of necessity; the business model is that bigger firms subcontract smaller ones; networking and enlarging the volume of production are sacrificed for competition; also state favors bigger firms mostly and

neglects smaller firms; inflation of TDZs in the same area is actually a threat because it may end in firm transfers; intra-TDZ level network is sacrificed for competition. It is likely to depict a worst-case scenario if fierce competition blocks development of TDZs into a sustainable structure.

Second, a failing ecosystem also adds to the worst-case scenario for TDZs because of wrong decisions to open TDZs in certain regions with low industrial potential and scarce human capital. However, overdependence of ecosystem on local potential and realities may also block development of TDZs; thus, a search for other niches is necessary for TDZs.

Finally, a worst-case scenario may eventually lead to some resolutions or punishments such as more strict supervision by the state, a research and development-only criterion to evict abuse by firms, limiting the total number of TDZs in Turkey to 5-10, and resolutions for industry to invest more in TDZs.

5.2 Implications of Findings

Given its conceptual framework and findings, the present study may offer several implications for theory, research, and practice.

Theory

Based on the findings, the study provides empirical evidence for the main proposition of the neo-institutional theory in that universities and TDZs yield to institutional controls in their organizational field (Turkish Higher Education) and resemble one another in time due to coercion and mimetic resemblance because their survival and success are contingent on adopting these institutional controls which are widely accepted in their socio-cultural environment, which, as a result, grants universities and TDZs legitimacy. The findings also provide evidence to reflect on the criticism for neo-institutional theory regarding the waning role of power and politics in the institutional environment. The findings actually point to an increased role of power and politics in the institutional environment as the state and university have a more dominating role and authority over TDZs which is evident from the type of

isomorphism - coercive over mimetic or normative- experienced in the institutionalization process of TDZs.

Another criticism posed at neo-institutional theory is that during isomorphism of organizations mimetic and normative types are claimed to be hardly separable and comprehensible at times. Data from the study show that this criticism may be valid to some extent because during the course of the study there was not a single mentioning of normative isomorphism in any of the three cases while coercive isomorphism was more frequently mentioned than mimetic isomorphism. In the case of normative isomorphism, TDZs would display resemblance in time by following professional standards and practices set by education, training, certification, and accreditation. However, as the data from the study show, a lack formal training for TDZ cadres, a lack of institutional or professional network as well as certification or accreditation from independent organizations all contribute to validating the criticism that normative isomorphism is hardly separable from mimetic and is incomprehensible at times.

Finally, neo-institutional theory has also been criticized because it predominantly emphasizes ceremonial conformity to access resources and secure legitimacy in the organizational field; however, data from this study contradict this because TDZs promote both efficiency and conformity due to intrusion of markets and politics. An emerging quasi-enterprise university model and a for-profit TDZ challenge knowledge and technology production phenomenon seems to evolve into a more intertwined model that seeks both legitimacy and efficiency. Thus, based on the findings of the study, it is possible to depict TDZs both as rationality/efficiency-based economic models and legitimacy/conformism-based socio-cultural models. More specifically, the findings of the study act as a validation tool for the assumption that TDZs can be studied both in the fields of economy as well as in sociology and public administration; and also data on TDZs in this study are a validation tool for the idea that organizations can be viewed both as production systems, and social and cultural systems. These propositions are also evident in the composition of

studies on university-industry relations in the literature- nearly half of the present research studies on university-industry relations are carried out by faculty or researchers from departments such as economy and business administration; about a quarter of them are done by faculty or researchers from specialized departments, institutes or centers such department of entrepreneurship, institute of entrepreneurship or entrepreneurship center; and another quarter of the available research studies on university-industry relations is conducted by faculty or researchers from educational sciences or education related fields. Overall, it can be concluded that the current study contributes to neo-institutional theory in terms of providing empirical evidence for its own propositions, validating or invalidating its certain assumptions and criticisms such as normative isomorphism or legitimacy-efficiency debate.

The data from this study present insight into ongoing restructuring and mission diversification debates as a result of neoliberalism and an entrepreneurial approach to higher education, and also the data provide some suggestions for transformation of higher education in Turkey. Two important themes- entrepreneurship and innovation- can be extracted from the data that drive the transformation of higher education in Turkey in various aspects: an innovation-driven entrepreneurial research-intense university, a more interdisciplinary research and education, curricular pressures due to entrepreneurship and innovation, academic capitalism, commodification of knowledge, intellectual property, market-oriented education-control of curriculum and research, commercialization of colleges and universities, increased funding and support for research, a closer operation with industry - rapid developments and products, interference of markets into research ethics, and alteration in traditional academic missions of universities as well as changes in organizational structure and operations of universities. All of these aspects combined, Turkish higher education is to experience challenges from the themes of entrepreneurship and innovation. The recent declaration of ten Turkish universities as research-intense universities in 2017 prove this transformation. Besides, some thematic universities have recently been

established as opposed to traditional universities in Turkey such as University of Medical Sciences or University of Social Sciences. It is observed that universities in Turkey are generating strategic responses to these challenges and transformations not only to become legitimate universities among all other universities in Turkey but also to safeguard their prestige, structures and operations for survival. As a result, data from this study contribute to understanding of transformation of higher education in Turkey.

Data from this study also point to managerial conduct of university-industry relations that has emerged as a conflict zone among traditional manager-academics, manager-academics with a mindset for a quasi-corporate university, and managers in TDZs in Turkey. The managerial conflict arises because traditional manager-academics have experienced a retreat from their power, status and impact on university governance and management. Data from this study depict managerial problems such as miscommunication of needs and problems, individual characteristics of managers problematizing the management, display of legal and administrative authority, lack of professionalism, interventionism, lack of vision, and lack of supervision. Better bottom-up communication channels, clarification of roles and responsibilities, a professional cadre to manage university's side, clarification of who's accountable for important decisions etc. have been some proposed suggestions for a better managerial conduct of university-industry relations. As a result, data from this study help locate sources of this conflict and provide suggestions for a better conduct of this managerial relationship.

Practice

Data from this study enable to depict clearer roles and implications for universities and TDZs within the context of university-industry relations. The study offers TDZs practical implications to help improve its structure and core operations. TDZs should re-evaluate their priorities because a thematic TDZ tradition is to be pressing soon; there seems to be not much success in the horizon if all TDZs are organized around software or ICT sectors, for instance.

Local realities and local business potential must be cultivated to open new niches for TDZs. Just like mission diversification of universities - e.g. recent declaration of research-intense universities- some top performing TDZs can be regrouped, funded more, and operated differently. Data from this study already reveal a segmentation of TDZs: a few top performing ones versus the rest of 'regular TDZs'. TDZs must also improve their infrastructure and connect more with the community in which they operate. In regards to their core operations, TDZs must adopt a research and development-focused technical core, otherwise TDZs may be trapped in the vicious circle of technology transfer unlike the state ideals of producing value added products and services to transform into a knowledge-based economy.

The study also offers universities practical implications to revisit their structures and roles. Universities must accommodate TDZs in their organizational structure bearing in mind that they are a separate legal entity. A lack of role distribution and coordination among similar units in university and the TDZ is a structural problem that needs to be addressed. University must find ways to accommodate structural pressures and a 'third mission' pressure by an entrepreneurial approach to higher education but at the same time identities of academics, curriculum, and ethics of research must be considered during the transformation of universities into a new generation of universities - or University 3.0.

The study is utmost important to universities which have recently established a TDZ or those who are planning to establish one soon. Data reveal that the developmental stage of new TDZs lasts for 6-10 years; data depict experiences of key informants in university-industry relations; thus, their experiences may be useful and provide guidance. Data also present a sustainable TDZ scenario versus a worst-case scenario for TDZs. Key decision makers in the establishment of new TDZs may benefit from these highlights.

The study may provide useful insights that transcend boundaries among different disciplines such as educational sciences, economy, entrepreneurship and innovation studies, and also open new directions for interdisciplinary

research and education among these disciplines. Data reveal that there is immediate need for a formal education given by universities in terms of innovation and entrepreneurship for undergraduate students and graduate students; there is also lack of formal education to educate cadres who are in charge of managing TDZs as well as those university cadres who are affiliated with TDZs. Thus, these departments mentioned above may initiate a formal education program that is interdisciplinary, offered to undergraduate and graduate students as well as to those who plan a career in the field of university-industry relations, and future managers in university-industry relations.

Finally, the study provides implications for other stakeholders other than universities and TDZs, such as government, non-governmental organizations etc. Government's policy makers in regards to knowledge and technology production, and higher education may benefit from objective data presented in this study which is free from university influence, TDZ influence or state influence. In other words, the data from this study act as a third eye or an omniscient perspective on university-industry relations. Besides, a diversity of non-governmental organizations is needed as diverse non-governmental organizations can be more involved in university-industry relations, and thus representation of all segments of the society can be achieved as opposed to a the current domination of market affiliated non-governmental organizations involved in university-industry relations.

Research

The study provides some implications for research as well. Considering the infrequency of the use of neo-institutionalization in analyzing university-industry relations within the context of TDZs in Turkey, this study offers significant implications and therefore provides motivation for organizational researchers to implement this theory in the organizational field of universities and TDZs in Turkey more. Moreover, the study provides a comprehensive but uniform conceptual framework for research by borrowing mainly from neo-

institutional theory together with contributions of other ideologies and approaches - neo-liberalism, new managerialism, and entrepreneurial approach to higher education. Thus, this study gives a more holistic perspective on university-industry relations. Besides, this study relates to researchers who study organizational field and organizational ecology. In addition, the research on university-industry relations is abundant in quantitative and single case studies. However, this study uses a multiple-case design and analyzes three cases of university-TDZ relations in Turkey; studies with this design are rare in analyzing university-industry relations in Turkey.

5.3 Recommendations for Further Research

Further research can be done by considering the following recommendations. Firstly, this study has a selection of state-only universities and their embedded TDZs; a future study that replicates this one with a mixture of cases from state universities and foundation universities can be done. As a result, diverse data patterns can be extracted from both a state university perspective and a foundation university perspective in regards to their potentially different contextual dynamics, management, institutionalization processes, and degree of impact on policy.

Secondly, this study draws a sample only from established TDZs in Turkey that have been operational for 10 year or more, while at the same time there exist TDZs that are at pre-operational stage, and those at developmental stage. MoSIT also categorizes TDZs as those operational for 10 years or more, those operational for 5 to 10 years, and finally those operational for 0 to 5 years. Therefore, future studies can consider developmental stages of TDZs to determine unique characteristics of established TDZs, developing TDZs and newly established TDZs. A longitudinal study that monitors the development of newly established TDZs over the years may also be enlightening.

Third, this study has four units of analysis under each case; namely, university administrators, university staffs, TDZ administrators, and TDZ firm administrators. Future research can be supplemented with additional units of

analysis under each case such as intern and graduate students as well as employees in TDZs who may add additional variation and richness to the data. Moreover, if the scope of future research should be enlarged to include state and non-governmental organizations beyond university and TDZs, additional units of analysis under each case may also include key informants from MoSIT, HEC, TÜBİTAK, MoD, and TOBB.

Fourth, sampling procedures of this study can be revisited in future studies to include more geographically distributed cases - cases in this study cover three out of seven geographical regions in Turkey. As a result, future research may better consider socio-economic development of the locales for TDZs instead of drawing samples from only metropolitan cities in Turkey because in non-metropolitan cities accumulation of industry, qualified human capital, local economic and socio-cultural realities may result in diverse and additional patterns in the data.

Fifth, a research design alternative to the present study would be a mixed-method design that combines qualitative perspective with quantitative perspective with contributions of interdisciplinary researchers from disciplines such as educational sciences, economy, and entrepreneurship and innovation studies. Such a mixed-method design would allow for not only a perceptional perspective or experience-based account of participants but also it may provide correlations among university-industry relations variables or help identify predictors of university-industry relationship variables.

Sixth, university-industry relations focus of this study may be associated with growing areas of research such as internationalization of higher education, internationalization of research, internationalization of know-how or know-how transfer; these themes may be lucrative future research.

Seventh, findings of this study, especially those in regards to TDZs' acting as drivers of transformation of higher education in Turkey via tools of innovation and entrepreneurship, point to research-intense university phenomenon that is taking place currently in Turkey. As the name suggests, research-intensity is almost as synonymous as a research technical core for

universities, a strong indicator of which is possibly having a more institutionalized research apparatus like TDZs. Thus, researching ways to have a better established and functional TDZ may offer future researchers great insight into this emerging phenomenon of research-intense university in Turkey.

Finally, university-industry relations and TDZs host a widespread assumption that university-industry relations are limited to natural sciences or hardcore engineering; and that social sciences have little or no place in university-industry relations and TDZs. This is actually a misconception since a value-added product, service or design out of a TDZ may need a sound engineering work; however, marketing of that product, service or design as well as customer behavior or psychology of the buyers may be equally valuable. Moreover, TDZs and firms within need better management of their personnel, better financing of their firms, knowledge of basic laws to operate as a legal entity. In short, future research may also focus on place of social sciences in university-industry relations and TDZs especially in a period when social innovation and entrepreneurship concepts such as ‘sociopark’ are being voiced out.

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APPENDICES

A. Approval of METU Applied Ethics Research Committee

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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01 TEMMUZ 2016

Sayı: 28620816 /304

Konu: Değerlendirme Sonucu

Gönderilen: Doç. Dr. Yaşar KONDAKÇI,
Eğitim Bilimleri

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç.Dr. Yaşar KONDAKÇI,

Danışmanlığını yaptığınız doktora öğrencisi Mehmet Ali YILIK' ın "Üniversite-Sanayi İşbirliği Bağlamında Teknoparkların Yükseköğretim Politikalarındaki Rolünün Yeni Kurumsal Kuram Bağlamında İncelenmesi" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek gerekli onay **2016-EGT-105** protokol numarası ile **01.07.2016-20.07.2017** tarihleri arasında geçerli olmak üzere verilmiştir.

Bilgilerinize saygılarımızla sunarız.

Prof. Dr. Canan SÜMER
İnsan Araştırmaları Etik Kurulu Başkanı

Prof. Dr. Meliha ALTUNIŞIK
İAEK Üyesi

Prof. Dr. Ayhan SOL
İAEK Üyesi

Prof. Dr. Mehmet UTKU
İAEK Üyesi

Prof. Dr. Ayhan Gürbüz DEMİR
İAEK Üyesi

Yrd .Doç .Dr. Pınar KAYGAN
İAEK Üyesi

Yrd. Doç. Dr. Emre SELÇUK
İAEK Üyesi

B. Consent Form

Gönüllü Katılım Formu

Bu çalışma, Doç. Dr. Yaşar Kondakçı akademik danışmanlığında, Mehmet Ali Yılık tarafından yürütülmektedir. **Bu çalışma, (1) üniversite-sanayi işbirliği bağlamında, üniversite-teknopark ilişkisinin yapısı, rolü ve işleyişi gibi teknoparkların başlıca kurumsallaşma süreçlerini incelemeyi ve (2) üniversite-teknopark ilişkisinin Türkiye'nin bilgi ve teknoloji üretim politikaları ile yükseköğretim politikalarına etkisini araştırmayı amaçlamaktadır.**

Çalışmaya katılım tamamıyla gönüllülük temelinde olacaktır. Araştırmacının veri toplama aracı olan mülakatta temel demografik bilgiler haricinde sizden kimlik belirleyici hiçbir bilgi istenmemektedir. Cevaplarınız tamamıyla gizli tutulacak ve sadece araştırmacılar tarafından değerlendirilecektir; elde edilecek bilgiler bilimsel yayımlarda isim belirtilmeden kullanılacaktır.

Mülakat genel olarak kişisel rahatsızlık verecek soruları içermemektedir. Ancak, katılım sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz soruları cevaplamayı yarıda bırakabilirsiniz. Böyle bir durumda mülakatı uygulayan kişiye, mülakatı yarıda kesmek istediğinizi söylemek yeterli olacaktır. Mülakat sonunda, bu çalışmayla ilgili sorularınız cevaplanacaktır. Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için ODTÜ Eğitim Bilimleri Bölümü Eğitim Yönetimi ve Planlaması Anabilim Dalı doktora öğrencisi Mehmet Ali Yılık (Tel: 210 3929 / 0533 6124217; E-posta: yilik@metu.edu.tr ile iletişim kurabilirsiniz.

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman çalışmayı yarıda kesip çıkabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı yayımlarda kullanılmasını kabul ediyorum. (Formu doldurup imzaladıktan sonra araştırmacıya geri veriniz).

İsim - Soyad	Tarih	İmza
……..	….. /….. / 2017	

C. Data Collection Forms

GÖRÜŞME FORMU

Demografik Veri *(araştırmacı tarafından doldurulacaktır)*

Katılımcı Kategorisi
□ Üniversite Yönetimi □ Akademik Personel
□ Teknopark Yönetimi □ Teknopark Şirketi Yönetimi

Cinsiyetiniz
□ Erkek □ Kadın

Yaşınız
□ 18-25 □ 25-30 □ 30-35 □ 35-40 □ 40-45 □ 45-50 □ 50 +

Eğitim Durumunuz / Son Aldığınız Derece

□ Lisans □ Master □ Doktora □Diğer: .....……..

Lisans Alanı / Uzmanlık Alanı
……..……

Akademik Ünvanınız
□ Prof. Dr.
□ Doç. Dr.
□ Yrd. Doç. Dr.
□ Öğr. Gör. (Dr.)
□ Arş. Gör.
□ Öğr. Gör. /Okt.
□ Uzman
□ Diğer: …….....

Kurum Ünvanınız:
□ Genel Müdür
□ Genel Müdür Yrd.
□ Müdür
□ Birim Müdürü/Sorumlusu
□ Yönetici
□ Uzman
□ Diğer: …….....

Çalıştığınız Üniversite / Teknopark :
……..……

Çalıştığınız Bölüm / Anabilim Dalı / Birim:
……..……

Üniversite-Sanayi İşbirliği Konusunda Deneyimiziniz (toplam yıl olarak)
□ Hiç yok □ 0-1 yıl □ 1-3 yıl □ 3-5 yıl □ 5-10 yıl □ 10 yıldan fazla

Üniversite-Sanayi İşbirliği Kapsamında Birlikte Çalıştığınız Üniversite ve Teknopark(lar)
□ Üniversite İsmi/ İsimleri:
……..……..

□ Teknopark İsmi/İsimleri:
……..……...

GÖRÜŞME SORULARI

1. Üniversite-sanayi işbirliğinde teknoparkların önemi nedir?

Anımsatma Sorusu 1: Teknoparkların, Türkiye'nin **stratejik önemi**ne etkisi nedir?
Anımsatma Sorusu 2: Teknoparkların, Türkiye için **ekonomik önemi** nedir?
Anımsatma Sorusu 3: Teknoparkların, Türkiye için **toplumsal açıdan önemi** nedir?

2. Teknoparkların üstlendikleri roller ve sağladıkları katkılar nelerdir?

Anımsatma Sorusu 1: Teknoparkların, **bilgi ve teknoloji üretimi**nde rolü/net katkısı nedir?
Anımsatma Sorusu 2: Teknoparkların, **yükseköğretim**deki rolü/ net katkısı nedir?

3. Teknoparklar ile üniversiteler arasındaki ilişkiyi yönetim açısından değerlendirebilir misiniz?

Anımsatma Sorusu 1: Teknoparklar ve üniversiteler arasındaki **ilişkinin yönetimi** ne kadar etkin?
Anımsatma Sorusu 2: Teknoparklar ve üniversiteler arasındaki **ilişkinin yönetimi** esnasında **sorunlar** gözlemliyor musunuz?
Anımsatma Sorusu 3: Teknoparklar ve üniversiteler arasındaki ilişkide nasıl bir **etkileşim** var? Bu ilişkinin yönetimine **etki eden unsurlar** nelerdir?

4. Teknoparklar ve üniversiteler arasındaki ilişkiyi işlevsellik açısından değerlendirebilir misiniz?

Anımsatma Sorusu 1: Teknoparklar ve üniversiteler arasındaki **ilişki** ne kadar **işlevsel**dir?
Anımsatma Sorusu 2: Teknoparklar ve üniversiteler arasındaki ilişki ne kadar **üretken/verimli**?

5. Teknoparklar diğer teknoparklar ile nasıl ilişki kurmaktadırlar?

Anımsatma Sorusu 1: Teknoparkların teknoparklarla kurduğu **iletişim ağları** nasıl gerçekleşiyor?
Anımsatma Sorusu 2: Teknoparkların teknoparklarla kurduğu ilişki ağları **sizi nasıl etkiliyor**?
Anımsatma Sorusu 3: Teknoparkları ve şirketleri bir **ekosistem** olarak değerlendirebilir miyiz?

6. Son yıllarda neden Teknopark kurmak gibi bir eğilim ortaya çıkmıştır?

Anımsatma Sorusu 1: Teknoparkları veya teknoparkı olan üniversiteleri **prestijli** buluyor musunuz?
Anımsatma Sorusu 2: Teknoparkları **kaynak üretimi/kullanımı** açısından değerlendirebilir misiniz?

7. Türkiye'deki teknoparklar ne kadar birbirleriyle benzer veya birbirlerinden farklıdır?

Anımsatma Sorusu 1: Teknoparkların birbirleriyle **benzeşen veya ayrışan özellikler**i nelerdir?
Anımsatma Sorusu 2: Teknoparkları birbiriyle **benzeşmeye iten unsurlar / faktörler** nelerdir?

8. Bilgi ve teknoloji üretimi politikası bağlamında, teknoparkların politikaya yön veren kurum veya kişileri etkileme potansiyelleri nedir?
Anımsatma Sorusu 1: Teknoparklar ne ölçüde bilgi ve teknoloji üretim politikalarının **oluşturulmasına** yön verebilmektedir?
Anımsatma Sorusu 2: Teknoparklar ne ölçüde bilgi ve teknoloji üretim politikalarının **uygulanmasına** yön verebilmektedir?

9. Yükseköğretim politikası bağlamında, teknoparkların politikaya yön veren kurum veya kişileri etkileme potansiyelleri nedir?

Anımsatma Sorusu 1: Teknoparklar ne ölçüde yükseköğretim politikalarının **oluşturulmasına** yön verebilmektedir?

Anımsatma Sorusu 2: Teknoparklar ne ölçüde yükseköğretim politikalarının **uygulanmasına** yön verebilmektedir?
Anımsatma Sorusu 3: **Teknoparklar** üniversiteden **bağımsız bir yapı** oluşturabilir mi?
Anımsatma Sorusu 4: Ünivesitelerin teknopark ile ilişkilerinde: **eksiklik**leri / **bıkkınlık** yaratan durumlar / **engeller** / **etik olmayan** durum var mı? **Teknoparklar**, üniversitelerin bu sorunları aşmasında **yardımcı** olabilir mi?

10. Eklemek istedikleriniz var mı?

.....
.....
.....

BELGE ANALİZİ FORMU

Belge Analizi Verisi (Araştırmacı tarafından doldurulacaktır)

Belge Çeşidi

- ☐ Yasa- Yönetmelik
- ☐ Stratejik Plan
- ☐ Faaliyet Raporu
- ☐ Resmi Veri
- ☐ Politika Belgesi
- ☐ Basın
- ☐ Erişime Açık Materyaller
- ☐ Diğer: ……..

Kaynak

☐ Üniversite ☐ Teknopark
☐ Devlet ☐ Katılımcı Arşivi

Araştırmacıyı yönlendiren alt araştırma soruları:

1. **Teknoparkların kurumsal çevresini oluşturan unsurlar nelerdir?**

2. **Teknoparklar ne üretmektedir?**

3. **Teknoparkların kurumsallaşmasını doğrulayan unsurlar nelerdir?**

4. **Mevcut bilgi ve teknoloji üretim politikalarının amaçları ve kaynakları nelerdir?**

5. **Mevcut yükseköğretim politikalarının amaçları ve dayandığı kaynaklar nelerdir?**

D. Main Codes List for Interview

Main Codes	Corresponding Interview Question(s)
Strategic importance	**#Q1: Üniversite-sanayi işbirliğinde teknoparkların önemi nedir?**
Economic importance	
Societal importance	
Knowledge & technology production	**#Q2: Teknoparkların üstlendikleri roller ve sağladıkları katkılar nelerdir?**
Higher Education	
Dynamics of uni- tech relations	**#Q3: Teknoparklar ile üniversiteler arasındaki ilişkiyi yönetimsel açıdan değerlendirebilir misiniz?**
Management of uni- tech relations	
Administrative problems	
Functionality of uni- tech relations	**#Q4: Teknoparklar ve üniversiteler arasındaki ilişkiyi işlevsellik açısından değerlendirebilir misiniz?**
Networking	**#Q5: Teknoparklar diğer teknoparklar ile nasıl ilişki**

Technopark as an ecosystem	**kurmaktadırlar?**
Legitimacy	**#Q6: Son yıllarda neden Teknopark kurmak gibi bir eğilim ortaya çıkmıştır?**
Resource use	
Buffering strategy	**#Q7: Türkiye'deki teknoparklar ne kadar birbirleriyle benzer veya birbirlerinden farklıdır?**
Bridging strategy	
KTP Policy making/implementation	**#Q8: Bilgi ve teknoloji üretim politikası bağlamında, teknoparkların politikaya yön veren kurum veya kişileri etkileme potansiyelleri nedir?**
HE Policy making/implementation	**#Q9: Yükseköğretim politikası bağlamında, teknoparkların politikaya yön veren kurum veya kişileri etkileme potansiyelleri nedir?**

E. Main Codes List for Document Analysis

Main Codes	Corresponding Document Analysis Question(s)
External environment	**#Q1: Teknoparkların kurumsal çevresini oluşturan unsurlar nelerdir?**
Internal dynamics	
Production-technical core	**#Q2: Teknoparklar ne üretmektedir?**
Resources used	
Institutional norms & processes	**#Q3: Teknoparkların kurumsallaşmasını doğrulayan unsurlar nelerdir?**
Goals	**#Q4: Mevcut bilgi ve teknoloji üretim politikalarının amaçları ve kaynakları nelerdir?**
Sources	
Goals	**#Q5: Mevcut yükseköğretim politikalarının amaçları ve dayandığı kaynaklar nelerdir?**
Sources	

F. Turkish Summary / Türkçe Özet

1. Giriş

Günümüzde üniversitenin dönüşümüne paralel olarak, üniversite-sanayi ilişkileri dünyada ve Türkiye'de hızlı bir dönüşüm geçirmektedir. Üniversite-sanayi ilişkilerine devleti, endüstriyi, yükseköğretimi ve toplumu bilgi temelli bir ekonomiye dönüştürme bağlamında önemli roller atfedilmektedir. Üniversite-sanayi ilişkilerine atfedilen roller arasında bilgi temelli ulusal kalkınma ve endüstriyel üretim ile yenilik-girişimcilik odaklı yükseköğretim ve bilgi toplumuna ulaşmaya katkı sunmak da yer almaktadır (Alkibay, Orhaner, Korkmaz ve Sertoglu, 2012; Bakırcı, 2018). Aydoğdu'ya (2012) göre, Türkiye'nin bu yenilik-odaklı ekonomik kalkınma modeline geçişi yoğun araştırma-geliştirme (AR-GE), bilgi ve teknoloji üretimi yapılan profesyonel AR-GE birimleri ile mümkündür. Teknoloji Geliştirme Bölgesi (TGB) bu amaca yönelik olarak kurulmuş olan ve üniversite ile endüstri arasında bir nevi arayüz oluşturan ve bilgi-teknoloji üretimi olgusuna aracılık eden bir örgüttür. Bilgi-teknoloji üretim süreçlerinin çıktıları olan katma değerli ürün ve hizmetler, 21. yüzyılda ekonomik kalkınma ve refahın göstergesi olarak algılanmaktadır.

TGB aracılığıyla gerçekleşen bilgi-teknoloji üretimi, Türkiye'de geç kalmış bir girişimdir; özellikle İkinci Dünya Savaşı sonrasında Amerika Birleşik Devletleri ve (o zamanki) Sovyet Sosyalist Cumhuriyetler Birliği arasında bilim ve teknoloji alanında bir rekabete yol açan uzay çalışmaları ile birlikte, Amerika Birleşik Devletleri'ndeki Silikon Vadisi öncülüğünde ilk TGB'ler ortaya çıkmaya başlamıştır (Kleinman, Feinstein ve Downey 2013; Rahm, Kirkland ve Bozeman, 2000). İkinci Dünya Savaşı sonrası ortaya çıkan politik ve bilimsel çerçeve ile birlikte üçüncü nesil bir endüstriyel sıçramadan bahsetmek mümkündür. Drath ve Horch'un (2014) aktardığına göre Endüstri 3.0 olarak adlandırılan bu endüstriyel devrim, otomasyon-üretim sistemlerinin dijitalleşmesi ve 1960'larda bilgisayarın icadı ile özdeşleştirilmektedir (kısaca, Endüstri 1.0-buhar gücüne dayalı üretim; Endüstri 2.0 elektrik gücüne dayalı üretim). Günümüz bilgi temelli ekonomilerinin gündeminde

ise Endüstri 4.0 olarak tabir edilen bir endüstriyel devrim vardır. Endüstri 4.0 deneyiminde insanlar, makinalar ve internet arasında bir etkileşim ile yoğun AR-GE'ye dayalı bilgi-teknoloji üretimi yer almaktadır (Roblek, Mesko ve Krapez 2016). Değişen üretim sistemleri ile birlikte, devletlerin rekabetçi ve bilgiye dayalı ekonomi ideallerine ulaşması görevi üniversite-sanayi birlikteliğine ve bu birlikteliğin arayüz örgütü olarak TGB'lere düşmüştür denilebilir (Kleinman vd., 2013; Olssen ve Peters, 2005; Powell ve Owen-Smith, 1998).

Üniversite-sanayi ilişkileri günümüzde sıklıkla kullanılan bir terim olsa da, aslında İkinci Dünya Savaşı sonrasında başlayan ve günümüze dek devam eden bir bilgi-teknoloji üretimi kaygısından ve rekabetinden bahsetmek mümkündür. 1970'lerde ortaya çıkan ekonomik ve politik gerilimleri takiben neoliberal politikalar uygulanmaya konulmuştur (Kleinman vd., 2013; McClure, 2016; Taylor, 2017). Neoliberal kamu ve sanayi politikaları, küreselleşen bir pazara, özelleştirmeye ve özel sektör üzerinde devlet müdahalesinin azaltıldığı bir ekonomiye karşılık gelmekteydi (Gabbard, 2008; Kleinman vd., 2013). Neoliberal politikalar aynı zamanda ulusal ekonomiden fonlanan hizmetlerde-eğitim dahil olmak üzere- bir kesinti anlamına da gelmekteydi (Slaughter ve Rhoades, 2005). Neoliberal politikaların, yükseköğretimde bir dönüşüm, kaynak kısıtlaması, özelleştirme, sanayi ile işbirliği ve araştırmanın ticarileşmesi gibi yansımaları da olmuştur. (Balyer, 2011; Gabbard, 2008; Ward, 2012). Yine bu dönemde kamu yönetiminde etkili olmaya başlayan yeni işletmecilik ideolojisi ise kamu yönetiminde rekabet, verimlilik, üretkenlik, hesap verebilirlik gibi piyasa yönetimi prensiplerini uygulamak olarak tanımlanabilir. Yükseköğretimde ise yeni işletmecilik ideolojisi ile birlikte yerleşik üniversite işleyişinin ve yönetiminin piyasa yönetimi prensiplerini benimsemesi veya yükseköğretimin bu prensipleri benimsemiş yöneticiler tarafından yönetilmesi gündeme gelmiştir; bu bağlamda yeni işletmecilik ile neoliberalizm birbiri ile ilişkilidir (Deem, Hillyard ve Reed, 2007). Bu iki ideolojiye ek olarak, yükseköğretim alanında girişimci yükseköğretim yaklaşımı gündeme gelmiş ve yükseköğretim kurumları yapılarını, temel faaliyetlerini ve kültürlerini bu yaklaşıma göre adapte etmeye başlamıştır (Fayolle ve Redford, 2014); yükseköğretimde yöneticiler, akademisyenler ve öğrenciler girişimci fikir yapısı ve girişimci

faaliyetler konularında cesaretlendirilmeye başlanmıştır. Bu girişimci yükseköğretim yaklaşımı ile birlikte bilgi-teknoloji üretimi konusunda bazı gerilimler ortaya çıkmıştır; yerleşik üniversite kültüründe temel araştırma, eğitim verme, akademik özgürlük, bilim için bilim yapma gibi esaslar bulunurken; girişimci yükseköğretim veya girişimci üniversite yaklaşımı ile -eğitim ve araştırmaya ek olarak-verilen 'üçüncü misyon' ile üniversiteler, stratejilerinde, yapılarında ve faaliyetlerinde değişime giderek bilgiye-dayalı ulusal ekonomi hedefine katkıda bulunmaya sevk edilmiştir. Stratejiler ile bilgi-teknoloji üretimi politikaları, yapılar ile araştırma merkezleri ve TGB'ler ve faaliyetlerle ise katma değeri yüksek ürün ve hizmet üretmek için araştırma geliştirme yapmak kastedilmektedir. Özetle, bu yeni üniversite modeli, endüstri ile yakın ilişkiyi gerektirmektedir.

Türkiye'de neoliberal politikaların ve yeni işletmecilik ideolojisinin uygulanması, Endüstri 3.0 olarak adlandırılan endüstriyel devrim ve katma değeri yüksek bilgi-teknoloji üretiminin kurumsallaşmasının ilk adımı sayılabilecek Teknoloji Merkezleri'nin (TEKMER) kurulması Turgut Özal dönemine denk gelmektedir. Günümüzdeki bilgiye-dayalı ekonomilerin Endüstri 4.0 olarak adlandırılan son endüstriyel devrimi ve girişimci üniversite gibi kavramları benimsemiş olmalarının aksine Türk yükseköğretimi bu gelişmelere biraz geç tepki vermekte ve devam ede gelen yükseköğretimin yeniden yapılandırılması tartışmalarında bu kavramlar araştırma ve geliştirme, girişimcilik, yenilik, kalite, hesap verebilirlik ve uluslararasılaşma gibi konularla birlikte yükseköğretimin gündemini oluşturmaktadır (Armağan, 2014; Çetinsaya, 2014).

TGB ile birlikte, üniversitelere atfedilen araştırma misyonu tekeli bir nevi paylaşılmıştır denebilir; mod 2 adı verilen (Gibbons vd., 2010) bilgi üretimi ile bilgi-teknoloji üretimi üniversite dışındaki merkezlerde ve aktörlerce de yaygın olarak gerçekleştirilmeye başlanmıştır. Bu yeni durum yerleşik üniversite yapısı ile girişimci üniversite yaklaşımı arasında bazı çatışmalar doğurmuştur. Bilgiye dayalı ekonomi ve bilgi toplumu idealleri ile paralel olarak dönüşüme zorlanan üniversitede üniversite, akademisyenler, üniversite yöneticileri ve akademik faaliyetler için sırasıyla işyeri, bilgi işçileri, şirket yöneticileri ve bilgi işi gibi yeni tanımlamalar ortaya atılmıştır (Deem vd.,2007).

Türkiye bağlamında bakıldığında-yurtdışından daha geç olmakla birlikte-bu değişim ve dönüşümün TGB'ler vasıtasıyla 2000'li yıllarda Türk yükseköğretimini daha çok etkilediği görülmektedir. Türkiye'deki TGB modeli karma bir model (devlet-yerel yönetim/üniversite) olarak yurtdışındaki önde gelen TGB'lerden (serbest girişim) ayrışmaktadır (Aksan, 2012). Türkiye'deki TGB modelinin belirgin özelliği devlet destekleri ve devlet denetimidir; bunlar da birçok çatışma yaratmaktadır: yönetim, çıktılar, akademisyen rolü, üniversitelerin rolleri ve yapısı vb. alanlarda. Bunlara ek olarak, misyon farklılaşması, tematik TGB gibi kavramlar Türkiye'de yükseköğretimin gündemine giren konulardır. Türkiye'de üniversiteler ve ilintili TGB'leri bu tür değişimlere, dönüşümlere, çatışmalara ve yeniliklere stratejik tepkiler vermektedir ve diğer üniversiteler ve ilintili TGB'leri arasında kabul görme veya meşruiyet kazanma arayışına girmektedirler.

Araştırmanın kuramsal çerçevesini oluşturan Yeni Kurumsal Kuramın neoliberalizm, yeni işletmecilik ve girişimci üniversite yaklaşımı ile bağını Olssen ve Peters (2005) aktarmaktadır. 1980 ve 1990'larda neoliberalizmin ve yeni işletmeciliğin yükselişi ile birlikte yükseköğretimi yeniden tanımlamaya yönelik bir değişim ve dönüşüm yaşanmış, bu değişim ve dönüşüme üniversiteler kurumsal tepkiler vererek örgüt yapılarını ve temel faaliyetlerini uydurma yönüne gitmişlerdir; böylelikle örgütsel olarak varoluşlarını sürdürmek istemişlerdir. Yerleşik veya geleneksel üniversite düzeni özelleştirme, kaynak kısıtlaması, piyasa prensipleri ile karşı karşıya kalmış, bilgiye-dayalı ekonomik düzene geçişin bir aracı olarak görülerek sanayi ile ilişkiler kurması için yönlendirilmiştir. Bu bağlamda, Yeni Kurumsal Kuram örgütlerin yalnızca ekonomik çevrelerinde faaliyet gösterip teknik verimlilik arayışında olmadığını, daha geniş bir sosyo-kültürel alanda faaliyet gösterdiğini ve kurumsal alanlarında varoluş için meşruiyet arayı ile hareket ettiklerini savunmaktadır. Bu anlamda Meyer ve Rowan (1977), örgütlerin örgütsel alanda bir üretim sisteminden ziyade sosyal ve kültürel sistemler olarak görülmeleri gerektiğini savunmuştur. DiMaggio ve Powell (1983) bu fikre ek yaparak, örgütlerin yaygın sosyal beklentilere uyum gösterdiğini ve bunun sonucunda örgüt yapılarının zamanla birbirine benzeştiğini vurgulamıştır (eşbiçimlilik). Meyer ve Rowan (2006) ise yükseköğretim özelinde Yeni Kurumsal Kuramı açıklarken, üniversitelerin teknik

verimlilikten öte meşruiyet arayışında olduklarını savunmuştur. Meyer ve Rowan, örgütlerin-üniversitelerin gevşek bağlı olduğunu ve buna bağlı olarak daha istikrarlı yapılar olduğunu, üniversitelerin teknik çekirdekleri (eğitim ve araştırma) ile örgütsel yapıları arasında birbirini zayıfça etkileyen bir bağ olduğunu, ve yükseköğretim örgütlerinin teknik verimlilikten ziyade rasyonelleştirdikleri mitlerle hareket ettiklerini savunmuştur.

Özetle, yükseköğretimin bu bahsi geçen yaşadığı zorluklar, çatışmalar, değişim ve dönüşümler ile bilgi-teknoloji üretimi bağlamında TGB gibi örgütlerin ortaya çıkması göz önüne alındığında, Yeni Kurumsal Kuram gibi bir ana kuramsal çerçeve ve onu destekleyici ideolojik yaklaşımlar (neoliberalizm, yeni işletmecilik, girişimci üniversite yaklaşımı) ile donatılmış bir örgüt çalışması yapmak yerinde olacaktır.

1.1 Çalışmanın Amacı

Bu çalışmanın amacı, Türkiye'deki TGB'lerin kendine özgü yapısal ve işlevsel özellikleri belirlemek ve TGB'lerin bu yapısal ve işlevsel özelliklerinin Türkiye'nin bilgi ve teknoloji üretimi politikaları ile yükseköğretim politikalarını nasıl etkilediğini Yeni Kurumsal Kuram kavramsal çerçevesi ile incelemektir. Ana araştırma sorusu şu şekildedir:

TGB'lerin kurumsallaşmış yapıları ve işlevleri, Türkiye'nin bilgi ve teknoloji üretim politikası ile yükseköğretim politikasını nasıl etkilemektedir?

Alt-araştırma soruları ise şu şekilde sıralanmıştır:

1. TGB'lerin katkıları ve rolleri neoliberalizm bağlamında nasıl yeniden tanımlanmaktadır?
2. Yeni işletmecilik ve girişimci yükseköğretim yaklaşımı bağlamında yeniden tanımlanan üniversite-sanayi ilişkileri ne gibi çatışmalar doğurmaktadır?
3. TGB'lerin örgütsel alanında, paydaşlar arası ilişki ağları/yolları nasıl nitelendirilmiştir?

3.1 Yükseköğretimi dönüştüren itici güç(ler) nelerdir?

3.2 TGB'lerin yapıları ve işlevleri nasıl eşbiçimli hale gelmektedir?

1.2 Çalışmanın Önemi

Çalışmanın birincil önemi, bilgi ve teknoloji üretimi ile yükseköğretim alanlarında politika geliştirme ve politika uygulamasına katkıda bulunmaktır. Ayrıca bu çalışmanın, kuram, uygulamaya ve araştırmaya katkıları aşağıda belirtilmiştir.

Kuram. Bu çalışma, görgül kanıt eksikliği nedeniyle eleştirilen Yeni Kurumsal Kurama kanıt sağlama anlamında önemlidir. Bununla beraber, teorinin eşbiçim sınıflandırmasında taklitçi ve kuralcı eşbiçimlilik birbirinden ayrılması ve anlaşılması güç olarak görülmektedir. Örgütlerin teknik verimlilik temelli ekonomik model mi olduğu yoksa ve meşruiyet arayışı temelli sosyo-kültürel bir model mi olduğu ikilemi de yine dile getirilen bir eleştiridir. Çalışma aynı zamanda girişimci üniversite yaklaşımı ile yükseköğretimde süregelen yeniden yapılanma ve misyon farklılaşması gibi tartışmalara da ışık tutmaktadır.

Uygulama. Bu çalışma üniversiteler, TGB'ler ve diğer paydaşların rollerini ortaya koymada ve bunlara ilişkin bazı çıkarımlar sunma anlamında önemlidir. Çalışma, TGB'lerin yapılarını ve temel faaliyetlerini geliştirmelerinde kullanabilecekleri kullanışlı çıkarımlar sunmaktadır. Çalışma, TGB'lerin ve üniversitelerin daha profesyonel ve üretken bir ilişki kurmalarına yönelik kullanışlı tavsiyeler sunmaktadır. Çalışma ayrıca, yeni kurulan veya kurulması planlanan TGB'ler ve tematik TGBler, araştırma üniversitesi olma süreci yürüten üniversiteler, konu ile ilgili farklı disiplinler, devlet veya sivil toplum örgütleri gibi paydaşlar için de bazı kullanışlı çıkarımlar ve tavsiyeler sunmaktadır.

Araştırma. Çalışma, ayrı ayrı yaygın olarak çalışılmakta olan Yeni Kurumsal Kuram ve üniversite-sanayi ilişkileri konularını birlikte araştırması anlamında önemlidir. Araştırma aynı zamanda neoliberalizm, yeni işletmecilik ve girişimci üniversite yaklaşımı gibi ideolojiler ve yaklaşımlarla da beslenmektedir. Bütüncül bir kuramsal çerçeveye oturtulan bu çalışma aynı zamanda, ağırlıklı olarak nicel çalışmaların bulunduğu bu konularda nitel ve çoklu örnek olay incelemesi gibi nadir bir yöntem seçimi ile de önemlidir.

2. Yöntem

2.1 Araştırma Deseni

Olguları sosyal bağlamında açıklayıp yorumlamak amacıyla eğitim araştırmacıları - nicel araştırmanın yanı sıra- nitel araştırmayı artarak kullanmaya başlamıştır (Cohen, Manion ve Morrison, 2011; Denzin ve Lincoln, 2000). Bu çalışma, araştırma yöntemi olarak bir nitel araştırma çeşidi olan çoklu örnek olay çalışmasıdır. Çoklu örnek olay, birden fazla örnek olayı derinlemesine ve birçok bakış açısı ile ele alan ve örnek olayların karmaşıklığını ve özgünlüğünü gerçek hayat bağlamında ortaya koyan bir araştırmadır (Creswell, 1998; Eisenhardt, 1989; Miles ve Huberman, 1994; Yıldırım ve Şimşek, 2016; Yin, 2009). Çoklu örnek olayın amacı bir olguyu açıklamak, keşfetmek veya değerlendirmek (Thomas, 2011) veya kuram oluşturmak veya kuram test etmek (Eisenhardt, 1989) olabilir. Çoklu örnek olay bütüncül olarak örnek olaylardan oluşabilir veya birden fazla alt analiz birimlerini içeren örnek olaylardan oluşan gömülü bir desen olabilir (Yin, 2009).

Bu çalışma, üniversite-sanayi ilişkileri bağlamında bilgi-teknoloji üretimi olgusunu keşfedip açıklamayı amaç edinmiş, anahtar roldeki katılımcıların yer aldığı, dört gömülü analiz biriminden oluşan çoklu örnek olayların analiz edildiği bir çalışmadır. Çoklu örnek olay deseni her bir örnek olayı detaylıca betimlemenin yanı sıra, katılımcıların deneyimlerinin ve bakış açılarının diğer örnek olaylarda da tekrar edip etmediğinin test edilmesine - analitik olarak genellenebilmesine- olanak sağlamaktadır.

2.2 Örnek Olaylar

Bu araştırmada örnek olay olarak Türkiye'den iki üniversite ve bir yüksek teknoloji enstitüsü ile bunlarla ilintili TGB'ler seçilmiştir: A Üniversitesi ve ilintili TGB-Türkiye'nin orta bölgesi, B Üniversitesi ve ilintili TGB-Türkiye'nin batısı, C Üniversitesi ve ilintili TGB-Türkiye'nin güneyi.

2.3 Örneklem ve Katılımcılar

Bu araştırmada örneklem yöntemi olarak ölçüt örnekleme ve maksimum çeşitlilik örnekleme kullanılmıştır. Ölçüt örnekleme örnek olayların belirlenen niteliklere sahip olaylar, kişiler veya durumlardan seçilmesi olarak açıklanabilir. Maksimum çeşitlilik örnekleme ise örneklem boyutunu kısıtlarken katılımcı çeşitliliğini artırmayı hedeflemektedir (Marshall ve Rossman, 2006; Yıldırım ve Şimşek, 2016). Bu çalışmada ölçüt örnekleme için Bilim Sanayi ve Teknoloji Bakanlığı - BSTB tarafından ilan edilmiş olan ve girdi-faaliyet-çıktı ana kıstaslarına göre belirlenen (BSTB, 2015) 2015 TGB Performans Endeksi kullanılmıştır. Maksimum çeşitliliğin sağlanması için üniversite-sanayi ilişkileri bağlamında anahtar katılımcılar sayılabilecek üniversite yöneticileri, akademisyenler, TGB yöneticileri ve TGB şirket yöneticileri seçilmiştir. Çalışmaya, üç örnek olay için de ayrı ayrı bu dört katılımcı grubuna giren anahtar katılımcılar katkıda bulunmuştur: A Üniversitesi ve ilintili TGB-8 katılımcı, B Üniversitesi ve ilintili TGB-7 katılımcı, C Üniversitesi ve ilintili TGB-5 katılımcı.

2.4 Veri Toplama Araçları

Bu araştırmada yarı-yapılandırılmış görüşme sorularının bulunduğu bir görüşme formu ile belge analizi için oluşturulmuş bir form olmak üzere iki veri toplama aracı kullanılmıştır. Veri toplama araçları oluşturulurken alanyazın taramasından ve araştırma konusu üzerine yapılmış önceki çalışmalardan faydalanılmıştır. Ayrıca, alanında uzman akademisyenlerden uzman görüşü alınarak (Yıldırım ve Şimşek, 2016) pilot çalışma yapılmış ve böylelikle veri toplama araçlarına son hali verilmiştir. Yarı-yapılandırılmış görüşme formu 10 sorudan oluşmaktadır ve öncesine katılımcılar hakkında demografik bilgi toplamak için bir form bulunmaktadır. Belge analizi formu belgelerle ilgili demografik bilgi toplayan bir bölüm ile başlayıp, 5 alt araştırma sorusu ile devam etmektedir. Toplanan belgeler stratejik plan, yıllık faaliyet raporları, politika belgeleri, raporlar ve veri belgeleri gibi metinlerden seçilmiştir.

2.5 Veri Toplama İşlemleri

Araştırma iznini takiben, araştırmacı bir araştırma izlencesi (Yin, 2010) veya örnek olay protokolü (Lincoln ve Guba, 1985) oluşturmuştur. Bu izlence veya protokol ile araştırmacı, araştırmanın aşamaları, işleyişleri ve araştırma adımlarının neden uygulandığına dair kararlarını netleştirmiştir. Böylelikle, araştırmanın amacı, örneklem, veri toplama işlemleri, veri işleme, veri yorumlama, bulguların sunulması ve güvenirlik-geçerlik gibi esaslar araştırmanın başında belirlenmiş ve araştırmacıya rehberlik etmiştir. Araştırmada ortalama 40-50 dakika süren görüşmeler gerçekleştirilmiştir. Görüşmeler çoğunlukla ses kayıtları ile kayıt altına alınmıştır; katılımcının izninin olmadığı birkaç görüşmede detaylı notlar alınmıştır. Ayrıca, örnek olaya dair belgeler toplanmıştır ve veri çeşitlemesi yöntemi ile (Bogdan ve Biklen, 2007; Eisenhardt, 1989; Yıldırım ve Şimşek, 2016; Yin, 2009) görüşmeden elde edilen veri ile birlikte yorumlanmak üzere saklanmıştır.

2.6 Veri Analizi

Araştırmanın veri analizi aşamasında, önceden hazırlanmış ve pilot aşamasında geliştirilmiş bir kod listesinden yararlanılmıştır; kod listesi ile araştırmacının varsayımları ve alanyazından elde edilen temalar bir veri küçültme işlevi görmek üzere veri analizinde kullanılmaktadır (Miles ve Huberman, 1994). Araştırma verisi içerik analizi yöntemi ile analiz edilmiştir. İçerik analizi, araştırmacının büyük boyutlardaki nitel veri içindeki örüntülere bir şablon kullanarak veriyi küçültmesi olarak tanımlanabilir (Patton, 2002; Yin, 2009). Nitel veri dökümü, veri küçültmesi gibi işlemler MAXQDA isimli nitel veri analiz programı ile gerçekleştirilmiştir. Örnek olaylar, katılımcılar ve belgeler ile ilgili toplanan betimleyici veri Miles ve Huberman'ın (1994) önerdiği veri tablolaştırma yöntemi ile sunulmuştur. Araştırma verisi genel hatlarıyla örnek olay içi ve örnek olaylar arası olmak üzere iki bölümde analiz edilmiş ve bulgular bu iki ana sınıflandırma esas alınarak sunulmuştur. Örnek olay içi analizde her bir örnek olay bütüncül olarak ele alınmış ve araştırmacı veri ile ilgili daha yakın bilgi sahibi olmuştur. Örnek olaylar arası analiz ise, örnek olaylar arasındaki benzerlik ve farklılık yaratan örüntüleri ortaya çıkarmaya ve de veride

alanyazın ile uyuşan veya çelişen bulgular olup olmadığını ortaya çıkarmaya yarar (Eisenhardt, 1989; Yıldırım ve Şimşek, 2016; Yin, 2009)

2.7 Güvenirlik-Geçerlik

Örnek olay araştırmasının geçerliği, katılımcıların anlamlandırdığı olguların ve yaşantılarının eksiksiz anlatımı ile mümkündür. Örnek olay araştırmasının iç geçerliği, analiz ve sonuçların inandırıcılığına bağlıdır. Örnek olay araştırmasının dış geçerliği, sonuçların diğer örnek olaylara deneyimler ve örnek temalar halinde analitik olarak aktarılabilmesine bağlıdır (Miles ve Huberman, 1994; Yıldırım ve Şimşek, 2016; Yin, 2009). Örnek olay araştırmasının güvenirliği, sonuçların ve işlemlerin tutarlı olması ve benzer sonuçlara ulaşmak üzere tekrar edilebilmesine bağlıdır. Örnek olay araştırmasının iç güvenirliği, iki veya daha fazla araştırmacının bir olguyu açıklarken aynı bulgulara ulaşması bağlamında bir tutarlıkla açıklanabilir. Örnek olay araştırmasının dış güvenirliği, doğrulanabilirlik ile ilişkilidir; örnek olaydaki bulgular veya yorumlar benzer örnek olaylarda tekrar edilebilmelidir (Miles ve Huberman, 1994; Yıldırım ve Şimşek, 2016; Yin, 2009). Bu araştırmada güvenirlik ve geçerlik sağlamak için birçok strateji kullanılmıştır: araştırma alanında uzun süreli etkileşim, örnek olay protokolü, veri kaynakları çeşitlemesi, başka araştırmacının süreç ve sonuçları incelemesi, ayrıntılı betimleme, katılımcı teyidi vb.

3. Bulgular

Araştırmanın bulguları öncelikle her bir örnek olay için ayrı ayrı verilmiştir. Sonrasında ise örnek olaylar arası bulgular sunulmuştur.

3.1 Örnek Olay İçi Bulgular

Örnek olay içi bulgular dört tema etrafında sunulmuştur: TGB'lerin katkıları, TGB'lerin çatışmaları, TGB'lerin etki alanı ve TGB'ler için öneriler.

3.1.1 A Üniversitesi ve ilintili TGB

Bulgulara göre, Üniversite A ve ilintili TGB Türkiye'nin ulusal ekonomisine ve Türkiye'nin ülke imajına katkıda bulunmaktadır. Üniversite A ve ilintili TGB, iş olanakları, staj, uygulamalı araştırma gibi önde gelen alanlarda birbiriyle karşılıklı fayda da sağlamaktadır. Üniversite A ve ilintili TGB, franchising ve mentörlük yapma gibi stratejiler vasıtası ile bilgi-teknoloji üretimi bağlamında uluslararası alanda faaliyet göstermektedir. Ayrıca Üniversite A ve ilintili TGB, ürettiği ürünler ve hizmetler aracılığıyla sosyo-kültürel gelişmeye de katkıda bulunmaktadır.

Bulgulara göre TGB'lerin çeşitli çatışmaları bulunmaktadır. Bilgi-teknoloji üretimi alanında sahiplik çatışması ile başlanacak olursa, TGB'lerin pazar odaklı olması, bilgi-teknoloji üretimine az yatırım yapması ve üniversiteden gelen beşeri sermayeye bağımlı olması bu çatışmanın TGB tarafını oluştururken; üniversitelerin girişimcilik misyonuna mesafeli olması, akademik muhafazakarlık ve TGB üzerindeki baskınlığı bu çatışmanın üniversite tarafını oluşturmaktadır. İş kültürü uyumsuzluğu çatışması ise Türkiye'deki TGB modeli (devlet destekli, yerel yönetim ve üniversite öncülüğü) ile yurt dışındaki modeller (örneğin: serbest girişim) arası uyumsuzluk ve Türkiye'deki TGB modelindeki devlet ve üniversitenin müdahaleci tutumu ile özdeşleşmiştir. İşletmeci çatışması ise yatay yönetimde ve rol dağılımında sorunlar, profesyonellik eksikliği, işleri yavaşlatma gibi yönetsel bir çatışmayı işaret etmektedir. Yasal boşluk çatışması ise araştırma ve geliştirmenin doğası gereği zarar edebilmesinin yasal olarak bir karşılığı bulunmaması, TGB firmalarının yasaları kötüye kullanmaları ve üniversiteler ile TGB'lerin iki ayrı tüzel kişilik olarak hareket edememeleri olarak açıklanabilir.

TGB'lerin etki alanı temasına gelinecek olursa, bulgulara göre öncelikle girişimcilik ve yenilik kavramlarının yükseköğretim üzerinde bir etki alanı oluşturduğundan bahsedilebilir. Özellikle, disiplinler arası araştırma ve eğitim, müfredatı şekillendirme, araştırma üniversiteleri gibi temalarda bu etki alanından söz edilebilir. Üniversite A'da Girişimcilik Merkezi açılması, girişimcilik ve yenilik temalarına yönelik etkinlik ve eğitimler düzenlenmesi bu etki alanı doğrular niteliktedir. Üniversite A'nın ilintili TGB'sinin örgütsel çevresinde bazı dış güçler

(devlet, sanayi, STK'lar, diğer üniversiteler ve TGB'ler) ve TGB'nin iç dinamikleri (örgütsel yapı, birimler, yönetim, insan kaynakları, karar alma süreçleri, finansman ve denetim) TGB'nin etki alanında önemli etmenlerdir.

Üniversite A'nın ilintili TGBsi, yönetim tarzı, örgütsel yapı, binalar, hizmetler gibi konularda etki alanındaki diğer TGB'lere törensel uyum göstermektedir; aynı zamanda denetim ve orta-yönetim yapılarında farklılaşmaktadır; dış etmenlerden kaynaklı zorlayıcı eşbiçimlilik sergilerken, uluslararası TGB örneklerine karşı taklitçi eşbiçimlilik sergilemektedir. Üniversite A'nın ilintili TGB'sinin, bilgi-teknoloji üretimi bağlamındaki politika yapıcılar üzerinde doğrudan ve dolaylı etkilerinden bahsedilebilir. Bu etkiyi, politika yapıcılar ile yakınlık, kurumlar, devlete-sanayiye-iş kümelerine yakınlık gibi stratejiler ile ortaya koymaktadır. Bulgular ayrıca üniversite A'nın ilintili TGB'sinin, yükseköğretim bağlamındaki politika yapıcılar üzerinde dolaylı veya çok az etkisi olduğunu ortaya koymuştur; bu sınırlı etkiyi de üniversite vasıtası ile göstermektedir.

Öneriler temasına gelince, bulgulara göre TGB'lerin kurdukları ilişki ağları kurumsal, ortak projeler vasıtasıyla veya kişisel ilişki ağları ile gerçekleşebilmektedir; fakat katı rekabet ve devletin bazı firmaları kayırması gibi ilişki ağlarını zedeleyen durumlar da mevcuttur. TGB'lerin ekosistemlerinde kümelenme ve tematik TGB'ler yer tutmaktadır; üniversite A'nın ilintili TGB kendini uluslararası TGB'leri ekosisteminde konumlandırmaktadır. Daha iyi bir TGB yönetim modeli, Silikon Vadisi'ndeki gibi yatırımcılar, üniversite-TGB ortak yayın ölçütü gibi öneriler yanı sıra daha sıkı denetim ve daha sıkı TGB'ye kabul ölçütleri de önerilmiştir.

3.1.2 B Üniversitesi ve ilintili TGB

Bulgulara göre, Üniversite B ve ilintili TGB Türkiye'nin ulusal ekonomisine ve Türkiye'nin ülke imajına kısmen katkıda bulunmaktadır. Üniversite B ve ilintili TGB, iş olanakları, staj, uygulamalı araştırma, akademisyenlerin entelektüel gelişimi, üniversiteye gelir gibi önde gelen alanlarda birbirine karşılıklı fayda da sağlamaktadır. Üniversite B ve ilintili TGB, mentörlük yapma stratejisi vasıtası ile bilgi-teknoloji üretimi bağlamında bölgesel ve yerel alanda etkinlik göstermektedir.

Ayrıca Üniversite B ve ilintili TGB, ürettiği ürünler ve hizmetler aracılığıyla sosyo-kültürel gelişmeye de katkıda bulunmaktadır; girişimciler için bir cazibe merkezi olmanın yanı sıra kültürel etkileşim ve yerel sorunların çözümü anlamında da Üniversite B ve ilintili TGB yerel topluma ve bunun gelişimine katkıda bulunmaktadır

Bulgulara göre TGB'lerin çeşitli çatışmaları bulunmaktadır. Üniversite B ve ilintili TGB bilgi-teknoloji üretim kapasitesi, beşeri sermaye ve katma değeri yüksek ürün ve hizmet üretme kapasitesi açısından kritik kitleye tam anlamıyla ulaşmamış görünmektedir. Bilgi-teknoloji üretimi alanında sahiplik çatışması açısından, Üniversite B'nin ilintili TGB'sinin pazar odaklı olması, bilgi-teknoloji üretimine az yatırım yapması ve üniversiteden gelen beşeri sermayeye çok bağımlı olması bu çatışmanın TGB tarafını oluşturmaktadır. Üniversite B'nin TGB'sini besleyecek yeterince girdi üretmemesi ile yalın akademik bilgi ve teknoloji üretimi bağlamında akademik muhafazakarlık bu çatışmanın üniversite tarafını oluşturmaktadır. İş kültürü uyumsuzluğu çatışması ise Türkiye'deki TGB modeli (devlet destekli, yerel yönetim ve üniversite öncülüğü) ile yurt dışındaki modeller (örneğin: serbest girişim) arası uyumsuzluk, gelişimsel sorunlar ve üretim sorunları ile olduğu kadar Türkiye'deki TGB modelindeki üniversitenin müdahaleci tutumu ile de özdeşleşmiştir. Yetersizlik çatışmasına gelince, Üniversite B ve ilintili TGB kaynak tüketen bir yapı olarak kendini göstermese de Türkiye'de önde gelen birkaç TGB kadar işlevsel ve üretken değildir. Üniversite B ve ilintili TGB özelinde işletmeci çatışma ise, yöneticilerin kişisel özelliklerinin işlevsel bir yönetimi engellemesi, üniversite yöneticilerin TGB üzerinde yasal otorite kullanması, rektörlerin TGB'yi kendi dönemlerinin vitrini olarak gösterme çabaları ve TGB yönetiminde üniversite yöneticilerinin bulunmasının bir müdahale olarak algılanması olarak baş gösterdiği bir yönetsel çatışmayı işaret etmektedir. Yasal boşluk ve politik çatışma ise, yasa ile desteklerin fazla olduğu bilgi ve iletişim teknolojileri veya yazılım gibi sektörlerin ağırlıklı olarak girişimciler tarafından tercih edilmesi, TGB'ye kabul kıstaslarındaki gevşeklik, firmaların üzerindeki araştırma-geliştirmede başarılı olma baskısı, üniversite ve TGB gibi iki tüzel kişilik arasındaki belirsiz hiyerarşi, politikacılar tarafından alınan yüzeysel kararlar gibi çatışmalarda kendini göstermektedir.

TGB'lerin etki alanı temasına gelinecek olursa, bulgulara göre Üniversite B ve ilintili TGB'sinin öncelikle girişimcilik ve yenilik kavramları vasıtasıyla yükseköğretim üzerinde bir etki alanı oluşturduğundan bahsedilebilir. Özellikle, disiplinler arası araştırma ve eğitim, müfredatı şekillendirme, araştırma üniversiteleri gibi temalarda bu etki alanından söz edilebilir. Üniversite B'de, girişimcilik ve yenilik temalarına yönelik etkinlik ve eğitimler düzenlenmesi bu etki alanını doğrular niteliktedir. Üniversite B'nin ilintili TGB'sinin örgütsel çevresinde bazı dış güçler (devlet, sanayi, STK'lar, diğer üniversiteler ve TGB'ler) ve TGB'nin iç dinamikleri (örgütsel yapı, birimler, yönetim, insan kaynakları, karar alma süreçleri, finansman ve denetim) TGB'nin etki alanında önemli etmenlerdir.

Üniversite B'nin ilintili TGB, baskın kümelenme, temel faaliyetler ve birimler,

yönetim yapısı ve mali destek süreçleri gibi konularda etki alanındaki diğer TGB'lere törensel uyum göstermektedir; aynı zamanda ürün çeşidi, şehre yakınlık, akademisyen iştiraki, sunulan hizmetler, denetim, iş hacmi ve gelişim hızı gibi konularda farklılaşmaktadır; dış etmenlerden kaynaklı zorlayıcı eşbiçimlilik sergilerken, ulusal TGB örneklerine karşı taklitçi eşbiçimlilik sergilemektedir. Üniversite B'nin ilintili TGB'sinin, bilgi-teknoloji üretimi bağlamındaki politika yapıcılar üzerinde doğrudan ve dolaylı etkilerinden bahsedilebilir. Bu etkiyi, politika yapıcılar ile yakınlık gibi stratejiler ile kurumlar, üniversite yönetimi, TTO ve TGB üst yönetimi gibi aracılar ile ortaya koymaktadır. Bulgular ayrıca üniversite B'nin ilintili TGB'sinin, yükseköğretim bağlamındaki politika yapıcılar üzerinde dolaylı veya çok az etkisi olduğunu ortaya koymuştur; bu sınırlı etkiyi de üniversite yönetimi vasıtası ile göstermektedir.

Öneriler temasına gelince, bulgulara göre Üniversite B ve ilintili TGB'sinin kurdukları ilişki ağları kurumsal, ortak projeler vasıtasıyla veya kişisel ilişki ağları ile gerçekleşebilmektedir; fakat yereldeki TGB'ler arası katı rekabet gibi ilişki ağlarını zedeleyen durumlar da mevcuttur. Üniversite B ve ilintili TGB'sinin ekosisteminde kümelenme ve tematik TGB'ler yer tutmaktadır; Üniversite B'nin ilintili TGB'si kendini ulusal TGB ekosisteminde bölgesel etkin bir TBG olarak konumlandırmaktadır. Daha belirgin role, koordinasyona, uzlaşıya ve hesap

verebilirliğe dayalı bir ilişki, gelişim ve işlevsellik seviyelerine bağlı olarak TGB'leri TGB 1.0 ve TGB 2.0 olarak sınıflandırmak gibi önerilerde bulunulmuştur.

3.1.3 C Üniversitesi ve ilintili TGB

Bulgulara göre, Üniversite C ve ilintili TGB'sinin Türkiye'nin ulusal ekonomisine ve Türkiye'nin yurtdışındaki ülke imajına sınırlı katkısı bulunmaktadır; bu katkıdan ziyade Üniversite C ve ilintili TGB'sinin daha yerel bir ekonomik katkısından söz edilebilir. Üniversite C ve ilintili TGB, iş olanakları, staj, akademisyenlere patent gibi kazanımlar sağlaması gibi önde gelen alanlarda birbirine karşılıklı fayda da sağlamaktadır. Ayrıca Üniversite C ve ilintili TGB, ürettiği ürünler ve hizmetler aracılığıyla sosyo-kültürel gelişmeye de katkıda bulunmaktadır; öğrencilerin ve sıradan insanların TGB'lere oryantasyon türü ziyaretlerde bulunması ile topluma daha iyi ulaşılabileceği ve bunun da sosyo-kültürel gelişime katkıda bulunacağı dile getirilmiştir.

Bulgulara göre TGB'lerin çeşitli çatışmaları bulunmaktadır. Üniversite C ve ilintili TGB'sinin bilgi-teknoloji üretim kapasitesi, beşeri sermaye ve katma değeri yüksek ürün ve hizmet üretme kapasitesi açısından kritik kitleye ulaşmada yetersiz kaldığı görülmektedir. Bilgi-teknoloji üretimi alanında sahiplik çatışması açısından, Üniversite C'de uygulamalı araştırma sınırlılıkları, mezun kalitesi ile girişimciliğin bağdaşmaması çatışma doğurmaktadır; sanayi açısından ise zaman alıcı projelere ve beşeri sermayeye yatırım yapmada isteksizlik ve sanayinin hep talep eden konumda olması çatışma doğurmaktadır. Yetersizlik çatışmasına gelince, Üniversite C ve ilintili TGB önde gelen TGB'lere göre çok az işlevsel ve üretken görünmektedir. Üniversite C ve ilintili TGB özelinde işletmeci çatışma ise, yöneticilerin kişisel özelliklerinin işlevsel bir yönetimi engellemesi, üniversite yöneticilerindeki vizyon eksikliği, üniversite yöneticilerinin TGB faaliyetlerini yavaşlatmaları ve TGB yönetiminde üniversite yöneticilerinin bulunmasının bir müdahale olarak algılanması bir yönetsel çatışmayı işaret etmektedir. Yasal boşluk ve politik çatışma ise, bilgi ve iletişim teknolojileri veya yazılım gibi sektörlerin ağırlıklı olarak girişimciler tarafından tercih edilmesi karşısında oluşan yasal boşluk, TGB şirketlerinin yasayı

istismar etmesi, üniversite ve TGB gibi iki örgüt arasındaki belirsiz yapısal hiyerarşi, sosyal bilimlerin TGB'de dezavantajlı olması gibi başlıklar halinde dile getirilmiştir.

TGB'lerin etki alanı temasına gelinecek olursa, bulgulara göre Üniversite C ve ilintili TGB'sinin girişimcilik ve yenilik kavramları vasıtasıyla yükseköğretim üzerinde bir etki alanı oluşturduğundan bahsedilebilir. Özellikle, disiplinler arası araştırma ve eğitim ile müfredatı şekillendirme gibi temalarda bu etki potansiyelinden söz edilebilir. Üniversite C'nin ilintili TGB'sinin örgütsel çevresinde bazı dış güçler (devlet, sanayi, STK'lar, diğer üniversiteler ve TGB'ler) ve TGB'nin iç dinamikleri (örgütsel yapı, birimler, yönetim, insan kaynakları, karar alma süreçleri, finansman ve denetim) TGB'nin etki alanında önemli etmenlerdir.

Üniversite C'nin ilintili TGB, benzer yapılar, alt-birimler, binalar, sunulan hizmetler, ve yönetim yapısı gibi konularda etki alanındaki diğer TGB'lere törensel uyum göstermektedir; aynı zamanda ürün çeşidi, beşeri sermaye, mali destek ve sektöre yakınlık gibi konularda farklılaşmaktadır; dış etmenlerden kaynaklı zorlayıcı eşbiçimlilik sergilerken, ulusal TGB örneklerine karşı taklitçi eşbiçimlilik sergilemektedir. Üniversite C'nin ilintili TGB'sinin, bilgi-teknoloji üretimi bağlamındaki politika yapıcılar üzerinde etki potansiyelinden bahsedilebilir fakat bunu pratiğe dökememektedir. Kısıtlı etkisini de kurumlar vasıtasıyla göstermektedir. Bulgular ayrıca üniversite C'nin ilintili TGB'sinin, yükseköğretim bağlamındaki politika yapıcılar üzerinde dolaylı veya çok az etkisi olduğunu ortaya koymuştur; bu sınırlı etkiyi de üniversite yönetimi vasıtası ile göstermektedir.

Öneriler temasına gelince, bulgulara göre Üniversite C ve ilintili TGB'sinin kurdukları ilişki ağları kurumsal, ortak projeler vasıtasıyla veya kişisel ilişki ağları ile gerçekleşebilmektedir; fakat Anadolu'daki diğer TGB'ler arası katı rekabet gibi ilişki ağlarını zedeleyen durumlar da mevcuttur. Üniversite C ve ilintili TGB'sinin ekosisteminde tematik TGB'lere sıcak bakılmaktadır; tematik TGB ile şehrin az işlenen potansiyelinden (deniz bilimleri ve tarım gibi) yararlanılabileceği düşünülmektedir. Üniversite C ve ilintili TGB'si kendini daha çok yerel ekosistemin parçası olarak görmektedir. Araştırmanın ve araştırma merkezlerinin bir yaşam tarzı haline gelmesi, Türkiye'deki TGB'lerin sayısının 5 ile 10 arasında sınırlandırılması ve sanayiye yönelik yaptırımlar konusunda önerilerde bulunulmuştur.

3.2 Örnek Olaylar Arası Bulgular

Örnek olaylar arası bulgular dört tema etrafında sunulmuştur: TGB'lerin katkı seviyeleri, TGB'lerin çatışmalarının kaynakları, TGB'lerin etki ağları/yolları ve TGB'ler için öneriler.

TGB'lerin katkı seviyelerine ilişkin bulgular makro ve mikro seviyede katkılar etrafında toplanmaktadır. TGB'lerin makro seviyedeki katkılarından başlamak gerekirse, Türkiye'de en önde gelen ve yüksek performans sergileyen sadece birkaç TGB Türkiye'nin ulusal ekonomisine, ülke imajına ve bilgi-teknoloji üretimi bağlamında uluslararası alanda ve ulusal alanda etkili olmasına katkıda bulunmaktadır. Üniversite A ve ilintili TGB bu bağlamda en çok katkıyı sağlarken, Üniversite B ve ilintili TGB, daha ulusal düzeyde katkı sunmaktadır; Üniversite C ve ilintili TGB ise yerel katkı sunmaktadır. TGB'lerin mikro seviyedeki katkılarına gelince, üniversiteler ve TGB'ler maddi, eğitsel ve entelektüel olarak karşılıklı fayda sağlamaktadır; aynı zamanda TGB'lerin ürettikleri ürün ve hizmetlerle toplumun sosyal ve kültürel gelişimine katkısından bahsetmek mümkündür. Özellikle Üniversite C ve ilintili TGB içinde bulunduğu yerel toplumla daha bütünleşmiş görünmekte, sosyal ve kültürel gelişmeye daha fazla katkı sağladığı görülmektedir.

TGB'lerin çatışmalarını kritik kitle, bilgi-teknoloji üretimi sahipliği, iş kültürü/modeli uyumsuzluğu, yetersizlik, işletmeci/yönetsel sorunlar, ve yasal boşluk-politik sorunlar olarak listelemek mümkündür. TGB'lerin kritik kitle çatışmasının kapsamında bilgi-teknoloji üretim kapasitesi, beşeri sermaye ve ürün ile hizmet kalitesine dair sorunlar bulunmaktadır. Üniversite A'da bu çatışma neredeyse hiç yaşanmazken, Üniversite B'de biraz yaşanmakta; Üniversite C'de ise en çok yaşanmaktadır. Bilgi-teknoloji üretimi alanında sahiplik çatışması akademik girişimcilik ile akademik muhafazakarlık arasında geçmekte ve yalın akademik bilgi ve teknoloji üretimi ile katma değerli ürün ve hizmete dönüştürülebilecek bilgi ve teknoloji üretimi arasındaki ikilemde daha çok kendini göstermektedir. Bu çatışma her üç üniversite ve ilintili TGB'lerinde de gözlemlenmektedir. TGB bağlamında iş kültürü/modeli uyumsuzluğu çatışması ise Türkiye'deki devlet ve üniversite destekli/himayeli TGB modeli ile yurtdışında yaygın olan serbest girişim TGB

modeli arasındaki farklarda ortaya çıkmaktadır. Türkiye'deki TGB modelinden yurtdışındaki TGB modelinin önde gelen örneklerinden Silikon Vadisi olması beklenmektedir. Bu çatışma Üniversite A ve B ile ilintili TGB'lerinde dile getirilmiştir. Türkiye'de çoğu TGB'lerin tüm yatırım ve desteklere rağmen birkaç yüksek performans sergileyen TGB dışında işlevsiz ve kaynak tüketen bir görüntü sergilediği görülmektedir; bu da yetersizlik çatışması ile açıklanabilir. Üniversite A ve ilintili TGB'sinin bu çatışmadan uzak olduğunu veriler doğrulamaktadır. İşletme/yönetsel çatışma ise geleneksel üniversite yöneticileri ile yeni nesil girişimci yöneticiler arasında ortaya çıkmaktadır ve bu çatışma üç üniversite ve ilintili TGB'lerinde de gözlemlenmektedir. Yasal boşluk-politik çatışma ise, AR-GE'nin her zaman başarılı olacağı yanılgısı ve bunla ilgili yasal sorunlarda, TGB şirketlerinin yasaları istismar etmesinde, üniversite ile TGB'nin iki ayrı tüzel kişilik olmaları nedeniyle yaşadığı sorunlarda ve politikacıların bunlara ilişkin attığı veya atmadığı adımlarda kendini göstermektedir.

TGB'lerin etki ağları/yolları bağlamında bulgular incelendiğinde, girişimcilik ve yenilik kavramlarının yükseköğretim üzerinde bir etki ağı/yolu oluşturduğundan bahsedilebilir. Özellikle, disiplinler arası araştırma ve eğitim, müfredatı şekillendirme ve araştırma üniversiteleri gibi konularda TGB'lerin üniversite ve yükseköğretim üzerinde etki oluşturduğundan söz edilebilir. Bu etki ağları veya yolları sırasıyla Üniversite A ve ilintili TGB'sinde, Üniversite B ve ilintili TGB'sinde etkin olarak görülürken, Üniversite C ve ilintili TGB'sinde yalnızca etki potansiyelinden bahsedilebilir. Bu bağlamda TGB'ler girişimcilik ve yenilik kavramlarının taşıyıcısı rolünü üstlenerek üniversite veya yükseköğretimin dönüşümünde itici bir güç olarak düşünülebilir. TGB'lerin dış ve iç dinamikleri incelendiğinde, dış etmenlerden (devlet, üniversite vb.) ve iç etmenlerden (örgüt yapısı, insan kaynakları v.) etkilendiğini söylemek mümkündür. TGB'ler ve üniversiteler örgütsel alanlarında saygın bir üniversite ve saygın bir TGB görüntüsü vermek istemektedir; bu anlamda hem örgütsel alandan etkilenmektedirler hem de örgütsel alanı etkilemeye çalışmaktadırlar. Üniversiteler ve ilintili TGB'leri yönetim yapısı, örgütsel yapı, bina ve hizmetler gibi konularda etki alanındaki diğer üniversitelere ve TGB'lere törensel uyum göstermektedir; aynı zamanda ürün çeşidi,

sektöre yakınlık, denetim ve beşeri sermaye gibi konularda farklılaşmaktadır. TGB'ler dış etmenlerden kaynaklı zorlayıcı eşbiçimlilik sergilerken, uluslararası (Üniversite A ve ilintili TGB) ve ulusal TGB örneklerine karşı taklitçi eşbiçimlilik sergilemektedir; böylelikle TGB'ler hem etki eden hem de etkilenen konumundadırlar. TGB'lerin bilgi-teknoloji üretimi bağlamındaki politika yapıcılar üzerinde doğrudan ve dolaylı etkisinden bahsedilebilir. Bu etkiyi politika yapıcılar ile yakınlık ve kurumlar vasıtasıyla yapmaktadırlar; bu anlamda TGB'ler hem etki eden hem de etkilenen konumundadırlar. Bulgular TGB'lerin yükseköğretim bağlamındaki politika yapıcılar üzerinde dolaylı veya çok az etkisi olduğunu ortaya koymuştur; TGB'ler bu sınırlı etkiyi de kurumlar veya üniversite yönetimi vasıtası ile göstermektedir; bu anlamda bakıldığında TGB'ler çoğunlukla etkilenen konumundadırlar.

TGB'ler için öneriler teması altında bulgular, sürdürülebilir TGB modeli ve en kötü durum senaryosuna işaret etmektedir. Sürdürülebilir TGB modeline ilişkin öneriler kaliteli bir ilişki ağına işaret etmektedir; bu sürdürülebilir modelde kişisel ilişki ağlarındansa kurumsal ilişki ve ortak projelerdeki birlikteliklere işaret edilmektedir. Ayrıca sürdürülebilir TGB modeli için işleyen bir TGB ekosistemi ulusal ve uluslararası ekosistemlerle bütünleşmeli ve aynı zamanda da tematik TGB'ler oluşturulmalıdır. TGB daha iyi yönetilmeli, yatırımlar artmalı, TGB bilimsel yayın üreten yerler haline gelmeli ve TGB'ler TGB 1.0 ve TGB 2.0 olarak yeniden yapılandırılmalı. Diğer taraftan en kötü durum senaryosu da sürdürülebilir TGB modelinin zıttı olarak karşımıza çıkmaktadır. Katı rekabet, ilişki ağlarının geçici kurulması, küçük firmaların dezavantajlı durumda olması, devlet desteği ve himayesi sürerken TGB'lerin kendi kendine yetebilen bir ekosistem oluşturamaması, yerel potansiyele uygun TGB kurulamaması veya kurulu TGB'lerin yerel potansiyeli işleyememeleri neticesinde daha sıkı devlet denetiminin gündeme gelebileceği ve TGB'lere giriş ölçütlerinin daha da sıkılaşması ve TGB'lerin sayısının kısıtlanması gibi bir durumda TGB'ler için en kötü durum senaryosunun devreye girebileceği düşünülmektedir.

4. Tartışma

Araştırmanın bulguları alanyazın ve önceki araştırmalar ışığında tartışılmıştır. Araştırma bulguları makro seviyede bir bakış açısı ile irdelendiğinde, TGB'lerin Türkiye'nin bilgi temelli bir ekonomi olma hedefine büyük katkı potansiyeli olduğunu ortaya koymaktadır; pratikte ise aslında bu katkı, uluslararası alanda rekabet edebilen birkaç TGB ile sınırlıdır. Bu bağlamda, Türkiye İstatistik Kurumu-TÜİK (2016) ve Bilim Sanayi ve Teknoloji Bakanlığı-BSTB (2017) tarafından sunulan ihracat rakamları ve TGB kaynaklı toplam ihracat rakamları faydalı olacaktır. TGB'ler, kuruldukları günden bu güne toplam 3 milyar dolarlık bir ihracat hacmine erişmiştir fakat Türkiye'nin 2016 yılı toplam ihracatı olan 143 milyar dolar göz önüne alınınca TGB kaynaklı ihracatın Türkiye'nin bilgi temelli ekonomiye geçiş hedefi ile bağdaşmadığı görülmektedir. Daha dramatik olan iki veri ise 143 milyar dolarlık ulusal toplam ihracatın sadece %3'ünü yüksek teknolojili ürünler oluşturmaktadır; 3 milyar dolarlık toplam TGB kaynaklı ihracatın 2 milyar doları ise önde gelen 3 TGB tarafından gerçekleştirilmesidir. Bu istatistikler ışığında TGB'lerin, Türkiye'nin bilgi temelli ekonomiye geçişine ve Türkiye'nin ülke imajına katkı sağladığını söylemek güçtür.

TGB'lere mikro seviyede bir bakış ile bulgular değerlendirildiğinde TGB'lerin ve üniversitelerin maddi, eğitsel ve entelektüel açıdan birbirlerine karşılıklı katkı sağladıkları görülmektedir; fakat neoliberal ideoloji ile birlikte piyasa ekonomisinin etkilerinden ve prensiplerinden uzak kalamayan yükseköğretimin, sanayi ile işbirliğine teşvik edildiği ve araştırma gibi yükseköğretimin temel işlevinin ticarileştirildiği (Balyer, 2011; Hursch, 2008) eleştirisi dikkate alındığında, neoliberalizmin TGB'ler aracılığıyla beşeri sermaye, altyapı, sunulan hizmetler, ticarileştirilebilir bilgi ve teknoloji akışı gibi yükseköğretim imkan ve çıktılarını kullandığı göz ardı edilmemelidir. Yine mikro seviyede bir bakış ile bulgular incelendiğinde, TGB'lerin toplumun sosyal ve kültürel gelişimine katkısı daha ikincil bir amaç olarak göze çarpmaktadır; öyle ki neoliberalizm aslında piyasa prensiplerini benimsemiş, rekabetçi ve girişimci bir bilgi toplumu hedeflemektedir (McClure, 2016) ve TGB'leri neoliberalizmin bir aracı olarak düşünecek olursak, TGB'ler

üniversiteleri de geleneksel misyonlarından uzaklaştırmaktadır denilebilir (Olssen ve Peters, 2005).

Araştırmanın bulguları ile TGB'lerin çatışmalarının kaynağı üzerine tartışmak gerekirse, kritik kitle çatışması daha çok bilgi-teknoloji üretimi kapasitesi ve beşeri sermaye kaynaklı görünmektedir. Üniversite A ve ilintili TGB bu çatışmadan uzak iken (Cansız, 2016), Üniversite B ve ilintili TGB ile Üniversite C ve ilintili TGB bu çatışmayı yaşamaktadırlar. Bilgi ve teknoloji üretimi alanında sahiplik çatışması ise daha çok geleneksel üniversite ve muhafazakar akademisyenler ile girişimci akademisyenler ve TGB'ler veya girişimci üniversiteler arasında meydana gelmektedir. Lam (2010) bu iki kamp arasındaki çatışmayı ele aldığı çalışmasında, bu iki zıt ucun arasındaki sınırın belirsizliğinin akademisyenlerce nasıl algılandığını, akademik kapitalizmi ve akademik muhafazakarlığı savunan akademisyenlerin nasıl rollerini savunduklarını ve profesyonel kimliklerini nasıl tanımladıklarını araştırmıştır ve araştırmasının sonucunda bu belirsizliğin bir süre daha devam edeceğine işaret etmektedir. Bir diğer çatışma olan iş kültürü/modeli uyumsuzluğuna gelince, Türkiye'deki devlet destekli ve devlet-üniversite himayeli TGB modeline (Aksan, 2012), Silikon Vadisi gibi farklı bir modelde başarılı olmuş TGB hedefi dayatılmasındansa, daha erişilebilir ve kendine özgü hedefler konulmasında fayda olacaktır. Bulgular ışığında diğer bir çatışma olan yetersizlik bağlamında TGB'lerin birçoğunun işlevsellikten uzak ve kaynak tüketen bir durumda oldukları görülmektedir ve bu da TÜİK (2016) verisi, BSTB (2017) verisi, URAP (2017b) derecelendirmesi, TGB Performans Endeksi (BSTB, 2015) ile Girişimcilik ve Yenilik Endeksi (TÜBİTAK, 2016) gibi veriler ile doğrulanabilir. İşletmeci/yönetsel çatışma anlamında bulgulara bakılınca, üniversite yöneticileri sanayi ile daha fazla ilişki kurduklarında yönetsel olarak daha fazla kontrol sahibi olmak istemektedirler (Martin, 2000) çünkü mevcut durumu korumak istemektedirler (Amaral, Jones ve Karseth, 2002); sonuç olarak da üniversite yöneticilerinin bu yaklaşımı girişimci TGB yöneticileri ve girişimci akademisyenler üzerinde sıkıntı doğurmaktadır. Son olarak, yasal boşluk ve politik kararlar çatışmasına bulgular ışığında bakıldığında yapısal ve bürokratik sorunlar ile en çok karşılaşılmaktadır (Peker, Ar ve Baki, 2014) ve bu yönde adımlar atmak gerekliliği ortaya çıkmaktadır.

Araştırmanın bulguları ile TGB'lerin etki ağları/yolları temasını tartışmak gerekirse, TGB ile özdeşleşen girişimcilik ve yenilik gibi kavramların yükseköğretimi dönüştüren itici bir güç olarak ortaya çıktığı görülecektir. Bu anlamda girişimci üniversite yaklaşımından yola çıkarak, TGB'lerin yükseköğretimin dönüşümü ve üniversite üzerinde etkisinden (disiplinlerarası araştırma, gelişmiş araştırma çıktıları, mali destek sağlama vb.) bahsedilebilir (Link ve Scott, 2003). Fakat unutulmamalıdır ki yine bu girişimci üniversite yaklaşımı aynı zamanda, piyasa odaklı eğitim ve müfredat baskısı, araştırmanın tarafgirliği ve fikri mülkiyet gibi çekinceleri de gündeme getirmektedir (Bousquet, 2008). Diğer bir etki ağı/yolu başlığı ise TGB'lerin kurumsallaşma süreçlerinin bulgular ışığında tartışılmasıdır. Neoliberal ideoloji ile birlikte üniversitelerin rollerinde ve yapılarında bir değişim yaşanmaktadır ve bu değişim üniversiteleri, örgüt yapılarını ve temel faaliyetlerini piyasa beklentilerine göre şekillendirmeleri için zorlamaktadır. Üniversiteler de bu zorlamalar karşısında kurumsal yapılarını korumak için diğer üniversitelere zamanla benzeyerek - eşbiçimli hale gelerek- örgüt alanlarında meşruiyetlerini korumaya çalışmaktadırlar. Bilgi ve teknoloji üretimini kimin veya neyin himaye ettiği ve hangi paydaşların bunu etkilediği konusunda bulgular, TGB'lerin etkin rolünden söz etmektedir ve TGB'lerin bilgi ve teknoloji üretim politikasını doğrudan etkilediğini işaret etmektedir çünkü bu etki TGB'ler için varoluşsal bir önceliktir. Yükseköğretim politikalarını kimin veya neyin himaye ettiği ve hangi paydaşların bunu etkilediği konusunda bulgular, TGB'lerin düşük derecede ve belirsiz bir etkisini işaret etmektedir; TGB'ler kendilerini yükseköğretim politika yapıcıları ile doğrudan bir muhatap olarak görmemekte ve üniversite veya kurumlar vasıtasıyla bu sahip oldukları etkiyi göstermektedirler.

Öneriler ve TGB'ler için çıkarımlar teması bulgular ışığında tartışıldığında, sürdürülebilir TGB modeli ve en kötü durum senaryosu olmak üzere iki zıt grupta bulguların ayrıştığı görülebilir. Sürdürülebilir TGB için, Teknoloji Geliştirme Bölgeleri Derneği isimli kurumsal bir ilişki ağı TGB'ler tarafından önemsenmektedir fakat kişisel ilişki ağları daha baskın olsa da ortak projeler vasıtasıyla oluşturulan ilişi ağları ile kümelenmeye gitme ve bilgi transferi konularında işbirliği yapmaktadırlar. Sürdürülebilir TGB için diğer bir ölçüt ise işleyen bir ekosistem

olarak görülmektedir; bu hem ulusal hem de yerel bir ekosistemle eklemlenmiş olmalıdır ve ayrıca tematik veya butik olarak adlandırılan TGB'leri de barındırmalıdır. Sürdürülebilir TGB için öne çıkan bir öneri TGB'lerin gelişmişliklerine, işlevselliklerine ve üretkenliklerine göre TGB 1.0 ve TGB 2.0 olarak sınıflandırılmasıdır. Sürdürülebilir TGB'nin zıttı bulgular da tartışmaya değer görünmektedir. TGB'ler için en kötü durum senaryosunda ise, katı bir rekabetin ilişki ağlarını zedelemesi ve TGB'lerin devlet desteği ve himayesinin devam etmesinin planlandığı 2023 yılına kadar kendi kendine yeten bir düzeye gelememesi durumunda, TGB ekosisteminin çökmesi gündeme gelebilecektir. Ve bunun da neticesinde TGB kapanmalarının söz konusu olabilmesi veya TGB sayılarının 5 ile 10 arasında sınırlandırılması gibi öneriler de bulgularda ön plana çıkmaktadır.

G. Curriculum Vitae

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ARTICLES-INTERNATIONAL/PEER-REVIEWED:

Kondakçı, Y., Caliskan, O., Bulut Sahin, B., **Yılık, M. A.,** & Engin Demir, C. (2016). Regional internationalization in higher education between Turkey and the Balkans. *Bilig, Journal of Social Sciences of the Turkic World, 78*(16), 287-308.

BOOKS

Kondakçı, Y., & **Yılık, M. A.** (in press). Çoklu örnek olay [Multiple-case study]. In K. Beycioğlu, N. Özer & Y. Kondakçı (Eds.) *Eğitim yönetiminde araştırma yöntemleri*[Research methods in educational administration]. Ankara: Pegem.

PRESENTATIONS

Yılık, M. A., Kondakçı, Y. (2015, October). *The effects of technoparks on higher education policies of Turkey as institutions of university- industry relations.* Paper presented at 1st International Higher Education Studies Conference. (IHEC), İstanbul, Turkey.

Yılık, M. A. (2014, November). *Role of higher education in knowledge and technology production policies in Turkey.* Paper presented at Eastern Michigan Graduate Research Conference. (GRC), Michigan, the USA.

Çalışkan, Ö., **Yılık, M. A.,** Bulut Şahin, B., Kondakçı, Y. & Engin Demir, C. (2013, September). *Rationales for regional internationalization between Turkey and the Balkans*. Paper presented at the European Conference on Educational Research. (ECER), İstanbul.

ACADEMIC INTERESTS

Higher Education Management, Higher Education Policy, University - Industry Relations, Internationalization in Higher Education, Qualitative Research.

FOREIGN LANGUAGES

Advanced English, Intermediate Spanish, Elementary German

COMPUTER SKILLS

Data analysis: PASW/SPSS (quantitative), MAXQDA (qualitative)

H. Tez Fotokopisi İzin Formu

TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	
Sosyal Bilimler Enstitüsü	X
Uygulamalı Matematik Enstitüsü	
Enformatik Enstitüsü	
Deniz Bilimleri Enstitüsü	

YAZARIN

Soyadı : Yılık
Adı : Mehmet Ali
Bölümü : Eğitim Bilimleri Bölümü / Eğitim Yönetimi ve Planlaması

TEZİN ADI (İngilizce): A MULTIPLE-CASE STUDY ON UNIVERSITY-INDUSTRY RELATIONS FROM NEO-INSTITUTIONAL PERSPECTIVE

TEZİN TÜRÜ : Yüksek Lisans [ ] Doktora [X]

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]

2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. [ ]

3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. [X]

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: