

RELATIONSHIP BETWEEN SOCIAL CAPITAL, INFORMATION SHARING,
ORGANIZATIONAL AMBIDEXTERITY
AND FIRM PERFORMANCE IN TECHNOLOGY PARKS

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ABSTRACT

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The main purpose of this thesis is to investigate the link between social capital, information sharing, ambidexterity, and firm performance in technopark firms in Turkey. To that end, the bilateral relations and serial mediation effects of these concepts were probed. Data was gathered through surveys from three technoparks in Ankara. Survey results of 87 firms were analyzed using serial and combined (serial and parallel) mediation analyses. According to the results, higher social capital among technopark firms increases their performance through enabling information sharing, which in turn improves the ambidexterity of firms. In order to investigate this relationship in-depth, two dimensions of social capital (structural and relational) and two components of ambidexterity (exploration and exploitation) were also included into the model and a second analysis was conducted. It was found that both the structural and relational dimensions of social capital contributed to firm performance through serial mediation of information sharing and exploitation, whereas exploration had no significant effect on firm performance in technopark firms. These results reveal

implications that are highly likely to serve critical strategic and operational purposes of both firm and technopark managements. The findings indicate that organizational performance and ambidexterity level of technopark firms can be improved by increasing social capital among them, which fosters information sharing. Furthermore, increasing trust and information sharing between these firms is highly likely to enhance explorative activities such as innovations, new product developments, and new market penetrations, which are among the main objectives of technoparks.

Keywords: Social capital, ambidexterity, technology parks, information sharing, knowledge transfer

ÖZ

TÜRKİYE'DEKİ TEKNOPARK FİRMALARINDA SOSYAL SERMAYE, BİLGİ PAYLAŞIMI, ÖRGÜTSEL ÇİFTYÖNLÜLÜK VE FİRMA PERFORMANSI ARASINDAKİ İLİŞKİ

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Bu tezin esas amacı Türkiye'deki teknopark firmalarında sosyal sermaye, bilgi paylaşımı, çift yönlülük ve firma performansı arasındaki bağı araştırmaktır. Bu maksatla bu kavramlar arasındaki ikili ilişkiler ve seri aracılık etkisi irdelenmiştir. Anket yoluyla Ankara'daki üç teknoparktan veri toplanmıştır. 87 firmanın anket sonuçları seri ve birleşik (seri ve paralel) aracı etken analizi kullanılarak analiz edilmiştir. Sonuçlara göre teknopark firmaları arasındaki yüksek sosyal sermaye, firmalar arası bilgi paylaşımı sağlayarak ve bu sayede firmaların çift yönlülüklerini artırarak firma performansını artırmaktadır. Bu ilişkiyi daha derinlemesine araştırmak için sosyal sermayenin iki boyutu (yapısal ve ilişkisel) ve çift yönlülüğün iki bileşeni (geliştirme ve yararlanma) de modele dahil edilmiş ve ikinci bir analiz yapılmıştır. Bulgulara göre, sosyal sermayenin hem yapısal hem de ilişkisel boyutu bilgi paylaşımı ve yararlanmanın seri aracı etkisi üzerinden firma performansına katkıda bulunmaktadır. Bu sonuçlar firma ve teknopark yönetimlerinin amaçlarına hizmet edecek çıkarımları açığa çıkarmıştır. Bulgular, teknopark firmaları arasındaki bilgi paylaşımını teşvik eden sosyal sermayenin artırılması ile firma performanslarının ve

ift ynllk seviyelerinin geliřtirilebileceđini gstermektedir. Buna ek olarak, firmalar arasındaki gvenin ve bilgi paylařımının artırılması ile teknoparkların esas amaları arasında yer alan inovasyon, yeni rn geliřtirme ve yeni pazarlara girme gibi geliřtirici aktivitelerin geliřtirilmesi kuvvetle muhtemeldir.

Anahtar Kelimeler: Sosyal sermaye, ifynllk, teknopark, bilgi paylařımı, bilgi transferi

To My Family

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TABLE OF CONTENTS

PLAGIARISM.....	iii
ABSTRACT	iv
ÖZ.....	vi
DEDICATION	viii
ACKNOWLEDGMENTS.....	ix
TABLE OF CONTENTS	x
LIST OF TABLES	xii
LIST OF FIGURES.....	xiii
CHAPTER	
1. INTRODUCTION.....	1
1.1 Problem Statement.....	1
1.2 Significance of the Study	3
1.3 Research Questions	4
1.4 Organization of the Study	5
2. LITERATURE REVIEW	6
2.1 Definition of Social Capital	6
2.2 Types and Dimensions of Social Capital	7
2.3 Social Capital Across Different Domains and Contexts.....	8
2.4 Effects of Social Capital on Organizational Performance Measures	9
2.5 Definitions of Exploitation, Exploration, and Ambidexterity.....	10
2.6 Types of Ambidexterity	12
2.6.1 Contextual, Simultaneous/Structural and Sequential Ambidexterity	13
2.6.2 Different Combinations of Exploration and Exploitation in the Formulation of Ambidexterity	14
2.7 Antecedents and Resources of Ambidexterity	17
2.8 Ambidexterity across Different Contexts, Domains, and Levels.....	18
2.9 Effects of Ambidexterity on Organizational Performance Measures	20

3. HYPOTHESES	21
3.1 Inter-Organizational Social Capital and Information Sharing.....	21
3.2 Information Sharing and Ambidexterity	25
3.2.1 Information Sharing and Exploration.....	28
3.2.2 Information Sharing and Exploitation.....	29
3.3 Ambidexterity and Firm Performance.....	30
3.4 Model Summary	31
4. RESEARCH SETTING	33
4.1 Technoparks in Turkey.....	33
4.2 The Technopark Context.....	36
4.2.1 SMEs	36
4.2.2 High-Tech Firms	37
4.2.3 Clusters.....	38
5. METHODOLOGY.....	41
5.1 Methodological Approaches and Theoretical Framework	41
5.1.1 Social Capital	41
5.1.2 Ambidexterity.....	42
5.1.3 Firm Performance.....	43
5.2 Methods of Data Collection.....	44
5.3 Sample	47
6. ANALYSIS AND RESULTS	48
6.1 Descriptive Statistics, Reliability, Factor Analysis, and Correlations.....	48
6.2 Analysis of Bilateral Relations and Mediating Effects	56
7. DISCUSSION AND CONCLUSIONS.....	60
7.1 Managerial Implications.....	63
7.2 Limitations and Directions for Future Research	64
REFERENCES.....	67
APPENDICES	
Appendix A. QUESTIONNAIRE FOR TECHNOPARK FIRMS (ENGLISH) ..	80
Appendix B. QUESTIONNAIRE FOR TECHNOPARK FIRMS (TURKISH) ...	83
Appendix C. TURKISH SUMMARY / TÜRKÇE ÖZET.....	86
Appendix D. TEZ FOTOKOPİSİ İZİN FORMU	98

LIST OF TABLES

Table 1 Examples of Balanced and Combined Dimensions of Ambidexterity.....	17
Table 2 General Information About Technoparks.....	33
Table 3 Sectoral Distribution of Respondent Firms	47
Table 4 Descriptive Statistics of the Respondent Characteristics	49
Table 5 Descriptive Statistics of the Firm Characteristics	50
Table 6 Descriptive Statistics of Variables.....	50
Table 7 Cronbach's Alpha Values of Scales.....	51
Table 8 Total Variance Explained.....	52
Table 9 Pattern Matrix.....	52
Table 10 Correlation Matrix of All Variables	55

LIST OF FIGURES

Figure 1 Initial Model	31
Figure 2 Extended Model.....	32
Figure 3 Sectoral distribution of firms operating in ODTU Teknokent.....	34
Figure 4 Sectoral distribution of firms operating in Bilkent Cyberpark ..	35
Figure 5 Sectoral distribution of firms operating in Hacettepe Teknokent.....	35
Figure 6 Distribution of the Education Level of the Respondents.....	49
Figure 6 Distribution of the Education Level of the Respondents.....	45
Figure 7 The regression analysis coefficients of relationship between social capital, information sharing, ambidexterity, and firm performance	57
Figure 8 The regression analysis coefficients of relationship between structural social capital, relational social capital, information sharing, exploration, exploitation, and firm performance.....	58

CHAPTER 1

INTRODUCTION

1.1 Problem Statement

In conjunction with the increasing importance and need of innovation management in today's rapidly changing technology environment (Junni, Sarala, Taras, and Tarba, 2013), organizational ambidexterity and social capital concepts have demonstrated increasing popularity in the organization and management literature in recent years (Maurer, Bartsch, and Ebers, 2011; Nosella, Cantarello, and Filippini, 2012; O'Reilly and Tushman, 2013). Organizational ambidexterity, which is defined as the ability to simultaneously achieve exploration and exploitation (He and Wong, 2004), or alignment and adaptability (Cegarra-Navarro and Dewhurst, 2007), is found to be critical especially for more dynamic industries such as the high-technology industry (Simsek, Heavey, Veiga, and Souder, 2009). There are numerous empirical, theoretical, and review papers, and even special journal issues focusing on organizational ambidexterity and its different aspects (O'Reilly and Tushman, 2013) in various fields including strategic management, innovation and technology management, organizational learning and adaptation, and organizational behavior (Simsek, 2009). In order to succeed in both explorative and exploitative activities, firms need to have enough resources and the capability of using them optimally (Cao, Gedajlovic, and Zhang, 2009; O'Reilly and Tushman, 2013). While the traditional resource-based view (RBV) argued that it was enough for firms to maintain their resources as "rare, valuable, non-substitutable, and inimitable" to obtain competitive advantage (Barney, 1991), the relational view (Dyer and Singh, 1998) and extended RBV (Lavie, 2006) suggest that internal resources of organizations are not sufficient

for competitive advantage, and organizations need to access and acquire external knowledge and resources, especially in today's emerging highly dynamic environment (Wu, 2008).

Social capital, on the other hand, is an asset embedded in social connections within a network, along with the structure and relational content of the ties (Maurer, et al., 2011). Social capital is found to affect several organizational measures, two of which are performance (Acquaah, 2007; Moran, 2005) and information/knowledge exchange (Maurer et al., 2011; Tsai and Ghoshal, 1998; Wu, 2008; Yli-Renko, Autio, and Sapienza, 2001). There are also some studies that reveal the positive direct effect of information sharing on firm performance (Cummings, 2004; Kulp, Lee, and Ofek, 2004).

Thus, in the literature, there are different studies that propose or reveal bilateral or trilateral relations among the four variables: social capital, information sharing, ambidexterity, and firm performance. This thesis suggests that it is highly likely to observe a serial relationship among them, since social capital is an important antecedent of information sharing (Tsai and Ghoshal, 1998; Wu, 2008; Yli-Renko et al., 2001), whereas information is a critical input for exploration and exploitation capabilities of firms (Maurer et al., 2011), and high levels of both exploration and exploitation yield increased firm performance (Cao et al., 2009; He and Wong, 2004; Lubatkin, Simsek, Ling and Veiga, 2006). Considering that the aforementioned bilateral relationships are found by several studies in extant literature, it is possible to find a path including successive effects of these four concepts.

This proposition is put forth and investigated within the context of technoparks in Turkey, for several reasons. Technoparks (or technology development zones) are clusters of high-tech and R&D firms that are physically located close to each other in a bounded area, mostly close to a university, for the purpose of generating new technology and innovations and improve the commonwealth of the region or country ("What is a Technopark?", ODTÜ Teknokent). By definition, technopark firms

operate in dynamic and rapidly changing high-tech industries, where ambidexterity and resource access capability are more essential (Junni et al., 2013; Simsek, 2009). Furthermore, an average firm operating in a technopark can be considered as a young small and medium sized enterprise (SME), and SMEs are found to lack the critical resources, organizational structure, and routines that provide organizational learning (Abebe and Angriawan, 2014). Moreover, it is more likely to observe higher social capital in technoparks and its effects, since there is a common environment, physical proximity, and interaction among the member firms (Laursen, Masciarelli, and Prencipe, 2012; Szulanski, 1996). Considering these aspects of technoparks, the investigation of the relationship of social capital, information sharing, ambidexterity, and firm performance in the networks consisting of technopark firms is deemed particularly fruitful and relevant.

1.2 Significance of the Study

First of all, this study proposes a unique model, that was neither suggested nor investigated in the extant relevant literature. Within this framework, two distinct and important literatures (social capital and ambidexterity) are combined. Moreover, some bilateral and trilateral relations, found in earlier studies, are probed in terms of whether and which other latent factors affect them.

The majority of the literature has investigated ambidexterity within the organizational context (Raisch, Birkinshaw, Probst and Tushman, 2009), therefore, its antecedents were sought in internal fields such as organizational culture and structure. However, resources obtained from external sources are quite likely to foster ambidexterity, especially its exploration component (Raisch et al., 2009). Similarly, a big part of the literature suggests and reveals a positive link between social capital and several performance measures; however, this literature did not consider what other factors could mediate that relationship (Maurer et al., 2011). In this thesis, possible mediators are considered, and their effects are investigated.

This study also possesses significance in terms of its context. According to the data published by the Turkish Ministry of Industry and Technology, as of the end of June 2018, there are 81 technoparks in Turkey, 57 of which are actively in operation. 4,852 firms operate in these technoparks and over 48,000 people are employed, 81.5% of which work in R&D. Technopark firms have a cumulative export volume of \$3.5 billion (Ministry of Industry and Technology, Directorate General for R&D, 2018). Comparing this number to the total export value of Turkey in June 2018, which is published as \$12.9 billion by the Turkish Statistical Institute, the importance of technoparks for national economy can be appreciated. Thus, the results and conclusions of such a study could contribute to improvement of such organizations which were founded with the purpose of generating and commercializing technological knowledge, increasing production quality and efficiency, and decreasing costs by relevant innovations, and increasing the competitiveness of the industry (Ministry of Industry and Technology, Directorate General for R&D, 2018). The findings of this study are likely to provide managerial implications for technopark and firm managements, on how to promote more innovative, efficient, competitive, and competent firms and environments within clusters like technoparks.

1.3 Research Questions

This thesis mainly tries to answer the following questions:

- (1) What are the bilateral relationships of social capital and its structural and relational dimensions with information sharing, ambidexterity, exploration, exploitation, and firm performance for technopark firms in Turkey?
- (2) Are there any serial mediating effects of information sharing and ambidexterity on relationship between social capital and firm performance?

(3) If such serial mediation effects exist, what are the individual roles of the structural and relational dimensions of social capital, and the exploration and exploitation components of ambidexterity on this mediation?

1.4 Organization of the Study

In the following section, the literature is reviewed for the social capital and ambidexterity concepts: their definitions, types and dimensions, antecedents and effects, relevant studies across different domains and contexts are examined.

The theoretical framework of the propositions suggested by this thesis is explained and the statistical model is demonstrated in the third section.

In the fourth section, the research context, its structure and characteristics are represented and linked to the main concepts of the study.

Data collection and analysis methodologies are explained in section five. The information about the sample, measures, and scales that are used in the analysis are also mentioned here.

Section six demonstrates statistical analysis results at each stage of the analysis. Descriptive statistics, correlations, and statistical effects are presented in this section along with numeric data.

Finally, the results are interpreted and discussed in the seventh section. Managerial implications are deduced, and limitations of the study and directions for future research are also introduced.

CHAPTER 2

LITERATURE REVIEW

2.1 Definition of Social Capital

The term “social capital” was first used to express the resources included in connections between the members of a society (Jacobs, 1965). Besides sociology, political science, and economics, the concept of social capital has also recently become a popular topic in the organization studies literature (Adler and Kwon, 2002).

Social capital is defined as a “capital”, since it is a durable and an investible asset which is expected to bring advantages in return; it is “appropriable” (Coleman, 1988), meaning that it can serve different aims, such as acquiring knowledge or accessing resources; it is “convertible” (Bourdieu, 1985), which implies that it can be transformed into other types of capital, like economic or intellectual capital; and it can become a “substitute or complement” for other resources (Adler and Kwon, 2002).

Nahapiet and Ghoshal’s (1998) definition describes social capital as “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit”. Adler and Kwon (2002) summarize social capital in their conceptual paper in a similar way, as “the goodwill available to individuals or groups, whose source lies in the structure and content of the actor's social relations, whose effects flow from the information, influence, and solidarity it makes available to the actor.”

By definition, social capital consists of not only realized, but also potential resources (Bourdieu 1985) and the social network (Nahapiet and Ghoshal 1998) offered by social relations, which is defined as “the relations in which favors and gifts are exchanged” (Adler and Kwon 2002). Thus, in an organizational context, social capital can be broadly defined as the set of resources that are reached or obtained through social contacts, relations, and networks.

2.2 Types and Dimensions of Social Capital

There are various approaches towards social capital, and several definitions have been given in the literature. Adler and Kwon (2002) categorize social capital into three types. The ones that are built upon the ties of an individual with individuals that are outside of focal actor’s network are called “external” relations and constitute “bridging” social capital. The structure of the internal relations that exist within a community form the “bonding” social capital. The third category includes both internal and external relations. Thus, if the members of a group are strongly interconnected with each other but isolated from external networks or individuals, that would mean they have a high bonding social capital, but a low bridging social capital (Molina-Morales and Martinez-Fernandez, 2010).

Nahapiet and Ghoshal (1998) suggest analyzing social capital in three dimensions; structural, relational, and cognitive. The structural dimension of social capital consists of the existence, density, and other fundamental characteristics and patterns of social relations, such as interaction frequency, communication channels, and identities of hierarchy among the actors. The presence of a connection between two parties could provide them with the ability of reaching each other’s knowledge and resources; however, it is the structure of the relationship what causes enthusiasm in parties to share their resources, and ask for, or offer help (Moran, 2005).

The relational dimension describes the behavioral dynamics of relationships, such as the level of trust between actors, norms, identities, responsibilities, and intentions that

are acknowledged by the parties within the networks. Trust functions as a control mechanism within a relationship (Uzzi, 1996) and promotes deeper and more open discussions on novel knowledge and ideas (Moran, 2005).

The cognitive dimension is related to the "shared languages, codes, narratives, representations, and interpretations" within a relation (Nahapiet and Ghoshal, 1998). It is fostered by collective goals, and common perceptions (Tsai and Ghoshal, 1998).

2.3 Social Capital Across Different Domains and Contexts

Social capital is investigated at the individual (Acquaah, 2007; Rogan and Mors, 2014), unit/department (Tsai and Ghoshal, 1998), organizational and inter-organizational levels (Yli-Renko et al., 2001) in different studies in the literature. While focusing on intra-organizational social capital (i.e., social capital between individuals or units within a firm) and suggesting that organizations (compared to markets) are more open to form social relationships that would provide social capital, Nahapiet and Ghoshal (1998) also note that inter-organizational networks are also likely to constitute social capital. Similarly, while earlier studies focused on social capital research at the individual level, organization networks also became a popular context in later studies (Acquaah, 2007).

There are empirical studies focusing on managerial social capital (i.e., between managers of different firms) (Acquaah, 2007; Moran, 2005; Peng and Luo, 2000), social capital between firms and their customers (Yli-Renko et al., 2001), and intra-organizational social capital (Maurer et al., 2011). Managerial social capital is divided into two by Peng and Luo (2000); the effort of individuals to benefit from favorable circumstances provided by personal connections, and the effort of organizations to collaborate with other organizations with the purpose of increasing their competitiveness. There are also several empirical studies that focus on social capital in various contexts and industries (Wu, 2008) such as family firms (Arregle, Hitt, Sirmon and Very, 2007), urban public schools (Leana and Pil, 2006), biotechnology

start-ups (Maurer and Ebers 2006), young technology firms (Yli-Renko et al., 2001), multinational corporations (Gooderham, Minbaeva, and Pedersen, 2010), and clusters of manufacturing firms (Laursen et al., 2011).

2.4 Effects of Social Capital on Organizational Performance Measures

There are many empirical studies in the strategy, organizational learning, and information sharing areas that reveal positive effects of social capital on various organizational indicators, and a few showing negative effects (Wu, 2008; Maurer et al., 2011). As with other types of capital, social capital may also cause drawbacks as well as advantages both for the parties (Adler and Kwon, 2002). Several studies in the literature have found that social capital may lead to successes and gains of individuals and organizations in different fields, such as intellectual capital (Nahapiet and Ghoshal, 1998), human capital (Coleman, 1988), adaptability and competitive advantage (Leana and Van Buren, 1999), competitiveness improvement (Wu, 2008), new product development, technological distinctiveness and sales costs (Yli-Renko et al., 2001), resource exchange, innovation performance and growth (Maurer et al., 2011; Tsai and Ghoshal, 1998), reputation (Burt, 1992), reaching external knowledge, power, and support (Adler and Kwon, 2002), career success, ease of finding jobs, resource exchange, product innovation, cross-functional team effectiveness, reduction of turnover rates, entrepreneurship, startup performance, supplier relations, and interfirm learning (Adler and Kwon, 2002), capability improvement (Andersson, Forsgren and Holm, 2002), and managerial task performance (Moran, 2005). Nahapiet and Ghoshal (1998) argue that social capital empowers “efficiency of action” by reducing redundancy; Putnam (1995) puts forward decreased transaction costs as one prominent benefit of social capital, and innovativeness is found to improve indirectly as a result of increased collaboration by high social capital (Fukuyama, 1995). Lavie (2006) suggests that an organization which has connections within a network is more able to benefit from external resources. Social capital has the potential of providing business benefits to actors, especially by substituting or complementing other types of capital through “compensating for a lack of financial capital” or by “reducing

transaction costs” (Adler and Kwon 2002). There are empirical studies that reveal the positive effect of social capital on innovativeness through improving cooperative behavior (Fukuyama, 1995; Jacobs, 1965; Putnam, 1995). Having a dense social network provides the firm with an increased level of opportunity and capability of reaching external resources, knowledge, and information, which in turn improves innovation capability (Molina-Morales and Martinez-Fernandez, 2010).

Peng and Luo (2000) examine the relationship between managerial social capital and the strategy and performance of an organization. Geletkancycz and Hambrick (1997) also focus on managerial social capital and suggest that the connections of managers in the same industry improve efficiency, whereas cross-industrial connections of managers contribute to new knowledge acquisition and innovation capabilities of firms.

Social capital can be an enabler for reaching information, power, and solidarity through social networks or relationships. However, it may also cause some risks and disadvantages instead of benefits for the actors. Although the number of studies that emphasize the benefits of social capital are higher than those that focus on risks and drawbacks, there may be some risks for both actors; the ones that are included in social network or relations, and the ones that remain external to them (Adler and Kwon 2002).

2.5 Definitions of Exploitation, Exploration, and Ambidexterity

Organizations should decide how to allocate their limited resources among two critical sets of activities that serve two distinct sets of business purposes. One of these sets consists of acquiring new capabilities and knowledge on uncertain and new fields, and getting engaged with novel products and new markets, whereas the other set is related to improving the firm's existing operations and current market position. The former set is called “exploration,” while the latter one is defined as “exploitation”. In the

widest sense, organizational ambidexterity is the firm's ability to reach and maintain an optimum balance between explorative and exploitative activities.

Explorative activities consist of concepts such as search, discovery, autonomy, flexibility, alignment, variation, uncertainty, trial and error, responsiveness, and innovation. Exploitation, on the other hand, is related to standardization, efficiency, integration, implementation, adaptability, control, certainty, and reducing risk and variance (Birkinshaw and Gupta, 2013; March, 1991). Exploitation facilitates making money through using the firm's current knowledge. However, that knowledge will become obsolete without sufficient explorative efforts, which provides the firm with improved and novel knowledge (Jansen, Van Den Bosch and Volberda, 2006). In this respect, exploitation supports a firm's short-term benefits, like having high productivity, high quality, low risks, and low costs, whereas exploration provides long-term opportunities, such as establishing new and innovative products, gaining novel knowledge in diverse areas, and the ability of operating in broader markets. Levinthal and March (1993) make this distinction by associating exploitation with the 'current viability', and exploration with the 'future viability' of a firm. Some researchers did not consider innovation to fall under only exploration, but examined innovation from an ambidextrous perspective by defining "explorative innovation" as changing the firm's whole technological orientation with the purpose of entering new markets or sectors, and "exploitative innovation" as advancing in current technological capabilities while remaining within the scope of current technological orientation with the purpose of strengthen the current market position (Benner and Tushman, 2003; He and Wong, 2004).

While the two concepts have distinct, almost opposite benefits and risks, they are cultivated by the same organizational resources, which are scarce. Therefore, March (1991) argues that if a firm focuses too much on exploration while it does not attach enough importance to exploitation, it will probably result with excessive new projects and ideas, with insufficient monetary return to optimally utilize the firm's capacity and capabilities. On the other hand, if a firm focuses too much on exploitation and

deals with exploration insufficiently, it may end up in a “suboptimal stable equilibria” (March, 1991). Similarly, He and Wong (2004) suggest that excessive adaptation to current conditions would reduce the dynamism of a firm and make it harder to adapt to possible future improvements, while spending high amounts of resources to obtain novel experiences would prevent the firm from excelling at its existing operations at a fast pace. Thus, firms should be able to manage the tension between exploration and exploitation in order to maintain their existence and benefits in the long term. O’Reilly and Tushman (2013) called this tension as "managing evolutionary and revolutionary change" by simultaneously achieving incremental and radical innovation to obtain low costs, high productivity, new product development, and flexibility. Gibson and Birkinshaw (2004) also argue that the need for balancing exploration and exploitation causes a conflict within firms, therefore making some trade-offs becomes inevitable, and those firms which are able to manage these trade-offs obtain success and competitive advantage. Exploration and exploitation also create conflict in terms of the organizational structure and culture; they require "distinctive organizational routines" (Stettner and Lavie, 2014). Therefore, there is a critical difference between the organizational structure that is demanded by exploration-intensive operations and units, and the one demanded by exploitation-intensive operations and units. Explorative activities are likely to be carried out more effectively in organic, loose, flexible, and autonomous settings, while mechanistic, routine, stable, and bureaucratic structures are more appropriate for exploitative activities (He and Wong, 2004).

2.6 Types of Ambidexterity

In ambidexterity research, different classifications were made. Raisch et al. (2009) for example, assert that ambidexterity should be analyzed in terms of method of implementation (integration vs. differentiation and static vs. dynamic), level of implementation (firm vs. employee), and the context and domain of implementation (internal vs. external). In the following two sections, the ambidexterity literature is summarized based on the implementation method, domain, and contexts.

2.6.1 Contextual, Simultaneous/Structural and Sequential Ambidexterity

In their review, O'Reilly and Tushman (2013) analyze the implementation of ambidexterity under three categories: contextual ambidexterity, simultaneous/structural ambidexterity, and sequential ambidexterity. Sequential ambidexterity means adopting exploration and exploitation activities in an alternating sequence, which is called as "organizational vacillation" by Boumgarden, Nickerson and Zenger (2012), and as "punctuated equilibrium" by Gupta, Smith and Shalley (2006). Brown and Eisenhardt (1997) and Burgelman and Grove (2007) also examined sequential ambidexterity in their research. Simultaneous/structural ambidexterity is achieved by assigning particular units within a firm for explorative activities only, and deploying other units in exploitative activities, such as having a Research and Development Department to develop new products (exploration), and a Production Optimization Unit, which is responsible for decreasing production costs (exploitation). Within such a structure, explorative and exploitative activities are fully separated at the department level, and these two sets of departments are generally distinguished from each other by their strategies (Andriopoulos and Lewis, 2009), management methods, cultures, structures (O'Reilly and Tushman, 2013), and sometimes even their workplace design and geographical location. The third type, contextual ambidexterity, is achieved through enabling individuals to apply ambidexterity on a daily basis by establishing flexible, cross-functional, and convenient processes and environment (Gibson and Birkinshaw, 2004), such as organizing social and collective activities or creating a team spirit (Ghoshal and Bartlett, 1997). Contextual ambidexterity relies on the behavioral, relational, and cultural framework of an organization, and is usually studied at the managerial level in the literature (Andriopoulos and Lewis, 2009).

All three types of ambidexterity practice were investigated, supported, and criticized across different domains and contexts in the literature. Hedberg et al. (1976) and Brown and Eisenhardt (1998) argue that shifting strategy between exploration and

exploitation would make a company more dynamic and capable. Nickerson and Zenger (2002) and Siggelkow and Levinthal (2003) also assert that organizations would benefit periodical shifting between the two components of ambidexterity. According to O'Reilly and Tushman (2013), however, in a dynamic environment where changes take place frequently and in a fast pace, sequentially implementing ambidexterity's two components would cause delays and ineffectiveness. Christensen (1998) suggests that departments that carry out exploration activities should be totally separated from the ones that carry out exploitation activities, especially in the high-tech industry due to its rapid change. Mom, Van Den Bosch, and Volberda (2007) focus on ambidexterity that is possessed by individuals and investigate managers' capability of conducting explorative and exploitative activities at the same time in order to be ambidextrous.

Birkinshaw and Gupta (2013) define ambidexterity as a "nested" concept, where exploration and exploitation are carried out together across all units and levels of a firm. Boumgarden et al. (2012) argue that large, well-established organizations generally adopt contextual ambidexterity through "hybrid or dual structures" (O'Reilly and Tushman, 2013); however, conducting simultaneous ambidexterity is more essential where exploitative and explorative activities are conducted at the same time in a nested structure. In addition to the three implementation methods of ambidexterity, Lavie and Rosenkopf (2006) suggest that there is a fourth way that organizations use to become ambidextrous, which is improving either exploitation or exploration by forming alliances with or acquiring related firms.

2.6.2 Different Combinations of Exploration and Exploitation in the Formulation of Ambidexterity

In the literature, empirical studies that measure ambidexterity can be divided into two, in terms of how to use exploration and exploitation while formulating the measurement of ambidexterity. While some researchers take ambidexterity as the

equilibrium of exploration and exploitation, others consider it as the maximization of both concepts independently.

Gupta et al. (2006) raise the question of whether exploration and exploitation are "orthogonal or continuous". The answer depends on whether the two concepts are independent, complementary, or conflicting. If they are contradictory, it means increasing one would cause the other to decrease, and therefore they should be balanced to reach a high level of ambidexterity. If the two concepts are independent or complements of each other, then it is possible to simultaneously increase both, without one being limited by the other. Cao et al. (2009) define these two approaches as two dimensions of ambidexterity: (1) "the balanced dimension", in which exploration and exploitation are two ends of a continuum, and therefore should be balanced; and (2) "the combined dimension", where the main concern is to keep individual levels of exploration and exploitation as high as possible instead of making them balanced. According to Cao et al. (2009), the combined dimension would yield a richer set of resources and information which could be exploited at a higher level, whereas the balanced dimension would eliminate the drawbacks of any overuse of exploration or exploitation.

March (1991) argues that exploration and exploitation are conflicting in terms of both requiring the same scarce resources, both resulting in low organizational performance when excessively focused on, and both requiring distinct organizational structures and management methods. Therefore, according to March (1991), they cannot be complementary. Following Levinthal and March (1993), Lavie and Rosenkopf (2006) adopt the balanced dimension and measure ambidexterity by considering exploration and exploitation as conflicting concepts.

Boumgarden et al. (2012), on the other hand, argue that exploitation's existing benefits on firm performance grow with increased exploration, and vice versa, therefore exploration and exploitation complement each other. Shapiro and Varian (1998) also assert that not all resources are necessarily scarce, by exemplifying this statement with information and knowledge, which could positively affect exploration

and exploitation simultaneously. Katila and Ahuja (2002), basing their research on the orthogonality of exploration and exploitation, reach results implying that excelling on exploration and exploitation would improve new product development capability. Baum, Li, and Usher (2000), Beckman, Haunschild, and Phillips (2004), Koza and Lewin (1998), and Rothaermel (2001) are other examples of studies in which exploration and exploitation are approached as complementary instead of conflicting (Gupta et al., 2006).

Derbyshire (2014) suggests that the decision of how to combine exploration and exploitation may depend on the industry. Exploration and exploitation may be ‘mutually enhancing’ in some industries (Gupta et al., 2006; Jansen et al., 2006) and may be at the two ends of a continuous ambidexterity measure in others (March, 1991). Cao et al. (2009) also propose that the firms which do not have sufficient resources are more inclined to utilize a balanced dimension, while a combined dimension is more likely to be valuable to firms that have enough resources or can easily reach external resources.

When calculating ambidexterity, exploration and exploitation variables are combined within different mathematical operations. For the combined dimension, multiplication (Cao et al., 2009; Gibson and Birkinshaw, 2004; He and Wong, 2004; Im and Rai, 2008; Jansen, Simsek and Cao, 2006; Jansen et al., 2012; Mom et al., 2009; Morgan and Berthon, 2008; Tiwana, 2008; Tushman, Smith, Wood, Westerman and O’Reilly, 2010) and summation (Cao et al., 2010; Jansen, Tempelaar, Van Den Bosch, and Volberda, 2009; Lubatkin et al., 2006) are used. For the balanced dimension, subtraction (Boumgarden et al., 2012; Cao et al., 2009; Fernhaber and Patel, 2012; He and Wong, 2004; Lin, Yang and Demirkan, 2007; Rogan and Mors, 2014; Rothaermel and Alexandre, 2009) and continuous measures are used, where exploration and exploitation are measured on a single scale (Junni et al., 2013). Ambidexterity calculation with different combinations of exploitation and exploration are summarized in Table 1. As can be seen, within the balanced dimension, an organization can be concluded to be ambidextrous even if it has low levels of both exploitation and exploration (Cao et al., 2012).

Table 1

Examples of Balanced and Combined Dimensions of Ambidexterity

	Exploration Score	Exploitation Score	Difference	Balanced Dimension	Sum	Product	Combined Dimension
Firm 1	3	7	4	Low	10	21	High
Firm 2	2	3	1	High	5	6	Low

2.7 Antecedents and Resources of Ambidexterity

In the literature, there are several antecedents found to create or increase the ambidexterity capability of organizations, such as environmental uncertainty, high competition, richness of internal resources, and firm size (O'Reilly and Tushman, 2013). To achieve structural ambidexterity, building up appropriate cultural norms and common visions for business units devoted to exploration and exploitation are considered to be critical pre-conditions (Benner and Tushman, 2003; O'Reilly and Tushman, 2004). Contextual ambidexterity, on the other hand, is fostered by flexibility, control, support, and trust (Gibson and Birkinshaw, 2004). In order to identify the factors that determine how an organization becomes more ambidextrous than others, the decision making and implementing processes and environments should be investigated (Birkinshaw and Gupta, 2013). O'Reilly and Tushman (2013) found that in an uncertain and resourceful environment, ambidexterity leads to greater advantages. Junni et al. (2013) discovered that the results of ambidexterity change according to industry, and that ambidexterity's effect is stronger for the technology sector when compared to manufacturing. According to Lavie and Rosenkopf (2006), organizational inertia is a trigger for exploitation, and absorptive capacity is the antecedent of the exploration capability of a firm. Gibson and Birkinshaw (2004) propose that a supportive organization context is a must for employees to be ambidextrous. High competitiveness, owning sufficient resources, and having a bigger size are other antecedents that have been empirically found in the literature (O'Reilly and Tushman, 2013).

2.8 Ambidexterity across Different Contexts, Domains, and Levels

Some researchers propose that the importance and effects of organizational ambidexterity may vary among different industries and contexts. Since ambidexterity is likely to have diverse antecedents, results, and characteristics in different sectors (Derbyshire, 2014), there are many theoretical and empirical studies that investigate ambidexterity across different contexts and domains.

Simsek et al. (2009) argue that in dynamic industries, achieving a balance between exploration and exploitation generates more beneficial results. According to the meta-analysis by Junni et al. (2013), achieving exploration has a bigger effect for high-technology and service firms, whereas exploitation is more critical for firms that operate in the manufacturing industry. Wang and Rafiq (2013) investigate which type of ambidexterity is better for particular sectors and propose that contextual ambidexterity is more conducive for new product development and high firm performance, especially for high-tech companies in dynamic industries.

High technology firms (Cao et al., 2009) and manufacturing firms (He and Wong, 2004) are popular contexts for ambidexterity research in the literature. Recently, SMEs and well-established firms also have become two popular contexts that have attracted ambidexterity researchers' attention (Abebe and Angriawan, 2013). Lubatkin et al. (2006) focus on the effects of ambidexterity on SME performance and suggest that the optimal allocation of resources between exploitation and exploration is likely to be more critical for SMEs, since their internal resources and capability of reaching external resources are not as much as big firms'. Cao et al. (2009) suggest that well-established firms are more likely to benefit from a balanced dimension of ambidexterity due to having a substantial amount and variety of resources.

Ambidexterity is investigated at various levels, such as the firm level (Boumgarden et al., 2012; Cao et al., 2009; Fernhaber and Patel, 2012; He and Wong, 2004; Jansen et

al., 2009; Lin et al., 2007; Lubatkin et al., 2006; Morgan and Berthon, 2008; Patel, Messersmith and Lepak, 2012; Rothaermel and Alexandre, 2009), individual level (Mom et al., 2009), project team level (O'Reilly and Tushman, 2004), and unit/department level (Gibson and Birkinshaw, 2004; Jansen et al., 2006; Jansen et al., 2012; Tushman et al., 2010; Boumgarden et al., 2012). Boumgarden et al. (2012) list the actors that should focus on ambidexterity as follows: "entire multi-business organizations, single divisions, departments, work teams, and even individuals". Besides the aforementioned levels, some researchers investigate exploration and exploitation beyond organizational boundaries. Gupta et al. (2006) take the ambidexterity concept beyond the firm level and discuss ambidexterity of markets by arguing that a market can be ambidextrous if it includes a balanced number of firms excelled on exploration and firms excelled at exploitation. O'Reilly and Tushman (2013) also recommend that the boundaries of ambidexterity should go beyond organizations since inter-firm or community ecosystems are also likely to be fruitful domains for ambidexterity research. Lavie and Rosenkopf (2006) analyze exploration and exploitation in an inter-organizational context and suggest that organizations can decrease risk, complexity, and uncertainty by being ambidextrous across different domains. Stettner and Lavie (2014) argue that a firm may carry out exploration and/or exploitation within alliances and acquisitions. There are also several studies that approach ambidexterity through a framework of organizational knowledge, by suggesting that exploitation requires utilizing current knowledge at a maximum and transforming it to commercial advantage, while exploration improves and diversifies a firm's knowledge by bringing in novel capabilities and diversified information in new areas (Andriopoulos and Lewis, 2009; Stettner and Lavie, 2014; Taylor and Greve, 2006). In Atuahene-Gima's (2005) paper, ambidexterity is discussed in terms of innovation, where exploitation is related to incremental innovation and exploration is an enabler for fundamental innovation. Voss and Voss (2013) investigate ambidexterity in product and market domains. They define product exploitation as utilizing and improving the earnings that are brought by current products, and product exploration as creating new solutions, establishing new products, discovering new technologies, whereas market exploitation is to maintain and improve the satisfaction

of the existing customer base, and market exploration is to reach and acquire new segments.

2.9 Effects of Ambidexterity on Organizational Performance Measures

There are empirical findings about the effects of ambidexterity on several organizational measures such as new product development, firm performance (Gibson and Birkinshaw, 2004), competitiveness (Andriopoulos and Lewis, 2009), absorptive capacity (Jansen et al., 2006), sales growth (Derbyshire, 2014; He and Wong, 2004), market valuation (Wang and Li, 2008), new product performance (Atuahene-Gima and Murray, 2007), innovation (Katila and Ahuja, 2002; Rothaermel and Alexandre, 2009; Tushman et al., 2010), survival (Hill and Birkinshaw, 2012), financial performance (Cao et al., 2009), and growth and profitability (Lin et al., 2007).

According to the meta-analysis made by Junni et al. (2013), the combined dimension (sum or product of exploitation and exploration) has a significant positive effect on organization performance. Lubatkin et al. (2006) similarly propose that ambidexterity is a critical antecedent to organizational performance and competitive advantage, especially for SMEs. Sustainable competitiveness of a firm is also found to depend on coexistent efficiency and innovativeness (Hayes and Abernathy, 1980). According to Jansen et al. (2006), ambidexterity improves a firm's absorptive capacity, while O'Reilly and Tushman (2014) discover that firms with high ambidexterity succeed better at developing new products or services, and their existing products become more competitive.

CHAPTER 3

HYPOTHESES

3.1 Inter-Organizational Social Capital and Information Sharing

Different types of knowledge, resources, and capabilities are owned by different actors, and the actors can extend their knowledge base through transferring the information they do not have internally from external resources. Therefore, in order to increase its intellectual capital, a firm should have the opportunity to access other firms' or its cluster's knowledge (Zucker, Darby, Brewer, and Peng, 1996). One of the channels to access external resources is social connections, which enable the transfer of useful knowledge (Uzzi, 1997). Information or knowledge sharing happens as an outcome of social actions that are included in social relationships (Kogut and Zander, 1992). Social capital comprises sets of such relationships, which are built upon reciprocal sharing, and at the same time, foster more and wider exchange of knowledge, information, and resources, and even new knowledge creation between the related parties (Nahapiet and Ghoshal, 1998).

Social connections do not only enable access to information, but also make that process more effective and efficient. According to Nahapiet and Ghoshal (1998), regardless of the initial purpose or cause of their formation, social relationships can provide actors the opportunity of accessing information through a less costly and less time-consuming process. Similarly, Lane and Lubatkin (1998) propose that social connections are likely to improve the "depth, breadth and efficiency" of the transferred knowledge. Social capital also facilitates information sharing by preventing opportunism and misappropriation so that the actors mutually benefit from a relationship (Yli-Renko et al., 2001).

Knowledge transfer between actors may be facilitated by social capital in different ways, such as information sharing, collaborative problem solving, provision of relevant expertise, and common usage of other favorable resources (Maurer et al., 2011). There are several studies in the literature that investigate the relation between social capital and information sharing at different levels; within or between firms. The majority of the academic studies on social capital are concerned with intrafirm social capital, which includes the information flow through social connections between individuals, teams, or units within a firm. For example, several studies in the literature reveal that individuals' connections have a significant impact on their capability of accessing information and resources (Rogan and Mors, 2014). However, besides intra-firm social capital, inter-organizational social capital is also a very promising domain for social capital research (Nahapiet and Ghoshal, 1998) since organizations are open systems (Scott, 1992) which are members of an interconnected network, where information about technology and sector is exchanged between the actors (Cao et al., 2009). As well as professional or technical assets, relational assets and social networks are also of great importance for organizations to access new information and improve their knowledge base (Atuahene-Gima and Murray, 2007; Molina-Morales and Martinez-Fernandez, 2010). The connections between organizations provide them the opportunity to access and internalize external information, and in turn, improve their existing knowledge base (Yli-Renko et al., 2001). Thus, along with alliances and professional collaborations, social capital is a critical enabler of information sharing, organizational learning (Adler and Kwon, 2002; Tsai and Ghoshal, 1998), and acquisition of inimitable beneficial resources that are contained in an organization's network of connections (Gulati, Norhria and Zaheer, 2000). Connections between firms are found to provide new competencies and beneficial information to the members of the network (Podolny and Page, 1998). Moreover, such connections improves the quality, pertinence, opportuneness, and timeliness of the acquired knowledge (Adler and Kwon, 2002).

There are some theoretical and empirical studies in the literature that are built upon inter-organizational social capital's role as a facilitator for knowledge exchange or

information sharing, and a few emphasizing the mediating role of knowledge acquisition/transfer and information sharing between social capital and several organizational measures (Maurer et al., 2011; Wu, 2008). Kraatz (1998) reveals that strong connections between organizations improve communication and information sharing. Yli-Renko et al. (2001) assert that social capital between a firm and its customers facilitates knowledge acquisition, which creates a positive effect on knowledge exploitation. Social capital enables employees to utilize information of close contacts from other organizations (Uzzi and Lancaster, 2003) and thus creates transactions through which information is transmitted between the organizations (Burt, 1997). Wu (2008) suggests that information sharing stands as a mediator in the relation between social capital and competitiveness improvement, thus the potential advantages of social capital are revealed by information sharing. To conclude, information/knowledge transfer is accepted as one of the most essential advantages of social capital (Coleman, 1988; Maurer et al., 2011). Thus, I propose that higher social capital leads to increased information sharing in technoparks.

Hypothesis 1a (H1a): *Social capital between technopark firms affects information sharing positively.*

Since social capital is measured based on two dimensions (structural and relational social capital) in this thesis (further explained in the Theoretical Framework section), it would be wise to probe the effects of these dimensions separately as well. Maurer et al. (2011) focus on the effects of the structural and relational dimensions of social capital on information transfer between business units, i.e., at an intra-firm level. According to their study, as the number of connections increases, business units become more capable of reaching useful information relevant to their needs, and stronger connections with repeated communications facilitate easy transfer of knowledge between actors. The number and strength of the connections, which are the two components of structural social capital (Nahapiet and Ghoshal, 1998), are argued to be enablers for resource and knowledge exchange (Tsai and Ghoshal, 1998). The structural dimension has an impact on “exchanging knowledge” and

“participating in knowing activities” (Nahapiet and Ghoshal, 1998). This impact is created by network ties facilitating accessing useful information in a timely manner, and the network configuration determining the scope of obtained information. High interaction and density of communication help transfer of intangible information (Wu, 2008), which is more difficult to acquire compared to explicit knowledge. Furthermore, higher levels of communication broaden and deepen the information transferred from connections and increase the firm’s capability of identifying, internalizing, and exploiting the relevant and important information (Lane and Lubatkin, 1998; Dyer and Singh, 1998).

The relational dimension fosters the inclination of actors to engage in social exchange, and the expectation of receiving helpful or beneficial input through social interaction (Nahapiet and Ghoshal, 1998). The most commonly measured aspect of relational dimension of social capital is trust (Atuahene-Gima and Murray, 2007; Wu 2008), which has four facets: (1) confidence in goodwill and interest of one another, (2) confidence in one another’s capabilities and proficiencies, (3) confidence in their consistency, and (4) confidence in transparency (Nahapiet and Ghoshal, 1998). Nahapiet and Ghoshal (1998) argue that trust encourages parties to participate in social interactions and collaborative, open communications. Especially for technology firms, trust is an important antecedent of actors’ courage and willingness to share critical knowledge (Dyer and Singh, 1998). Maurer et al. (2011) suggest that actors are more likely to ask for or provide information when they believe their partners have goodwill and willingness for reciprocal and collaborative sharing. Furthermore, information received from a trusted partner is easier to be relied on and utilized more smoothly, due to the elimination of the cost and time that recipient would spend to check its accuracy (Dyer and Chu, 2003). Moran (2005) asserts that closeness (i.e., sustained and enduring relationships) and trust held in social relations are builders of the quality and potential value of social capital. Therefore, having “close” relationships could compensate for having a low number of ties, since closeness increases the intention to spend more effort and time to share tacit and complex

knowledge or resources which are difficult or time-consuming to transfer (Granovetter, 1985).

Building upon the study of Tsai and Ghoshal (1998), which found a positive effect of structural and relational dimensions of intrafirm social capital on resource exchange, and a similar study by Maurer et al. (2011) that indicated a positive relationship between two dimensions and knowledge transfer again at intra-organization level, I extend their arguments to the inter-organizational context and hypothesize that the structural and relational dimensions have a positive effect on information sharing between firms operating in technology parks.

Hypothesis 1b (H1b): *The structural dimension of social capital has a positive effect on information sharing between technopark firms.*

Hypothesis 1c (H1c): *The relational dimension of social capital has a positive effect on information sharing between technopark firms.*

3.2 Information Sharing and Ambidexterity

The traditional resource-based view suggests that organizations can achieve high performance through utilizing their internal resources at a maximum, as long as their resources are “non-tradable, inimitable, and non-substitutable” (Barney, 1991). Thus, the whole focus is on the firms’ internal resources. However, other theoretical and empirical studies assert that internal resources are usually not sufficient alone, and they should be combined with external resources, such as those of competitors and governmental institutions, for high organizational performance (Conner, 1991). Similarly, Powell, Koput, and Smith-Doerr (1996) suggest that organizational resources do not consist of only internal resources, but also of potential external ones. When internal and external resources are combined, a reciprocal improvement can be achieved (Laursen et al., 2012). Along similar lines, Dyer and Singh (1998) extend the resource-based view by proposing the “relational view”, asserting that

collaborations and alliances provide valuable resources to organizations through complementary network resources.

According to the knowledge-based view, knowledge is the most essential resource for an organization (Spender, 1996), and generating and acquiring knowledge is critical for an organization's competitive advantage (Nahapiet and Ghoshal, 1998; Yli-Renko et al., 2001). A lack of knowledge and information is regarded as a critical barrier to the improvement of an organization's capabilities (Wu, 2008), so maintaining a sufficient knowledge base is critical for having high ambidexterity. Exploration and exploitation activities, the two main components of ambidexterity, oblige firms not only to optimally allocate and utilize their existing resources but also to continuously improve and increase them.

For organizations, information sharing is one way to transfer one another's resources, or utilize each other's resources reciprocally, therefore, it is considered as a trigger for higher organizational performance (Wu, 2008). Thus, organizations are institutions that can generate individual or common benefits by complementing their internal resources with external ones through voluntary information transfers (Lavie and Rosenkopf, 2006). Gulati (1999) emphasizes the role of inter-organizational relationships and interactions on acquiring or accessing those external resources. Exchanging knowledge through information sharing provides the actors with several advantages, such as increased competitiveness (Wu, 2008) and collaborating with other firms (Gulati, 1998). Lane and Lubatkin (1998) suggest that firms may find and reach external complementing resources through bilateral or network connections. Therefore, organizations can enhance their existing resources and capabilities or obtain new ones by utilizing the knowledge and information of other organizations, which may be shared within social or professional networks, alliances, and collaborations. Lavie and Rosenkopf (2006) call this process "inter-organizational learning", where organizations either enhance their existing knowledge-base or acquire new knowledge through inter-organizational information sharing. Empirical

studies show that learning is included in both exploration and exploitation (Gupta et al., 2006).

Rogan and Mors (2014) approach the link between network and ambidexterity at an individual level by proposing that interconnections between managers provide communication and knowledge exchange, which yields to higher exploration and exploitation. In a similar respect, Cao et al. (2009) suggest that the essence of the relation between ambidexterity capability and performance depends not only on the organization's internal resources, but also on accessible external resources; therefore, a firm will better utilize ambidexterity if it is able to reach and acquire external resources. Lavie and Rosenkopf (2006) argue that a voluntary transfer of resources is beneficial for exploration and exploitation, and even suggest that extensive internal efforts to achieve ambidexterity may limit the organization's ability to acquire the necessary or beneficial external knowledge that exists outside of the organization.

In the literature, many empirical studies reveal that external knowledge that is acquired from connections is crucial for several organizational measures that contribute to achievement or improvement of critical activities, and many of these activities are related either to exploration or exploitation. According to Maurer et al. (2011), knowledge sharing is a critical antecedent to innovation, competitiveness, and growth. As a result of mentioned relations, I hypothesize that information sharing between firms would increase their ambidexterity level.

Hypothesis 2a (H2a): Information sharing between firms that operate in technoparks has a positive effect on their ambidexterity level.

Like social capital, ambidexterity is also measured using two different components. Thus, examining the roles of exploration and exploitation individually to see whether one dominates the other in terms of mediating relationships with information sharing and firm performance would be a deeper analysis to understand the underlying effects.

3.2.1 Information Sharing and Exploration

By definition, innovation is one of the main components of exploration (March, 1991). There is a strong relation between the knowledge base and innovation capability of a firm, since innovation is achieved through transformation of knowledge into novel products, processes, services, or operations (Molina-Morales and Martinez-Fernandez, 2010). Innovation requires integrating existing and acquired, traditional and novel, internal and external knowledge (Kogut and Zander, 1992; Laursen et al., 2012). The information transfer that happens through the social connections between firms facilitates obtaining new knowledge and exploiting existing knowledge (Lane and Lubatkin, 1998), thus information sharing fosters innovating products and processes (Maurer et al., 2011).

The improvement of the existing knowledge base depends on the ability of combining different information or resources (Moran and Ghoshal, 1996), thus information sharing is a critical antecedent for acquiring knowledge (Cabrera and Cabrera, 2002). Developing improved and innovative products require the organizations to combine and exchange resources (Molina-Morales and Martinez-Fernandez, 2010; Tsai and Ghoshal, 1998). Information exchange is critical for organizations to promote technology, which is a critical contributor for the innovation, and thus exploration performance of an organization (Laursen et al., 2012; Maurer et al., 2011; Yli-Renko et al., 2001), and enables the firm to generate novel ideas, develop new products, develop technological distinctiveness, and make valuable R&D investments (Laursen et al., 2012; Yli-Renko et al., 2001). According to Rogan and Mors (2014), another main activity related to exploration, i.e., the discovery of new opportunities, is also fostered by obtaining external ideas and information that are new to the individual or firm.

Burt (1997) shows that interfirm connections provide information about innovation capabilities to the firms, and Hansen (1999) infers that network ties provide novel and tacit knowledge to new product development teams, both of which are regarded as

explorative activities. Laursen et. al. (2012) also propose that the capability of obtaining external information is an important factor that affects the product innovation performance of firms. Tsai and Ghoshal (1998) found that resource exchange and combination lead to improved product innovations. Knowledge sharing is also likely to decrease the possibility of failure and accelerate the development process (Yli-Renko et al., 2001). Thus, I suggest that information sharing between firms would increase their exploration capability.

Hypothesis 2b (H2b): *Information sharing between firms that operate in technoparks has a positive effect on their exploration capability.*

3.2.2 Information Sharing and Exploitation

There are a few suggestions and findings in the literature on the link between information sharing and several activities that can be related to exploitation. For example, making more accurate predictions about future demands and consumer requirements are found to be supported by knowledge transfer (Uzzi, 1997). Accurate future demand forecasts would help a firm optimize its production, and predicting consumer requirements would increase product/service quality and customer satisfaction, which are among the activities that would improve the exploitation capability of a firm (March, 1991). Information transfer also enables the improvement of existing capabilities and reduces the cost of organizational learning (Wu, 2008). According to Wu (2008), an increased capability of outperforming rivals in a particular business is one of the critical gains provided by social capital, thus information sharing is likely to contribute to the competitiveness of a firm. Yli-Renko et al. (2001) also suggest that external knowledge acquisition leads to decrease in sales costs, thus, contributes to exploitation. To conclude, I propose that information sharing between firms would increase their exploitation capability.

Hypothesis 2c (H2c): *Information sharing between firms that operate in technoparks has a positive effect on their exploitation capability.*

3.3 Ambidexterity and Firm Performance

Ambidexterity is found to affect several organizational measures, the majority of which contributes to firm performance such as new product development, long-term firm performance, competitiveness (Andriopoulos and Lewis, 2009), and absorptive capacity (Jansen et al., 2006). High ambidexterity provides a competitive advantage to a firm by enabling it to more effectively capture the opportunities in the market (Lubatkin et al., 2006). Laursen et al. (2012) suggest that knowledge exchange contributes to competitiveness of firms through enhanced innovation capability. O'Reilly and Tushman (2004) found that a firm's existing products' competitiveness is higher for firms that achieve higher levels of ambidexterity. Thus, I propose that firms with higher ambidexterity would have an increased firm performance.

Hypothesis 3a (H3a): *The ambidexterity level of technopark firms has a positive effect on their performance.*

Again, investigating the effects of ambidexterity's two components distinctly would give a deeper perspective of the effects and relationships between variables.

Hypothesis 3b (H3b): *The exploration level of technopark firms has a positive effect on their performance.*

Hypothesis 3c (H3c): *The exploitation level of technopark firms has a positive effect on their performance.*

There are several studies in the social network field that investigate the social interactions at an inter-organizational level and find a link between inter-organizational connections and organizational performance (Lavie, 2006). However, it is very likely to detect a mediation within this relation, since social capital is a strong antecedent for information sharing. Finally, I hypothesize that there is a serial

mediation effect of information sharing and ambidexterity respectively, on the relationship between social capital and firm performance.

Hypothesis 4a (H4a): *Information sharing and ambidexterity mediate the relationship between social capital and performance of technopark firms.*

Hypothesis 4b (H4b): *Information sharing, exploration, and exploitation mediate the relationship between structural social capital and performance of technopark firms.*

Hypothesis 4c (H4c): *Information sharing, exploration, and exploitation mediate the relationship between relational social capital and performance of technopark firms.*

3.4 Model Summary

The two models that summarize the hypotheses mentioned earlier can be seen in Figure 1 and Figure 2. In Figure 2, by adding the dimensions of social capital and ambidexterity into the model, a combined model of serial and parallel mediation is built.

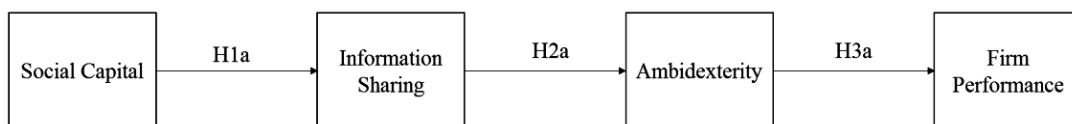


Figure 1. Initial model.

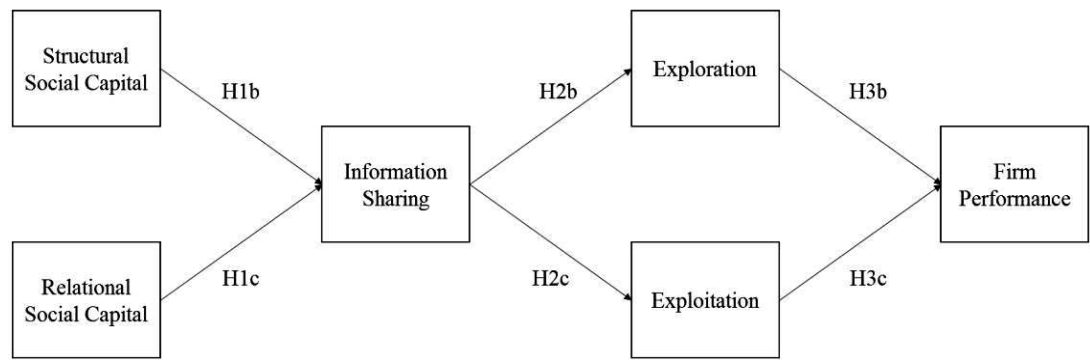


Figure 2. Extended model.

CHAPTER 4

RESEARCH SETTING

4.1 Technoparks in Turkey

According to the International Association of Science Parks (IASP), technoparks are enterprises that have connections with universities or research centers and have a purpose of boosting innovation and competitiveness among the firms that they host. Different names are used for such structures across different regions, some of which are “Research Park” (United States), “Science Park” (United Kingdom), “Technology City/Science City” (Far East) (“What Is a Technopark?”, ODTÜ Teknokent).

The present research is conducted among firms that operate in three technoparks in Ankara; ODTÜ Teknokent, Bilkent Cyberpark, and Hacettepe Teknokent. The number of firms operating in these three technoparks and their foundation years can be seen in Table 2.

Table 2
General information about technoparks

	ODTÜ Teknokent	Bilkent Cyberpark	Hacettepe Teknokent
Year of Foundation	2000	2002	2003
Number of Firms	360	236	225

Source: <http://odtuteknokent.com.tr/>, <http://www.cyberpark.com.tr/>,
<https://hacettepeteknokent.com.tr/>

The sectoral distribution of firms in ODTÜ Teknokent, Bilkent Cyberpark, and Hacettepe Teknokent can be seen in Figure 3, Figure 4, and Figure 5, respectively.

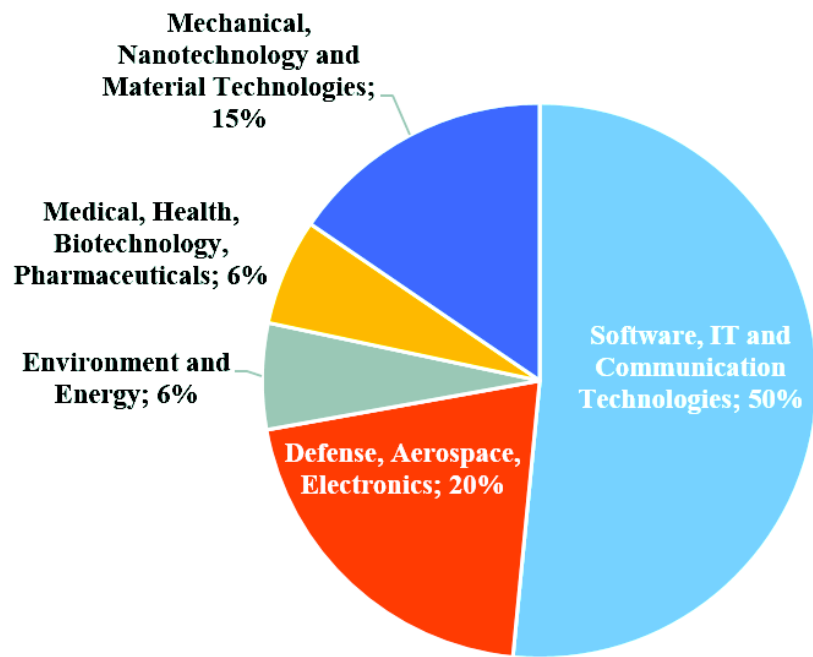


Figure 3. Sectoral distribution of firms operating in ODTÜ Teknokent.

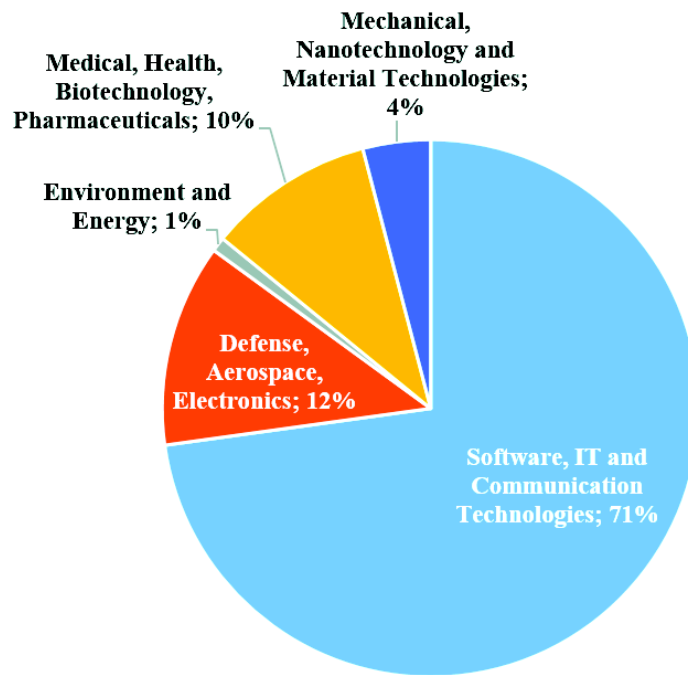


Figure 4. Sectoral distribution of firms operating in Bilkent Cyberpark.

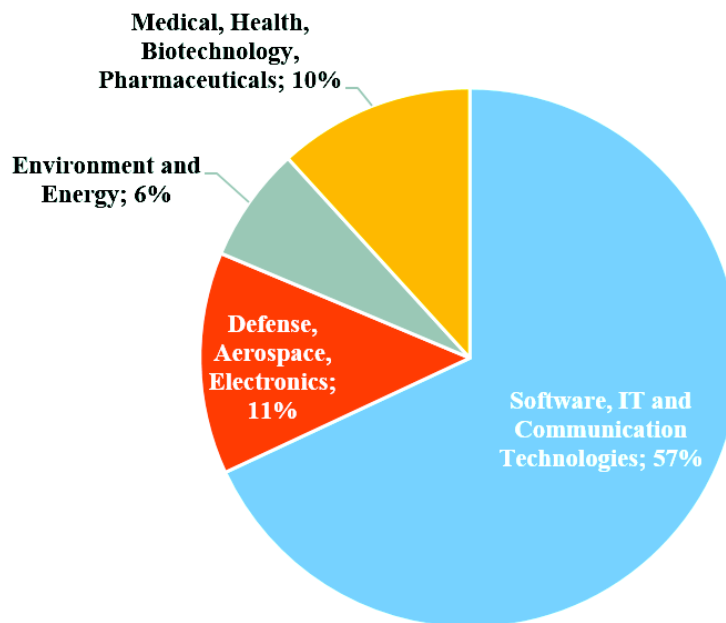


Figure 5. Sectoral distribution of firms operating in Hacettepe Teknokent.

4.2 The Technopark Context

Technoparks are institutions that create clusters of companies, the majority of which are SMEs and operate in high-tech industries. Thus, the context is examined under three sections: in terms of operating as an SME, as a high-tech firm, and in a cluster.

4.2.1 SMEs

According to the Turkish Ministry of Industry and Technology, as of the end of June 2018, there are 57 active technoparks and 4,852 firms that operate within these technoparks in Turkey. The average annual sales revenue of all firms that operate in technoparks in Turkey is 12.28 million Turkish Liras. The average number of employees of the firms operating in technoparks is 10. For ODTÜ Teknokent, this number is approximately 20 (“About ODTÜ Teknokent”, ODTÜ Teknokent).

The European Union classifies a firm as an SME if it has less than 250 employees and a turnover less than \$50 million. According to Regulation on Definition, Qualification, and Classification of SMEs in Turkey (24.06.2018/11828), a firm is considered as an SME if it has less than 250 employees and an annual sales revenue less than 125 million Turkish Liras. Therefore, when the average values of employee number and annual sales revenue are compared to the upper limits, it can be deduced that the majority of the firms that operate in Turkish technoparks are SMEs. Furthermore, among the establishment purposes of “Technology Development Zones”, there is a statement as “making SMEs adapt to novel and high technology”; therefore, technoparks aim to incorporate mainly SMEs (“What is a Technopark?”, ODTÜ Teknokent).

Three factors are listed by Abebe and Angriawan (2013) by which SMEs differ from larger companies: (1) “lack of slack resources”, (2) “senior management involvement and hierarchy”, and (3) “organizational routines”. The first one indicates that SMEs are more susceptible to be short of resources that facilitate organizational learning

(Cegarra-Navarro and Dewhurst, 2007). Second, in SMEs, due to having more flat structures, mid-level managers are more involved both in operations and decision processes, whereas larger firms have a more complex hierarchy and bureaucracy (Lubatkin et al., 2006). The third factor is that large firms are more conducive to having routine and well-defined processes for organizational learning, while SMEs generally do not have such standards. SMEs constitute an important research area for Turkey, since they account for 56.2% of the production volume and 59.2% of the export volume in 2015, and so have a critical role in economy (The Union of Chambers and Commodity Exchanges of Turkey, 2015).

There is a scarcity of research that investigates the antecedents and effects of ambidexterity in SMEs (Lubatkin et al. 2006). SMEs differ from larger companies in terms of their cultures, structures, and capabilities, which are critical organizational factors for exploitative and explorative activities. Voss and Voss (2012) propose that achieving ambidexterity is more critical and difficult for small organizations, which is why there should be more focus on ambidexterity research on such organizations in the literature. Similarly, Lubatkin et al. (2006) suggest that ambidexterity is a significant factor for SMEs to improve their organizational performance and gain competitive advantage.

4.2.2 High-Tech Firms

According to Cao et al. (2009), high-technology firms are a popular context for ambidexterity research. According to the Turkish Ministry of Industry and Technology, as of the end of June 2018, 81% of all employees that work in a technopark firm are R&D personnel. Among technopark firms, 37% operate in the software industry, 17% operate in Information and Communication Technologies (ICT), 8% operate in the electronics sector, 6% is involved in machine production, and 4% operate in the energy sector. All these industries are accepted as “high-tech” industries in the literature (Cao et al., 2009; Zahra et al., 2001). Furthermore, there are over 1,000 registered patents, over 2,200 patent applications in progress, and over

37,000 completed and ongoing R&D projects that belong to Turkish technopark firms, which are other indicators showing that these companies can be classified as high-tech firms (Turkish Ministry of Industry and Technology, 2018).

Since knowledge is prone to become obsolete quickly in the high-tech industry, acquiring the latest information and knowledge is critical for organizations that operate in such industries (Lane and Lubatkin, 1998). Social capital is an important facilitator for information transfer, and in turn, for increasing competitive advantage (Yli-Renko et al., 2001). Replenishing their knowledge base continuously by effectively integrating internal and acquired external knowledge and resources is significant for high-tech organizations' improvement (Yli-Renko et al., 2001).

In a study conducted across different sectors, Derbyshire (2014) discovers that in “professional, scientific and technical” industries, ambidexterity is more effective. The meta-analysis by Junni et al. (2013) also reveals that among several different sectors, the ambidexterity level is most effective on performance in high technology, manufacturing, and service sectors.

4.2.3 Clusters

Clusters such as technology parks or industrial zones enable firms to be located physically close to each other, which in turn increases the dissemination and exchange of knowledge, facilitates mutual improvement of parties' knowledge base, and enables the generation of new ideas and concepts. Laursen et al. (2012) take social capital as an aggregation of relationships and connections that are created and sustained within a localized cluster, instead of approaching it as an outcome of business-related connections or collaborations only. According to the authors, the interactions and transactions triggered by the regional environment eventually contribute to innovation capability. Closed networks such as clusters are considered to be more likely to provide dense social capital among their members, which yields positive effects on “execution and innovation-oriented tasks” (Coleman, 1988).

Hansen (1999) finds that nested connections increase the exchange of prosperous and tacit knowledge. Closure also provides the information to be transferred rapidly and in a timely manner, which decreases the uncertainty and risk in the perception of parties (Moran, 2005). Wu (2008) suggests that this is not only the natural consequence of firms being located physically close to each other in clusters, but is also the main motivation for organizations to enter such clusters in the first place, i.e., aiming to reach and acquire external knowledge and resources where lack of necessary knowledge is a critical barrier to organizational development.

There are several studies in the literature that investigate the dissemination of information within networks that consist of physically clustered firms (Laursen et al., 2012). Laursen et al. (2012) define the social connections within a geographically bounded area as “localized/regional social capital,” which is the sum of regional norms and networks. They argue that localized/regional social capital significantly contributes to the innovation capabilities of firms by enabling mutual learning and decreasing related transaction costs. According to the authors, the firms’ being physically close to each other in a bounded area facilitates the information transfer among them. The Marshallian perspective also posits that the diffusion and transfer of knowledge, information, new concepts and ideas are prevalent in clusters (Laursen et al., 2012). Sharing tacit and complicated knowledge is fostered by face-to-face and close interactions (Szulanski, 1996), which are facilitated by physical closeness (Rosenthal and Strange, 2003).

Saxenian (1994) attributes the prosperous progress of Silicon Valley to the geographic proximity and clustering of its members, which foster sharing knowledge and ideas. Intra-regional social capital is likely to enable network members to easily access valuable knowledge by offering more beneficial relationships, effective communication and higher “localized” trust (Laursen et al., 2012). Apart from providing shared identities and codes, clusters also leverage trust between firms by increasing the frequency of social interactions, which leads to the escalation of

information transfer between organizations which, in turn, facilitates innovation within those organizations (Laursen et al., 2012).

Considering that technoparks bring high-tech SMEs together in clusters, i.e., they are the combination of three contexts that are explained above, they are deemed to be a fruitful context for social capital, information sharing and ambidexterity concepts. Thus, in order to investigate the link between them, data is gathered from technopark firms. The methods used for data collection and analysis are explained in the following section.

CHAPTER 5

METHODOLOGY

5.1 Methodological Approaches and Theoretical Framework

The variables that are used in the models (Figures 1 and 2) proposed in this research are social capital, its structural and relational dimensions, information sharing, ambidexterity and its two components (exploration and exploitation), and firm performance. Since there are various definitions and measurement methods in the literature as stated in the Literature Review, the operationalization approaches adopted for each variable for this research are explained in this section.

5.1.1 Social Capital

Social capital is measured as a combination of its structural and relational dimensions following Maurer et al. (2011) and Wu (2008). For this study, the cognitive dimension is not investigated in the measures of social capital. The first and the foremost reason for not including the cognitive dimension is that its content, which consists of shared codes values, beliefs, and paradigms (Nahapiet and Ghoshal, 1998) and a shared vision of “collective goals” (Tsai and Ghoshal, 1998), is expected to exist and be observed more in intra-organizational social capital, such as social capital between business units or employees of a single firm. However, in this thesis, inter-organizational social capital is analyzed within a network, where organizations are independent in terms of their culture and values and have different, and probably conflicting, goals due to competition. Furthermore, as result of their analysis, Tsai and Ghoshal (1998) found that the cognitive dimension of social capital does not have a significant effect on resource exchange, while the structural and relational dimensions

do. In several other studies in the literature, inter-organizational social capital is built on the structural and relational dimensions (Wu, 2008; Maurer et al., 2011, Yli-Renko et al., 2001).

5.1.2 Ambidexterity

In this study, ambidexterity is calculated based on the combined dimension view of Cao et al. (2009), which proposes that exploration and exploitation are not conflicting, but can be achieved simultaneously. According to the authors, exploration and exploitation are not only independent, but also may even affect each other positively; the reasoning being that if a firm is successful at exploitative activities, and thus utilizes its existing knowledge and resources at a maximum, then the firm's capacity and capabilities can be better perceived and effectively employed to achieve exploration through activities such as new product development and market penetrations. The authors also assert that a firm which focuses on exploiting its resources at maximum would be more aware of what it lacks and be better at acquiring relevant external knowledge and resources. Similarly, explorative activities may foster exploitation by producing some common benefits. For example, a firm that develops a new product may generate or obtain new know-how that would also be helpful to increase the efficiency or decrease the cost of existing processes. There are other studies in the literature which also demonstrate that simultaneously and independently improving explorative and exploitative activities yields positive effects. Junni et al. (2013) found that the combined dimension (both sum and product of exploration and exploitation) increases organization performance, and Derbyshire (2014) used exploration as a moderator in the relationship between exploitation and sales turnover growth and vice-versa to show that exploration and exploitation have a reciprocal positive effect on each other, especially in the 'professional, scientific and technical' industries.

For researchers who adopt the balanced dimension, the main discussion is the scarcity of resources. However, the main resources whose effect on ambidexterity is analyzed

in this research are knowledge and information, which are inconsumable and can be used for both explorative and exploitative activities simultaneously (Shapiro and Varian, 1998), especially when the firm has access to external knowledge (Powell et al., 1996). Access to external resources considerably eases the constraint imposed on organizations by scarcity of internal resources. According to Cao et al. (2009), combining exploration and exploitation instead of making a tradeoff between them is more likely to result in high performance for organizations that are more capable of reaching and exploiting resources. Hence, in the literature, combining exploration and exploitation is a more commonly adopted approach for the measurement of ambidexterity, compared to the balanced dimension; therefore I adopt the combined dimension and take ambidexterity as the sum of exploration and exploitation.

5.1.3 Firm Performance

In the literature, firm performance is calculated through various measures; either using objective information, like numeric data on growth or profitability of the firm, or subjective measures that are obtained through the evaluation of the firm's absolute or comparative performance (by comparing the focal firm's performance to other firms' performances) (Junni et al., 2013). Sales growth rate is one of the objective measures used to quantify firm performance, especially in the manufacturing industry (He and Wong, 2004). Innovation, market valuation, and firm survival are some of the other measures used for the measurement of firm performance (O'Reilly and Tushman, 2013).

For several firms, especially private SMEs, objective numeric data on performance measures like financial measures, growth etc., are not accessible most of the time due to lack of regulations that obligate them to publish such data (Lubatkin et al., 2006). Many studies in the literature use subjective measures to evaluate firm performance of such firms (Acquaah, 2007; Bierly and Daly, 2007; Cao et al., 2009; Lubatkin et al., 2006; Gibson and Birkinshaw, 2004; Atuahene-Gima and Murray, 2007).

Therefore, following such studies, subjective measures are used in this thesis to evaluate firm performance.

5.2 Methods of Data Collection

In ambidexterity studies, the most commonly used methods to gather data are conducting questionnaires (Archibugi, Filippetti and Frenz, 2013; He and Wong, 2004; Gibson and Birkinshaw, 2004; Im and Rai, 2008; Cao et al., 2009; Abebe and Angriawan, 2013), obtaining data from archives (Andriopoulos and Lewis, 2009; Beckman, 2006; Mudambi and Swift, 2011), conducting case studies (Andriopoulos and Lewis, 2009; Boumgarden et al., 2012), doing interviews (Gibson and Birkinshaw, 2004; Mom et al., 2007; Andriopoulos and Lewis, 2009), and observation (Andriopoulos and Lewis, 2009). For this thesis, a survey was designed which included measures of the two dimensions (structural and relational dimensions) of social capital, two components (exploration and exploitation) of ambidexterity, information sharing, and firm performance. Scales that were generated and validated in prior studies are combined and adapted for the context of this thesis, translated from English to Turkish, back-translated, pilot tested with three people working in technopark firms in order to ensure the clarity, and approved by the METU Human Subject Ethics Committee. The survey consists of 34 items to be scored on a 1-5 Likert scale, which can be seen in Appendix A in English and Appendix B in Turkish. There are questions to measure the characteristics of the respondent and firm, such as the firm age, industry, firm's time of operation in current technopark, respondent's years of experience, education level, and years of experience in current firm.

In order to measure the social capital level between the respondents and their networks within the technopark they operate in, the scale developed by Maurer et al. (2011) is adapted. The items they use are aligned with the mentioned arguments of Nahapiet and Ghoshal (1998), Tsai and Ghoshal (1998), and Moran (2005). For structural social capital, four items are used. For structural social capital, questions about network ties and strength were used. Network ties are evaluated by asking the respondents to

choose the percentage interval of technopark firms in which employees have connections (0%-20%, 21%-40%, 41%-60%, 61%-80%, 81%-100%). In order to measure tie strength, three items were asked to respondents to be scored on a 1-5 Likert scale; “Our organization members and their connections in other companies (1) are very close to each other (2) communicate very often with each other and (3) abide by the norm that voluntary assistance by someone else in another company would be reciprocated eventually”. Trust and trustworthiness are used as main measures of relational social capital, as in the majority of social capital studies, following Nahapiet and Ghoshal (1998) and Tsai and Ghoshal (1998). Three items were asked to respondents to score on a 1-5 Likert scale; “Organization members and their connections in other companies could always trust that each would (1) decide and act professionally and competently, (2) receive necessary and reliable information and service, and (3) keep the promises they make.”

The information sharing scale is adopted from Wu (2008) and consists of four items to be scored on a 1-5 Likert scale: (1) “Our connections within this technopark always provide us with business information”, (2) “We rely on our connections within this technopark for market information”, (3) “Our connections within this technopark should be willing to share market information with each other”, and (4) “We always obtain timely information from our connections within this technopark”.

There is no commonly accepted measurement of ambidexterity that dominates ambidexterity research; however, there are measures built along a similar basis. The scale developed by He and Wong (2004) is widely used as the basis for later studies (Lubatkin et al., 2006). In order to measure ambidexterity in this study, the instrument developed by Lubatkin et al. (2006) is adapted and used to measure exploration, exploitation, and ambidexterity levels. Lubatkin et al. (2006) built the instrument on He and Wong’s (2004) scale. The instrument consists of six items each for exploration and exploitation, which is justified to be reliable (Cao et al., 2012). Lubatkin et al. (2006) validated the items used to measure exploration and exploitation by asking researchers that are knowledgeable on the relevant literature to classify the items as

“exploration” or “exploitation”. Six items from the initial set of items (which included 7 statements) were found to be valid, with an average degree of agreement of 90%. After experimenting with different operationalizations of the items to calculate ambidexterity, Lubatkin et al. (2006) found that the best way is calculating ambidexterity as the sum of exploration and exploitation.

The six items respondents were asked to score on a 1-5 Likert scale to measure exploitation level of the firm are (1) “The firm commits to improve quality” (2) “The firm commits to lower cost”, (3) “The firm continuously improves the reliability of its products and services”, (4) “The firm constantly surveys existing customers’ satisfaction”, (5) “The firm fine-tunes what it offers to keep its current customers satisfied”, and (6) “The firm penetrates more deeply into its existing customer base.” The six items respondents were asked to score on a 1-5 Likert scale to measure the exploration level of the firm are (1) “The firm looks for novel technological ideas by thinking “outside the box,” (2) “The firm bases its success on its ability to explore new technologies”, (3) “The firm creates products or services that are innovative to the firm”, (4) “The firm looks for creative ways to satisfy its customers’ needs”, (5) “The firm aggressively ventures into new market segments”, (6) “The firm actively targets new customer groups”.

In this thesis, firm performance is measured following Gibson and Birkinshaw’s (2004) self-assessment method. A manager or a senior employee from each firm was asked how much they agreed with following four statements: (1) “This firm is achieving its full potential”, (2) “Employees are satisfied with the level of firm performance”, (3) “This firm does a good job of satisfying its customers”, and (4) “This firm gives its employees the opportunity and encouragement to do the best work they are capable of”.

5.3 Sample

The survey, delivered online through the METUSurvey website, was announced via e-mail with the help of three technoparks' administrations, along with a cover letter explaining the purpose of the study and structure of the questionnaire. It was specified in the explanation that the respondent should be the founder of or a manager in the firm, who has thorough knowledge on firm's strategies, structure, operations, and management. Thus, it is expected that the respondents consist of the founder, manager, or senior employee from each firm that the survey was sent. After deleting the data of 6 firms which were outliers in terms of their employee numbers and age, the sample size was 87. Among these firms, 56 operate in ODTÜ Teknokent, 16 in Bilkent Cyberpark, and 15 in Hacettepe Teknokent. The number of respondent firms that operate in different sectors can be seen in Table 3.

Table 3
Sectoral Distribution of Respondent Firms

Sector	Number of Respondent Firms
Software, IT and Communication Technologies	48
Defense, Aerospace, Electronics	23
Environment and Energy	8
Medical, Health, Biotechnology, Pharmaceuticals	8

CHAPTER 6

ANALYSIS AND RESULTS

All statistical analyses were conducted with the IBM SPSS Statistics 24 (IBM Corp., 2016) software. In the first section of this chapter, descriptive statistics and bivariate correlations are shown. In the second section, the analysis of dyadic relationships and the mediation effect of Model 1 is given. In the third and last section, dyadic relationships and the mediation effect of Model 2 is given, which taps into the effects of dimensions and components of social capital and ambidexterity.

6.1 Descriptive Statistics, Reliability, Factor Analysis, and Correlations

The descriptive statistics (ranges, minimum and maximum values, means, and standard deviations) of the respondents' characteristics are given in Table 4, and their educational level distribution is shown in Figure 6. In the sample, the average respondent has a working experience of 15.81 years, and a tenure of 8.04 years in the focal company. 41.38% of the respondents have a Bachelor's degree, 47.13% have Master's degree, and the remaining 11.49% have a Doctoral degree.

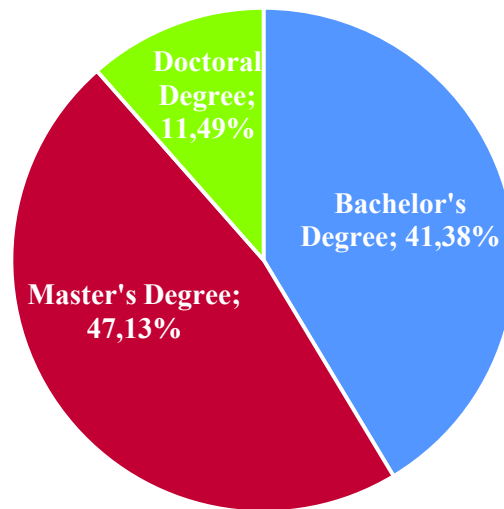


Figure 6. Distribution of the Education Level of the Respondents.

Table 4
Descriptive Statistics of the Respondent Characteristics

	N	Minimum	Maximum	Mean	Std. Dev.
Years of tenure	87	1	45	15.80	9.55
Years of tenure in current firm	87	0.5	20	7.38	5.05

The descriptive statistics of the firm characteristics can be seen in Table 5. Parallel to the information about technoparks that was stated earlier, the number of employees is not very high (Mean = 22.55, SD = 22.73) for the majority of the participant firms. The average year of operation for the firms is 7.16.

Table 5
Descriptive Statistics of the Firm Characteristics

	N	Minimum	Maximum	Mean	SD
Firm Age (months)	87	2	214	85.97	57.34
Number of Employees	87	1	120	22.55	22.73
Operating time in current technopark (months)	87	2	180	68.52	45.70

The descriptive statistics of the variables are given in Table 6. According to the results, technopark firms have higher relational social capital ($M = 3.38$, $SD = .96$) than structural social capital ($M = 2.57$, $SD = 1.04$). Considering the components of ambidexterity, the firms have higher scores of exploitation ($M = 4.27$, $SD = .61$) than exploration ($M = 4.01$, $SD = .78$).

Table 6
Descriptive Statistics of Variables

	N	Minimum	Maximum	Mean	SD
Structural Social Capital	87	1.00	5.00	2.57	1.04
Relational Social Capital	87	1.75	5.00	3.38	.96
Social Capital	87	1.57	5.00	3.03	.92
Information Sharing	87	1.75	5.00	3.59	.92
Exploration	87	1.67	5.00	4.01	.78
Exploitation	87	2.33	5.00	4.27	.61
Ambidexterity	87	2.58	5.00	4.14	.64
Firm Performance	87	2.00	5.00	3.89	.75

Reliability analysis is conducted for each measure in order to determine whether the items are consistent within each scale. Cronbach's Alpha values can be seen in Table 7. All values are above .80, which means the scales are highly reliable.

Table 7
Cronbach's Alpha Values of Scales

Factor	Number of Items	Cronbach's Alpha
Structural Social Capital	3	.90
Relational Social Capital	4	.95
Information Sharing	4	.90
Exploration	6	.89
Exploitation	6	.84
Firm Performance	4	.87

In order to test whether ambidexterity can be measured with two factors; exploration and exploitation, and whether the scale items of both are accurate, a factor analysis is conducted. First, to see if the data is factorable, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity are applied. Bartlett's Test of Sphericity examines the overall significance of all correlations, and KMO is used to analyze the strength of relationships among variables. As the results of these tests indicate, the data has a factorable structure with a high KMO (.85), and significant results for Bartlett's Test of Sphericity ($\chi^2(66) = 647.85$, $p < 0.001$). As can be seen in Table 8, factor analysis results indicate that there are two factors that have Eigenvalues bigger than 1, which means that 2 factors measure ambidexterity. Factor 1 explains 52.41%, Factor 2 explains 11.16% of the variance, and the total explained variance is 63.57%, which is a good ratio. The items that belong to each factor according to the test results and their loadings can be seen in Table 9. Factor 1 consists of the 6 items that were used to measure exploration, and Factor 2 contains the other 6 items that were used to measure exploitation. Factor loadings are between .88 and

.44, thus all of them are bigger than .4, which is accepted as the cutoff value for a good result.

Table 8
Total Variance Explained

Factor	Total	Initial Eigenvalues	
		% of Variance	Cumulative %
1	6.29	52.41	52.41
2	1.34	11.16	63.57
3	.89	7.40	70.97
4	.83	6.94	77.91
5	.68	5.67	83.57
6	.47	3.92	87.49
7	.40	3.31	90.80
8	.29	2.42	93.22
9	.26	2.17	95.38
10	.25	2.09	97.48
11	.16	1.35	98.83
12	.14	1.17	100.00

Table 9
Pattern Matrix

	Factor	
	1	2
“Our firm bases its success on its ability to explore new technologies.”	.88	
“Our firm creates products or services that are innovative to the firm.”	.83	
“Our firm aggressively ventures into new market segments.”	.64	
“Our firm looks for novel technological ideas by thinking ‘outside the box’.”	.59	
“Our firm looks for creative ways to satisfy its customers’ needs.”	.58	

Table 9 (continued)

	Factor	
	1	2
“Our firm actively targets new customer groups.”	.45	
“Our firm constantly surveys existing customers’ satisfaction.”		.82
“Our firm continuously improves the reliability of its products and services.”		.79
“Our firm fine-tunes what it offers to keep its current customers satisfied.”		.78
“Our firm penetrates more deeply into its existing customer base.”		.55
“Our firm commits to lower costs.”		.44
“Our firm commits to improve quality.”		.44

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 15 iterations. Explained variance: 63.57%

Bivariate correlation analysis was conducted to examine the links between all variables that are included in the models and study (Table 10). According to the results of the analysis, firm age is significantly correlated to industry only ($r = -.30, p < .01$), whereas industry is also correlated with structural social capital ($r = -.25, p < .05$). Number of employees is significantly correlated with structural social capital ($r = .37, p < .01$), relational social capital ($r = .37, p < .01$), exploration ($r = .40, p < .01$), exploitation ($r = .52, p < .01$) and firm performance ($r = .49, p < .01$). All other variables are significantly correlated with one another, which is an expected result for a mediation analysis. There are significantly high correlations for social capital and ambidexterity with their sub-dimensions, which is expected, and do not pose a problem since they are not included in the same model. There is a high correlation

between structural and relational social capital ($r = .73$, $p < .01$). This is consistent with Tsai and Ghoshal's (1998) findings revealing that there is a significant positive interaction between structural and relational dimensions of social capital. Furthermore, there are studies proposing that trust is fostered by social connection and communications (Gulati, 1995). All variance inflation factors were far below 10, which means multicollinearity is not a problem (Kleinbaum, Kupper and Muller, 1988).

Table 10

Correlation Matrix of all Variables

Variables	# Items	1	2	3	4	5	6	7	8	9	10	11
1. Firm Age (month)	-	-										
2. Number of Employees	-	.08	-									
3. Industry	-	-.30**	-.11	-								
4. Structural Social Capital	3	.04	.37**	-.25*	-							
5. Relational Social Capital	4	-.14	.37**	-.06	.73**	-						
6. Social Capital	7	-.06	.40**	-.16	.91**	.94**	-					
7. Information Sharing	4	-.12	.15	-.07	.63**	.74**	.74**	-				
8. Exploration	6	.00	.40**	-.05	.33**	.55**	.48**	.53**	-			
9. Exploitation	6	-.08	.52**	-.1	.36**	.52**	.48**	.46**	.69**	-		
10. Ambidexterity	12	-.03	.46**	-.08	.37**	.58**	.52**	.54**	.94**	.90**	-	
11. Firm Performance	4	-.15	.49**	-.03	.51**	.73**	.67**	.56**	.61**	.75**	.73**	-

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

6.2 Analysis of Bilateral Relations and Mediating Effects

Mediation analysis was conducted for each model in order to test the hypotheses and examine the relationships between variables. The analysis was made by using the “Process” macro that is developed for SPSS by Hayes (2018), which conducts an Ordinary Least Squares (OLS) regression-based method and bootstrapping to find the indirect effects of independent variables on dependent variable through mediators.

In the first model (Figure 1), social capital is the independent variable, information sharing, and ambidexterity are the serial mediators, and firm performance is the dependent variable. The regression results are illustrated in Figure 7. The results reveal that social capital explains 58% of variance in information sharing after controlling for firm age, industry, and number of employees ($R^2 = .58$, $F(4,82) = 28.27$, $p < .0001$). Consistent with Hypothesis 1a, social capital has a significant positive effect on information sharing ($\beta = .81$, $SE = .08$, $p < .0001$, 95% CI [.65, .96]). Social capital and information sharing explain 44% of the total variance in ambidexterity after controlling for firm age, number of employees and industry ($R^2 = .44$, $F(5,81) = 12.55$, $p < .0001$). Information sharing also significantly and positively affects ambidexterity ($\beta = .31$, $SE = .09$, $p < .001$, 95% CI [.14, .49]), which supports Hypothesis 2a. According to the multiple regression where firm performance is the dependent variable and all other variables are independent variables, social capital, information sharing, and ambidexterity explain 68% of the total variance in firm performance after controlling for firm age, size, and industry ($R^2 = .68$, $F(6,80) = 28.01$, $p < .0001$). While information sharing does not have a significant direct effect on firm performance, social capital ($\beta = .30$, $SE = .09$, $p < .001$, 95% CI [.13, .48]) and ambidexterity ($\beta = .55$, $SE = .10$, $p < .0001$, 95% CI [.35, .75]) significantly affect firm performance positively, which means that Hypothesis 3a is supported.

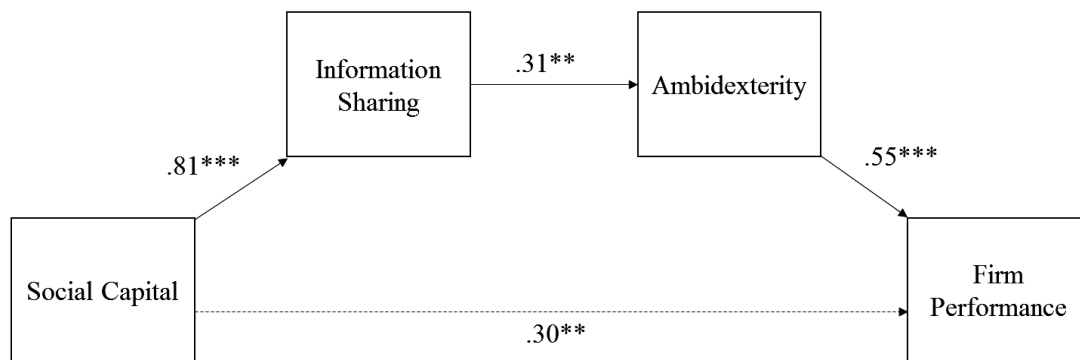


Figure 7. The regression analysis coefficients of relationship between social capital, information sharing, ambidexterity, and firm performance. The dashed lines indicate relationships that are tested for mediation analysis (i.e., testing of Hypotheses 4a, 4b, and 4c) despite being not hypothesized within this thesis.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

The significance of the indirect effect of social capital on firm performance is tested using bootstrapping procedures. Indirect effects were computed for each of 1,000 bootstrapped samples and 95% confidence interval. Results indicate that after controlling for firm age, size, and industry, social capital has a significant positive indirect effect on firm performance through serial mediation of information sharing and ambidexterity ($\beta = .14$, $SE = .05$, 95% CI [.05, .26]), supporting Hypothesis 4a.

For the second model (Figure 2), the mediation analysis was conducted again including two independent variables (structural and relational social capital) and both serial and parallel mediators (information sharing, exploration, and exploitation). The correlation coefficients between variables can be seen in Figure 8. According to the results, the structural dimension of social capital has a significant effect on information sharing ($\beta = .22$, $SE = .10$, $p < .05$, 95% CI [.02, .41]), and the effect of the relational dimension is also significant and higher ($\beta = .60$, $SE = .11$, $p < .0001$, 95% CI [.38, .81]), whereas the two variables explain 59% of the total variance in information sharing after controlling for firm age, size, and industry ($R^2 = .59$, $F(5,81) = 23.23$, $p < .0001$). Therefore, Hypotheses 1b and 1c are supported by the results.

Relational and structural social capital and information sharing explain 45% of the total variance in exploitation ($R^2 = .45$, $F(6,80) = 10.77$, $p < .0001$) and 42% of total variance in exploration ($R^2 = .42$, $F(6,80) = 9.51$, $p < .0001$), after controlling for firm age, size, and industry. Information sharing significantly affects exploitation ($\beta = .21$, $SE = .09$, $p < .05$, 95% CI [.04, .38]); whereas, neither dimension of social capital does. Exploration is significantly affected by information sharing ($\beta = .34$, $SE = .11$, $p < .01$, 95% CI [.12, .57]) and relational social capital ($\beta = .33$, $SE = .13$, $p < .05$, 95% CI [.07, .58]). Thus, Hypotheses 2b and 2c are supported by the regression results. Structural and relational social capital, information sharing, exploration and exploitation explain 72% of the total variance in firm performance ($R^2 = .72$, $F(8,78) = 25.61$, $p < .0001$). Firm performance is significantly affected by relational social capital ($\beta = .35$, $SE = .09$, $p < .001$, 95% CI [.17, .53]) and exploitation ($\beta = .55$, $SE = .12$, $p < .0001$, 95% CI [.33, .78]); however, exploration does not have a significant effect. The results support Hypothesis 3c, whereas Hypothesis 3b is not supported.

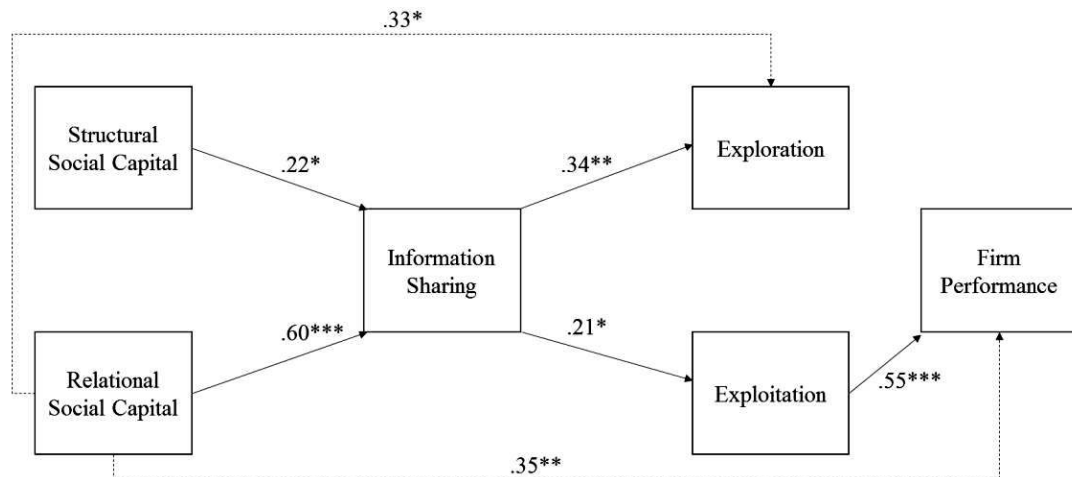


Figure 8. The regression analysis coefficients of relationships among structural and relational social capital, information sharing, exploration, exploitation, and performance.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Finally, the indirect effect of each of structural and relational social capital on firm performance through combined mediation of information sharing, exploration and exploitation is tested using bootstrapping procedures. Indirect effects were computed for each of 1,000 bootstrapped samples and 95% confidence interval. The results indicate that there is a significant mediation path through information sharing and exploitation between both structural social capital and firm performance ($\beta = .04$, $SE = .02$, 95% CI [.01, .09]), and relational social capital and firm performance ($\beta = .09$, $SE = .04$, 95% CI [.03, .18]). Thus, Hypotheses 4b and 4c are partially supported by the findings.

CHAPTER 7

DISCUSSION AND CONCLUSIONS

The results of the statistical analyses conducted in this study are consistent with the findings of several studies in the literature. A positive significant effect of social capital on information sharing was found between departments of a multinational electronics firm by Tsai and Ghoshal (1998), between manufacturing firms owned by family and their business partners by Wu (2008), between entrepreneurial high-tech ventures and their customers by Yli-Renko et al. (2001), and among employees of engineering firms by Maurer et al. (2011). With this study, the tie between social capital and information sharing is extended to the context of Turkish technopark firms and at the inter-organizational level. The results indicate that higher social capital would yield increased information sharing between the firms that operate in technoparks, which is also consistent with the structure of the such clusters, where high-tech industry firms are located close to each other in a specially designed area. Social capital is also found to affect firm performance directly. This result is consistent with relevant empirical studies in the literature where the link between the two concepts was analyzed, such as managerial social capital contributing to market share (Peng and Luo, 2000), and inter-organizational social capital increasing sales and net profit growth (Park and Luo, 2001) and competitiveness (McEvily and Zaheer, 1999).

The result of the serial mediation analysis, which includes the main question this thesis tries to answer, indicates that the relationship between social capital and firm performance, which is found by many empirical studies across different contexts and levels (Acquaah 2010; Laursen et al., 2011; Molina-Morales and Martinez-Fernandez, 2010) is mediated by both information sharing and ambidexterity. This means that higher social capital contributes to firm performance through enabling information

sharing between technopark firms, which in turn increases their ambidexterity capability, which is a new contribution to the extant literature. These findings are consistent with Laursen et al. (2011) in terms of underlining information sharing as a critical benefit of social capital and an important antecedent for organizational outcomes. Contrary to the majority of the extant studies, besides firm performance, ambidexterity is also investigated as an outcome of social capital and information sharing in this study. It is found that acquired information is a critical antecedent for ambidexterity of technopark firms, which makes sense since firms need sufficient resources to improve their ambidexterity level (Cao et al., 2009; O'Reilly and Tushman, 2013). Since in the extant literature, ambidexterity is widely approached in the organizational domain and its antecedents are searched within organizations (Raisch et al., 2009), this study contributes to literature by proposing and finding an inter-organizational antecedent of ambidexterity.

The analysis made by including the sub-dimensions of social capital and ambidexterity in the model with the purpose of scrutinizing the relationships of the first analysis and discovering the roles of the sub-dimensions of the main constructs, revealed results some of which are consistent with the proposed hypotheses. The results indicate that although both structural and relational social capital (i.e., tie number, strength, and trust) significantly affect information sharing between technopark firms, relational social capital has a much higher effect than the structural dimension. This implies that besides having close ties and frequent interaction with other firms, trust is critical for technopark firms to share information with each another. This finding is consistent with Tsai and Ghoshal's (1998) findings, which reveals that social capital's structural and relational dimensions increase resource exchange at the intra-organizational, and also extends their finding to the inter-organizational domain.

When the results of other relations of the two dimensions of social capital are examined, it is seen that relational social capital is also significantly associated to exploration and firm performance. This indicates that for technopark firms, it is

critical to have high trust and trustworthiness in order to share and receive information, increase explorative capabilities, and improving performance. Structural social capital does not have a direct effect on any variable except information sharing, which implies that the existence and strength of social connections increase information sharing, but do not contribute to ambidexterity or firm performance directly. The positive and significant effect of relational social capital on information sharing between technopark firms is also consistent with Laursen et al.'s (2011) findings which show that trust plays an important role in inter-organizational information sharing, especially in clusters, whereas there is no such effect between intra-organizational trust and knowledge transfer. Dyer and Singh (1998) also reveal that trust is essential for parties to have the courage and enthusiasm to share important information with their connections, especially for technology firms. Similarly, relational social capital was found to have association with transfer of information on technology and the market by Maurer et al. (2011). However, contrary to our findings, they could not find a significant relationship between structural dimension and information sharing, which may indicate that this link is not significant within the intra-organizational context, whereas in the inter-organizational context both structural and relational social capital, which means both number and strength of ties and trust, drive information sharing.

The positive effect of relational social capital on exploration may be caused by the situation where higher trust between firms encourages them to collaborate or form alliances with each other, where their resources and know-how are combined and lead to increased explorative activities such as innovations or new market penetrations. Consistent with Kauppila's (2010) finding that interorganizational partnerships generate explorative outcomes for parties, as an extension to the models investigated in this study, interfirm alliances or collaborations can be included as a mediator to the relationship between relational social capital and exploration to tap into this association.

Information sharing is found to affect both exploration and exploitation positively, where its effect on exploration is much higher. This is consistent with Raisch et al.'s (2009) proposition suggesting that externally acquired resources are more likely to foster exploration than exploitation. This result may indicate that technopark firms share or receive information that would contribute to explorative activities more, such as knowledge on new technologies or markets, and their success in exploitative activities benefit more from their internal knowledge and resources.

Firm performance is affected by exploitation, whereas it is not significantly affected by exploration for technopark firms. Considering that a typical firm operating in technopark is a young, small, high-tech firm, it can be expected that such firms need to achieve exploitation primarily in order to obtain a high performance within a short time span. Since exploitation brings short-term advantages to the firms (March, 1991), firm age could be a moderator in the relationship of exploration and exploitation with firm performance. Furthermore, according to Cao et al.'s (2009) findings, synchronous achievement of exploration and exploitation may negatively affect small firms' performance due to having a small pool of resources. Due to such reasons, exploitation may be a more critical factor than exploration for higher firm performance in this context.

Finally, the second mediation analysis results revealed that there was a significant mediation path from structural and relational social capital to firm performance, through exploitation, but not through exploration. This is due to the fact that exploration level of technopark firms do not affect their performance, thus the effect of structural and relational social capital on firm performance is mediated by only information sharing and exploitation.

7.1 Managerial Implications

This study provides several implications for technopark managers and the managers of firms operating in technoparks. First and foremost, technopark and firm

managements should notice the importance of inter-firm trust on information sharing, and also the role of social capital and information sharing on the ambidexterity level and performance of the firms. In order for firms to be ambidextrous and successful, thus improving the outputs of the technopark, an environment of trust and social interactions should be provided. Due to the role of structural social capital on information sharing, technopark management may seek ways to increase the interaction and communication between firms through some interaction events and projects, such as panels, forums, competitions, and some social activities.

The managers of firms should consider the importance of maintaining a high ambidexterity capability to increase their performance. They should develop ways to exploit the acquired information optimally to increase explorative and exploitative capabilities and outputs. Firm managements should monitor the ambidexterity level; how much explorative and exploitative activities are conducted within the firm, detect the deficiencies if any, and take necessary actions, since ambidexterity is a critical antecedent for firm performance. They also should not be negligent about exploitative activities while focusing on exploration too much, such as seeking for new innovations or products, since exploitation is crucial for a firm to survive in short-term (March, 1991). They should also try to engage in social connections with other firms in order to access or acquire useful information and knowledge, which would contribute to their ambidexterity capability. Since information sharing contributes to exploration, and hence ambidexterity, it is important for firms to enhance their social relations and information acquiring capability in order to increase their innovative activities or penetrate new markets.

7.2 Limitations and Directions for Future Research

The main limitation of this study was the low sample size ($N = 87$), since the statistical tests that were conducted would be more robust with a higher sample size. Another limitation may be that the three technoparks subject to the study were all located in the same city. Technoparks in other cities may give different results due to having

different environmental characteristics, structures, and cultures. It may be fruitful to replicate the study in another city or to conduct a cross-regional analysis.

Although being widely used in the literature, measuring firm performance with a subjective method was another limitation. Subjective measures were used for firm performance in this study, since it is not possible to obtain objective and published data about young SMEs' performance. The majority of the firms that participated in this study are private and young (with an average age of 7 years), which causes obtaining objective performance data like sales growth or profitability to be impossible. Subjective measurement of firm performance is an approach that is used in a widespread manner in the literature for similar contexts where objective data does not exist or is hard to access (Acquaah, 2007; Lubatkin et al., 2006). Furthermore, subjective measures of performance are found to be highly correlated with objective measures in several studies (Wu, 2008). However, using subjective and objective measures together may still lead to more solid analysis of firm performance where objective data is available.

Since structural social capital is not found to significantly affect ambidexterity and firm performance directly, the mediating effect of relational social capital in the relationship of structural social capital with other variables can be an interesting subject for future research. Ambidexterity and its exploitation component was found to be significantly associated with firm performance, whereas exploration did not affect performance. Exploration's moderating effect in the relationship between exploitation and performance may be investigated in order to tap into this result. In addition, firm age and size could be investigated as a mediator in the relationships between exploration and performance, and exploitation and performance.

In order to further understand why information sharing between technopark firms contribute more to exploration than exploitation, the content of information sharing can be examined, such as what kind of information are mostly shared between firms, and which types of knowledge contribute to activities related to exploration and

exploitation. It is known that exploitation utilizes explicit knowledge more, such as obtaining information about existing markets and products and current customer preferences, while exploration is more supported by tacit knowledge, such as predictions about future trends and improving know-how on innovative products (Lubatkin et al., 2006). These associations could also be investigated within technopark contexts.

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APPENDICES

Appendix A. QUESTIONNAIRE FOR TECHNOPARK FIRMS

General Information About the Firm and Respondent

1. How many months has the firm been in operation?
2. In which industry does the firm operate? (Select all that applies.)
 - a. Biotechnology and Genetics
 - b. Electronics
 - c. Energy and Environmental Technologies
 - d. Food and Agriculture Technologies
 - e. Aviation
 - f. Material Technologies
 - g. Chemistry
 - h. Machinery and Design
 - i. Medical and Biomedical Applications
 - j. Nanotechnology Applications
 - k. Telecommunications
 - l. Software and Information Technologies
 - m. Other – Please specify.
3. What is the average number of employees in the firm for the last year?
4. In which technopark does the firm operate in?
5. For how many months does the firm operate in this technopark?
6. How many years have you been working?
7. How many years have you been working in this firm?
8. What is your education level?
 - a. Elementary education
 - b. Secondary education
 - c. Bachelor's degree
 - d. Master's degree
 - e. Doctoral degree

Questions about Social Capital

9. Members of what percent of other firms in this technopark have professional or personal connections with the members of your firm, either professionally or personally?
 - a. 0% - 20%
 - b. 21% - 40%

- c. 41% - 60%
- d. 61% - 80%
- e. 81% - 100%

10. Please rate below statements. (1: strongly disagree, 5: strongly agree)
- a. The members of our firm and their connections in other firms in this technopark
 - i. are close to each other
 - ii. communicate very often with each other
 - iii. believe that voluntary assistance by someone else in the company would be reciprocated eventually
 - b. The members of our firm and their connections in other firms in this technopark could always trust that each would
 - i. decide and act professionally and competently
 - ii. receive necessary and reliable information and service
 - iii. keep the promises they make.

Questions about Information Sharing

11. Please rate below statements. (1: strongly disagree, 5: strongly agree)
- a. Our connections in this technopark always provide us with business information.
 - b. We rely on our connections in this technopark for market information.
 - c. Connected parties should be willing to share market information with each other in this technopark.
 - d. We always obtain timely information from our connections in this technopark.

Questions about Ambidexterity

12. Please rate below statements. (1: strongly disagree, 5: strongly agree)
- a. Our firm looks for novel technological ideas by thinking “outside the box,”
 - b. Our firm bases its success on its ability to explore new technologies
 - c. Our firm creates products or services that are innovative to the firm
 - d. Our firm looks for creative ways to satisfy its customers’ needs
 - e. Our firm aggressively ventures into new market segments
 - f. Our firm actively targets new customer groups
 - g. Our firm commits to improve quality
 - h. Our firm commits to lower costs
 - i. Our firm continuously improves the reliability of its products and services
 - j. Our firm constantly surveys existing customers’ satisfaction
 - k. Our firm fine-tunes what it offers to keep its current customers satisfied
 - l. Our firm penetrates more deeply into its existing customer base.

Questions about Firm Performance

13. Please rate below statements. (1: strongly disagree, 5: strongly agree)
- a. Our firm is achieving its full potential
 - b. Firm members are satisfied with the level of firm performance
 - c. Our firm does a good job of satisfying our customers
 - d. Our firm gives its members the opportunity and encouragement to do the best work they are capable of.

Appendix B. QUESTIONNAIRE FOR TECHNOPARK FIRMS (TURKISH)

Firma ve Katılımcı ile ilgili Genel Bilgiler

1. Firma kaç aydır faaliyet göstermektedir?
2. Firma hangi sektörde veya sektörlerde faaliyet göstermektedir? (Uyanların tümünü seçiniz.)
 - a. Biyoteknoloji ve Genetik
 - b. Elektronik
 - c. Enerji ve Çevre Teknolojileri
 - d. Gıda ve Tarım Teknolojileri
 - e. Havacılık
 - f. Malzeme Teknolojileri
 - g. Kimya
 - h. Makine ve Tasarım
 - i. Medikal ve Biyomedikal Uygulamaları
 - j. Nanoteknoloji Uygulamaları
 - k. Telekomünikasyon
 - l. Yazılım ve bilişim teknolojileri
 - m. Diğer – Lütfen belirtiniz.
3. Firmanın son bir senedir ortalama kaç çalışanı vardır?
4. Firma hangi teknokentte faaliyet göstermektedir?
5. Firma şu anda yer aldığı teknokent bünyesinde kaç aydır faaliyet göstermektedir?
6. Kaç yıldır çalışma hayatında yer alıyorsunuz?
7. Kaç yıldır bu firmada çalışıyorsunuz?
8. Eğitim durumunuz nedir?
 - a. İlköğretim
 - b. Ortaöğretim
 - c. Lisans
 - d. Yüksek lisans
 - e. Doktora

Sosyale Sermaye ile ilgili Sorular

9. Firmanız çalışanları, bulunduğunuz teknokentte faaliyet gösteren diğer firmaların yüzde kaçının çalışanları ile profesyonel veya kişisel düzeyde bağlantıdadır?
 - a. %0 - %20

- b. %21 - %40
- c. %41 - %60
- d. %61 - %80
- e. %81 - %100

10. Lütfen aşağıda yer alan ifadelerle 1-5 arasında bir puan veriniz. (1: kesinlikle katılmıyorum, 5: kesinlikle katılıyorum)

- a. Firma çalışanlarının aynı teknokentte faaliyet gösteren diğer firmalardaki bağlantıları ile ilişkileri oldukça yakındır.
- b. Firma çalışanlarının aynı teknokentte faaliyet gösteren diğer firmalardaki bağlantıları ile iletişimleri sıklıdır.
- c. Firma çalışanları, aynı teknokentteki diğer firmalardan gelen gönüllü yardımların er ya da geç karşılığının verileceğine inanırlar.
- d. Firma çalışanları aynı teknokentteki diğer firma çalışanlarının profesyonelce ve yetkin bir şekilde çalışıp karar vereceğine güvenırler.
- e. Firma çalışanları aynı teknokentteki diğer firmalardan gerekli ve güvenilir bilgi ve yardım göreceklerine güvenırler.
- f. Firma çalışanları aynı teknokentteki diğer firmaların verdikleri sözleri tutacaklarına güvenırler.

Bilgi Paylaşımı ile ilgili Sorular

11. Lütfen aşağıda yer alan ifadelerle 1-5 arasında bir puan veriniz. (1: kesinlikle katılmıyorum, 5: kesinlikle katılıyorum)

- a. Bulunduğumuz teknokentte bağlantıda olduğumuz firmalar bize her zaman yapılan işle ilgili bilgileri sağlarlar.
- b. Bulunduğumuz teknokentte bağlantıda olduğumuz firmalardan her zaman vakitli bilgi alırız.
- c. Bulunduğumuz teknokentte bağlantıda olduğumuz firmalar, pazar bilgilerini paylaşmak için istekli olmalıdır.
- d. Bulunduğumuz teknokentte bağlantıda olduğumuz firmalara pazar bilgisi konusunda güvenırliz.

Çift Yönlülük ile ilgili Sorular

12. Lütfen aşağıda yer alan ifadelerle 1-5 arasında bir puan veriniz. (1: kesinlikle katılmıyorum, 5: kesinlikle katılıyorum)

- a. Firmamız farklı perspektiflerden bakmak ve kalıpların dışında düşünmek yoluyla özgün teknolojik fikirler aramaktadır
- b. Firmamız başarısını yeni teknolojiler keşfetme kabiliyetine dayandırır
- c. Firmamız kendisi için yenilikçi olan ürün ve hizmetler geliştirir
- d. Firmamız müşterilerinin ihtiyaçlarını karşılamak için yaratıcı yollar aramaktadır
- e. Firmamız yeni pazar segmentlerine açılma konusunda girişkendir
- f. Firmamız aktif olarak yeni müşteri gruplarını hedefler
- g. Firmamız kaliteyi artırmaya çabalar

- h. Firmamız maliyetleri düşürmek için çabalar
- i. Firmamız ürün ve hizmetlerinin güvenilirliğini sürekli olarak artırır
- j. Firmamız müşterilerinin memnuniyetini sürekli takip eder
- k. Firmamız mevcut müşterilerinin memnuniyetini sürdürmek için sunduklarını düzeltir
- l. Firmamız mevcut müşteri tabanına daha derinlemesine ulaşmak için çabalar

Firma Performansı ile ilgili Sorular

13. Lütfen aşağıda yer alan ifadelere 1-5 arasında bir puan veriniz. (1: kesinlikle katılmıyorum, 5: kesinlikle katılıyorum)
- a. Firmamız performans bakımından potansiyelinin tamamına erişmektedir.
 - b. Firmamızda çalışanlar firma performansından memnundur.
 - c. Firmamız müşterilerinin memnuniyetini başarılı bir şekilde sağlamaktadır.
 - d. Firmamız çalışanlarına yapabileceklerinin en iyisini yapması için fırsat ve motivasyon sağlamaktadır.

Appendix C. TURKISH SUMMARY / TRKE ZET

Bu alışmanın amacı Trkiye’deki bilim ve teknoloji parklarında (teknopark/teknokentlerde) faaliyet gsteren firmalarda sosyal sermayenin bilgi paylařımı yoluyla rgtsel ift ynllğ etkisi ile, bu etkinin rgt performansına faydalarını arařtırmaktır. Gnmzde hızla değışen teknoloji ortamında yenilikilik ynetimi olduka nemlidir (Junni ve diğerleri, 2013). Firmaların z yeteneklerini geliřtirmek ve bunlardan en st dzeyde faydalanmak zere yaptıkları alışmaların (exploitation) ve yeni olanakları en iyi řekilde keřfetmek iin yaptıkları yeniliki faaliyetlerin (exploration) aynı anda ve dengeli bir řekilde yapılması olarak tanımlanan rgtsel ift ynllğn teknoloji sektr gibi daha dinamik olan sektrler iin ok etkili olabildiği ne srlmřtr (řimřek ve diğerleri, 2009). te yandan, bireylerin veya řirketlerin iinde yer aldıkları iletiřim ağlarının sunduğu, bilgi potansiyeli olarak tanımlanan sosyal sermayenin de firmaların entelektel sermayelerine katkı saėlayabileceği belirtilmiřtir (Nahapiet ve Ghoshal, 1998). Dolayısıyla teknoparkların fiziksel olarak bir araya getirdiği teknoloji firmaları arasında sosyal sermaye saėlayacak baėlantıların kurulması ve bu baėlantılar kapsamında bilgi akışının gerekleřmesiyle rgtsel ift ynllğe katkı saėlanması, bunlara baėlı olarak firma performansının iyileřmesi olasıdır. Bu amala Ankara’da bulunan eřitli teknoparklarda arařtırma yapılması; teknoloji firmalarının ikili ve ağ bazlı iliřkileri, bilgi paylařım seviyeleri, rgtsel ift ynllk seviyeleri, firma performansı ve bunların arasındaki iliřkinin llmesi planlanmıřtır.

Bu baėlamda teknoparklardaki firmaların sosyal sermayelerinin bilgi paylařımına, rgtsel ift ynllğe ve rgt başarısına etkisinin incelenmesi ile elde edilecek lm teknikleri ve bulguların Trkiye’de yer alan ve uluslararası birok teknoloji parkı ve firmasına stratejik ynetim aısından katkıda bulunacağı kuřkusuzdur. Teknoloji firmalarına gnmz iř dnyasında rekabeti ve daha başarılı olmak iin uygulanması gereken stratejilerle ve kaynakların doėru kullanımı ile ilgili bilgi

sağlayabilecek olan bu çalışma, bu sayede teknoloji alanında ülkemizin de daha rekabetçi ve başarılı olmasına katkıda bulunabilecektir.

Sosyal sermaye sosyal bağlantılar, ilişkiler, ağlar ve bunlar yoluyla erişilen veya elde edilen kaynakların bütününe verilen isimdir. Sosyoloji, politika, ekonomi gibi alanların yanı sıra son zamanlarda örgüt kuramı ve stratejik yönetim alanlarında da popüler bir araştırma konusu haline gelmiştir (Adler ve Kwon; 2002). Nahapiet ve Ghoshal (1998) sosyal sermayeyi birey veya sosyal birimler arasındaki bağlantı ve ilişkiler aracılığıyla ulaşılması veya kazanılması mümkün olan potansiyel veya gerçekleşen tüm kaynaklar şeklinde tanımlamışlardır. Sosyal sermaye uzun ömürlü olma, yatırım yapılabilir olma, farklı faydalar sağlayabilme (Coleman, 1988) ve diğer sermaye türlerine dönüştürülebilme (Bourdieu, 1985) özelliklerini taşıdığı için bir sermaye çeşidi olarak kabul görmektedir.

Yazında sosyal sermaye kavramına çeşitli yaklaşımlar bulunmaktadır. Adler ve Kwon (2002) yazındaki sosyal sermaye tanımlarını üçe ayırmışlardır: Bireylerin kendi toplulukları dışındaki bireylerle bağlantıda oldukları ortamlarda gelişen “harici” ve “köprü kuran” sosyal sermaye, bir topluluk içinde yer alan bireylerin birbiriyle bağlantıda oldukları ortamlarda gelişen “dahili” ve “birleştiren” sosyal sermaye, ve her iki tür bağlantının da yer aldığı sosyal sermaye. Nahapiet ve Ghoshal (1998) sosyal sermayeyi yapısal (*structural*), ilişkisel (*relational*) ve bilişsel (*cognitive*) olmak üzere üç boyut altında incelemişlerdir. Sosyal sermayenin yapısal boyutu sosyal ilişkilerde bağlantı kurma yolu ve sıklığı, taraflar arasındaki hiyerarşi gibi ilişkinin temel özelliklerini kapsamaktadır. İlişkisel boyut, taraflar arasındaki güven düzeyi, kabul gören normlar ve kimlikler gibi ilişkilerdeki davranışsal dinamikleri içerir. Bilişsel boyut ise ilişkilerdeki ortak dil, jargon, yorum ve ifadeleri kapsamaktadır.

Sosyal sermaye yazında birey, birim/departman, firma ve firmalar arası düzeylerde incelenmiştir. Örneğin, Acquaah (2007) yöneticilerin sosyal sermayesi ve firma performansı arasındaki ilişkiyi, Yli-Renko ve diğerleri (2001) teknoloji firmalarında çalışanlar ve müşteriler arasındaki sosyal sermayeyi, Arregle ve diğerleri (2007) aile

firmalarında, Leana ve Pil (2006) devlet okullarında, Maurer ve Ebers (2006) biyoteknoloji alanındaki genç firmalarda sosyal sermayeyi incelemişlerdir. Nahapiet ve Ghoshal (1998) firma içi sosyal sermayeye odaklansa da firmalar arası alanlarda da sosyal sermayenin öne çıkabileceğini ve incelenmesi gerektiğini vurgulamışlardır. Yazında sosyal sermayenin örgütsel başarı ölçülerine olan olumlu etkilerine dair birçok çalışmanın yanında olumsuz etkilerine dair de birkaç araştırma bulunmaktadır (Wu, 2008). Sosyal ilişkiler ilk oluşma nedenlerinden bağımsız olarak taraflara bilgiye daha kolay, kısa sürede ve az maliyetle ulaşmayı sağlayabilmektedir (Nahapiet ve Ghoshal, 1998). Yazında birey, birim ve örgütlerin kazanım ve başarılarını sosyal sermaye ile ilişkilendiren birçok kuramsal ve görgül çalışma bulunmaktadır. Sosyal sermayenin fayda sağladığı savunulan ve/veya tespit edilen ölçüler arasında entelektüel sermaye (Nahapiet ve Ghoshal, 1998), insan kaynağı (Coleman, 1988), uyum yeteneği ve rekabet üstünlüğü (Leanna ve Van Buren, 1999), rekabetçiliğin gelişimi (Wu, 2008), yenilikçilik başarısı ve büyüme (Maurer ve diğerleri, 2011), kariyer başarısı, iş bulmada kolaylık, kaynak alışverişi, ürün yenilikçiliği, çok fonksiyonlu ekiplerin verimi, personel değişim oranının azaltılması, girişimcilik, tedarikçi ilişkileri, firmalar arası ilişkiler bulunmaktadır (Adler ve Kwon, 2002). Nahapiet ve Ghoshal (1998) sosyal sermayenin gereksiz tekrarları engelleyerek verimliliği artırdığını, Putnam (1993) işlem maliyetlerinin düşürdüğünü, Fukuyama (1995) ise işbirliklerini geliştirerek yenilikçiliği artırdığını ileri sürmüştür. Sosyal sermaye ayrıca diğer sermayeleri ikame ederek veya tamamlayarak da taraflara fayda sağlamaktadır (Adler ve Kwon, 2002).

Geleneksel “kaynaklara dayalı görüş” (resource-based view) firmaların başarılı olabilmesi için kendi kaynaklarından maksimum düzeyde faydalanmaları ve firma kaynaklarının ticareti yapılamaz (non-tradable), taklit edilemez (inimitable) ve ikame edilemez (non-substitutable) olması gerektiğini savunmaktadır. Ancak bu görüşü takip eden kuramsal ve görgül çalışmalar firmaların iç kaynaklarının tek başına yeterli olmadığını ileri sürmüştür. Conner (1991) firma performansı için kamu kuruluşlarının ve rakiplerin kaynaklarının da kritik rol oynadığını, Gulati (1998) etkileşim ve bağlantıların sağladığı kaynakların önemini, Dyer ve Singh (1998) ise işbirlikleri ve

ortaklıklar yoluyla elde edilen değerli kaynakların faydalarını vurgulamıştır. Firmaların bilgi üretme ve bilgi edinme becerilerini geliştirmeleri, entelektüel sermaye geliştirerek rekabet üstünlüğü kazanmaları için kritik öneme sahiptir (Nahapiet ve Ghoshal, 1998). Granovetter (1985) zayıf bağlantılara taraf olanların faydalı dış kaynaklara ve bilgiye erişimde daha başarılı olduğunu bulmuştur. Bunların yanı sıra yazında bilgi edinimi, bilgi paylaşımı, bilgi transferi gibi kavramları sosyal sermaye ve örgütsel ölçüler arasında aracı değişken olarak ölçen çeşitli görgül çalışmalar bulunmaktadır (Wu, 2008; Maurer ve diğerleri, 2011).

Firmalar hem kısa hem de uzun vadede başarı elde edebilmek için, kısıtlı kaynakların farklı amaçlara hizmet eden iki iş faaliyeti grubu arasında nasıl paylaştıracağını planlamalıdır. Bu gruplardan biri belirsiz ve yeni alanlarda yeni beceriler ve bilgiler edinme, özgün ürünler geliştirme ve yeni pazarlara girme ilgili faaliyetleri, diğeri ise firmanın mevcut süreçlerini, operasyonlarını, faaliyetlerini ve pazar konumunu iyileştirmesini içerir. Söz konusu gruplardan ilki literatürde “geliştirme” (exploration), ikincisi ise “yararlanma” (exploitation) faaliyetleri olarak adlandırılmaktadır. Örgütsel çift yönlülük, en genel anlamıyla firmanın bu iki faaliyet grubunu başarıyla gerçekleştirmede optimum bir denge sağlama ve bu dengeyi sürdürme becerisidir.

Geliştirme faaliyetleri araştırma, keşfetme, otonomi, esneklik, çeşitlilik, belirsizlik, deneme-yanılma, çeviklik ve yenilikçilik gibi kavramlarla bağlantılıyken, yararlanma faaliyetleri standardizasyon, verimlilik, entegrasyon, uyum sağlama, kontrol, kesinlik, riski azaltma ve çeşitliliği azaltma gibi kavramları içermektedir (March, 1991; Birkinshaw ve Gupta, 2013). Yararlanma faaliyetleri firmadaki mevcut bilgiler kullanılarak maddi getiri elde etmeyi sağlar, ancak firmaya yeni özgün bilgiler sağlayan yeterli yararlanma faaliyetleri gerçekleştirilmediği sürece mevcut bilgiler zamanla eskiyecektir (Jansen ve diğerleri, 2006). Bu bağlamda yararlanma faaliyetleri verimlilik, üretkenlik, yüksek kalite, düşük risk, düşük maliyet gibi faydalar sağlayarak firmaların kısa vadeli çıkarlarına katkıda bulunurken, geliştirme faaliyetleri özgün ve yenilikçi ürünler, değişik alanlarda yeni bilgiler ve yeni pazarlara

eriřim gibi olanaklar saęlayarak uzun vadeli ıkarları destekler. İki kavram tamamen farklı ve oęu zaman zıt fayda ve risklere sahip olup aynı örgütsel kaynaklardan beslenmektedir. Bu kaynaklar oęunlukla sınırlı olduęu için, firmalar gelişmeye fazla odaklanıp yararlanmaya yeterince önem vermemesi durumunda fazla sayıda yeni fikir ve proje elde edecek, ancak yeterli mali getiri kazanamayacak; yararlanma faaliyetlerine daha ok önem verip geliřtirmeyi geri plana attıęı durumda ise mevcut bilgi ve becerileri zamanla deęerini yitirecektir (March, 1991). He ve Wong (2004) da firmanın mevcut řartlara uyum saęlamaya fazlaca odaklanmasının dinamizmin düşmesine ve gelecekteki muhtemel gelişmelere ayak uyduramamasına sebep olacağını; yeni ve özgün deneyimler elde etmek için harcayacağı fazla abanın da mevcut faaliyetlerinde hızlıca mükemmelleřmesini önleyeceğini savunmuşlardır. Dolayısıyla firmalar uzun vadedeki varlık ve başarılarını sürdürebilmek için yararlanma ve geliştirme faaliyetleri arasındaki gerilimi iyi yönetebiliyor olmalıdır. Söz konusu gerilim O'Reilly ve Tushman (1996) tarafından düşük maliyet, yüksek verim, yeni ürün geliştirme ve esneklik için yapılan kademeli ve köklü yenilikler aracılığıyla gerekleştirilen evrimsel ve devrimsel deęiřimi yönetme olarak tanımlanmıştır. Gibson ve Birkinshaw (2004) da yararlanma ve geliştirme faaliyetlerinin firma içi atışmalara neden olduęu, bazı seimleri kaçınılmaz kıldığını ve bu seimleri doęru yönetebilen firmaların başarı ve rekabet üstünlüęü elde edebileceğini belirtmiştir. Yararlanma ve geliştirme faaliyetleri ayrıca örgüt yapısı ve kültürünü etkileyen etmenler bakımından da ayrıřmakta, iki faaliyet türü farklı örgüt rutinleri gerektirmektedir (Stettner ve Lavie, 2014). Geliřtirme faaliyetleri oęunlukla organik, esnek ve özerk ortamlarda, yararlanma faaliyetleri ise mekanik, rutin, duraęan ve bürokratik yapılarda daha kolay ve başarı ile yürütölmektedir (He ve Wong, 2004).

Günümüzde iş dünyası giderek daha dinamik hale geldike birçok firma için mevcut iç kaynakları ve yetkinlikleri rekabet üstünlüęü için yetersiz kalmaktadır, bu nedenle firmalar eřitli işbirlikleri ve ortaklıklar aracılığıyla kendi kaynaklarını tamamlayıcı dış kaynaklara erişmeyi amaçlamaktadır (Wu, 2008). Sosyal sermaye bir firmanın baęlantılarının sahip olduęu ve içinde bulunduęu sosyal aęın içerdii kaynaklara

erişimi için önemli bir araçtır (Gulati ve diğerleri, 2000). Burt (1997) ve Coleman (1988) sosyal sermayenin bilgi kazanımı ve bilgi transferi üzerinde etkili olduğunu savunmuştur. Zengin kaynaklara sahip firmaların örgütsel çift yönlülük becerisinin daha iyi olduğu, dış kaynaklara erişimi kısıtlı veya yetersiz olan firmaların başarısı içinse örgütsel çift yönlülüğün daha kritik olduğu tespit edilmiştir (Cao ve diğerleri, 2009). Sosyal sermaye aracılığıyla ulaşılan bilgiler firmalara yararlanıcı öğrenme (exploitative learning) veya geliştirici öğrenme (explorative learning) ortamı sağlayabilir (Atuahene-Gima ve Murray, 2007). Örgütsel öğrenme ve başarı için firmanın teknik kaynakları kadar ilişkisel kaynakları da stratejik önem taşımaktadır (Atuahene-Gima ve Murray, 2007). Yazında sosyal sermayenin çeşitli örgütsel başarı ölçülerine etkisi araştırılırken bilgi edinme (Yli-Renko, 2001), bilgi paylaşımı (Wu, 2008) ve bilgi transferi (Maurer ve diğerleri, 2011) gibi ölçüler aracı değişken olarak ele alınmıştır.

Yukarıda belirtilen gerçeklerden yola çıkarak, bu çalışmada sosyal sermaye, bilgi paylaşımı, örgütsel çift yönlülük ve firma performansı arasındaki ilişkinin irdelenmesine karar verilmiştir. Bu araştırmanın yapılacağı bağlam, teknokent firmaları olarak belirlenmiştir. Teknokentler, çoğunlukla ileri teknoloji sektörlerinde faaliyet gösteren küçük-orta ölçekli şirketleri kümelenmeler halinde fiziksel bir alanda bir araya getiren yapılanmalardır. Dolayısıyla teknoloji sektörü, küçük-orta ölçekli şirketler ve kümeler olmak üzere üç farklı bağlamı bünyesinde barındırmaktadır. Bu bağlamlarla ilgili literatürde yer alan çalışmalar ve bulgular incelendiğinde bu çalışmada araştırılan kavramlarla birçok yönden ilişkili oldukları görülmektedir.

Küçük-orta ölçekli firmalar üç özellikleriyle büyük firmalardan ayrılmaktadır: (1) kaynakların azlığı, (2) üst yönetimin hiyerarşi düzeyi, (3) örgütsel rutinler (Abebe ve Angriawan, 2013). Birinci madde küçük-orta ölçekli firmaların örgütsel öğrenmeye olanak sağlayan kaynaklar bakımından yetersiz olabileceğine, ikinci madde bu firmaların yassı örgüt yapısına sahip olmaları sebebiyle üst yönetimin operasyon ve kararlara daha fazla dahil olabileceğine ve üçüncü madde örgütsel öğrenmeyi kolaylaştıran örgütsel standart, rutin ve yapıların bu firmalarda daha az bulunacağına

işaret etmektedir. Bu özellikler, küçük-orta ölçekli firmalar için örgütsel öğrenme ve örgütsel çift yönlülüğü daha kritik hale getirmektedir (Voss ve Voss, 2012). Örgütsel çift yönlülük, küçük-orta ölçekli firmaların yüksek performans ve rekabet avantajına sahip olmaları için önemli bir faktördür (Lubatkin ve diğerleri, 2006). Ayrıca, küçük-orta ölçekli firmalar Türkiye’de 2015 yılındaki üretim hacminin %56.2’sini, ihracat hacminin ise %59.2’sini oluşturmaktadır, dolayısıyla Türkiye ekonomisi için kiritik bir role sahiptir. Bu özellikler, küçük-orta ölçekli firmaları bu araştırma için elverişli ve önemli bir bağlam haline getirmektedir (Türkiye İhracatçılar Meclisi, 2015).

İleri teknoloji sektörü literatürde çift yönlülük için popüler bir bağlamdır. Türkiye Cumhuriyeti Teknoloji ve Sanayi Bakanlığı verilerine göre 2018 Haziran sonu itibariyle teknokentlerde çalışan personelin %81’i Araştırma ve Geliştirme alanında çalışmaktadır. Firmaların çoğunluğu ileri teknoloji sektörü olarak kabul edilen bilişim ve iletişim teknolojileri, elektronik, makine üretimi ve enerji gibi sektörlerde faaliyet göstermektedir. Binin üzerinde onaylanmış ve iki binin üzerinde başvuru yapılmış patent sayısına sahip teknokent firmaları, ileri teknoloji firmaları olarak sınıflandırılabilir. Bu sektörler fazlaca dinamik oldukları için, en yeni bilgi ve kaynakları edinme ve örgütsel çift yönlülük daha önemli hale gelmektedir.

Kümelenmeler ise firmaların fiziksel olarak bir araya geldikleri yapılanmalar olup, buralarda yüz yüze etkileşimler ve fiziksel yakınlığın etkisiyle sosyal sermaye ve bilgi alışverişinin daha fazla olduğu gözlenmiştir. Ayrıca bu yapılanmalarda gerçekleşen bilgi paylaşımı ve sinerjinin etkisiyle inovatif çıktıların da daha çok olabildiği görülmüştür (Laursen ve diğerleri, 2012).

Bahsedilen özellikler, teknokentlerin sosyal sermaye, bilgi paylaşımı ve örgütsel çift yönlülüğün araştırılması için oldukça uygun ve verimli sonuçlar vaat eden bağlamlar olduğunu ortaya koymaktadır. Bu nedenle bu çalışmanın teknokent firmalarında yapılmasına karar verilmiş, sosyal sermayenin iki boyutunun (yapısal ve ilişkisel) bu firmalar arasında bilgi paylaşımını olumlu yönde etkileyerek yararlanıcı ve geliştirici faaliyetlere katkıda bulunacağı ve böylece örgütsel çift yönlülüğü artıracığı; örgütsel

çift yönlülüğün artmasının da performansı geliştireceği öngörülmüştür. Bu durumda önerilen hipotezler aşağıdaki gibidir;

Hipotez 1a (H1a): Sosyal sermaye bilgi paylaşımını olumlu yönde etkiler.

Hipotez 1b (H1b): Yapısal sosyal sermaye bilgi paylaşımını olumlu yönde etkiler.

Hipotez 1c (H1c): İlişkisel sosyal sermaye bilgi paylaşımını olumlu yönde etkiler.

Hipotez 2a (H2a): Bilgi paylaşımı örgütsel çift yönlülüğü olumlu yönde etkiler.

Hipotez 2b (H2b): Bilgi paylaşımı geliştirici faaliyetleri olumlu yönde etkiler.

Hipotez 2c (H2c): Bilgi paylaşımı yararlanıcı faaliyetleri olumlu yönde etkiler.

Hipotez 3a (H3a): Örgütsel çift yönlülük firma performansını olumlu yönde etkiler.

Hipotez 3b (H3b): Geliştirici faaliyetler firma performansını artırır.

Hipotez 3c (H3c): Yararlanıcı faaliyetler firma performansını artırır.

Hipotez 4a (H4a): Bilgi paylaşımı ile örgütsel çift yönlülük, sosyal sermaye ve firma performansı arasındaki ilişkide aracı değişkendir.

Hipotez 4b (H4b): Bilgi paylaşımı, yararlanma ve geliştirme, yapısal sosyal sermaye ile firma performansı arasındaki ilişkide aracı değişkendir.

Hipotez 4c (H4c): Bilgi paylaşımı, yararlanma ve geliştirme, ilişkisel sosyal sermaye ile firma performansı arasındaki ilişkide aracı değişkendir.

Firmaların sosyal sermaye, bilgi paylaşımı ve örgütsel çift yönlülük ölçümü için yazından ilgili ölçekler birleştirilerek firma genelindeki operasyonlara hakim, üst düzey bir yönetici tarafından doldurulmak üzere bir anket hazırlanmıştır. Sosyal sermaye ölçümü için Maurer ve diğerlerinin (2011) kullandığı ölçek kullanılmıştır. Katılımcılara firma çalışanlarının aynı teknoparkta faaliyet gösteren firmaların yüzde kaçıyla ilişki içinde olduğu sorulmuş, bu bağlantıların yakınlık seviyesi, iletişim sıklığı ve karşılık görme seviyesinin (yapısal boyut) ve güveni (ilişkisel boyut) beşli Likert ölçeğinde değerlendirmeleri istenmiştir. Bilgi paylaşımı için Wu (2008) tarafından geliştirilen ölçek kullanılmış ve katılımcıların firma çalışanlarının diğer firmalardaki bağlantılarının iş ile ilgili bilgiler paylaşma seviyesi, aralarındaki güven, bilgi paylaşımı için istek seviyesi ve bilgi paylaşımının zamanlamasını beşli Likert ölçeğinde değerlendirmeleri istenmiştir. Örgütsel çift yönlülüğü ölçmek için ise

Lubatkin ve diğerleri (2006) tarafından geliştirilen ölçek kullanılmış ve yararlanma için 6, geliştirme için 6 olmak üzere toplam 12 soru sorulmuştur.

Anket ODTÜ Teknokent, Bilkent Cyberpark ve Hacettepe Teknokent firmalarına e-posta ile iletilmiş ve çevrimiçi olarak paylaşılmıştır. 93 tamamlanmış cevap toplanmıştır. Uçdeğerler çıkarıldığında nihai örneklem büyüklüğü 87 olmuştur. Verilerin analizi sonucu H1a, H2a ve H3a hipotezlerinin desteklendiği görülmüştür. Sosyal sermaye ile bilgi paylaşımı, bilgi paylaşımı ile örgütsel çift yönlülük ve örgütsel çift yönlülük ile firma performansı arasındaki ikili ilişkiler anlamlı bulunmuştur. Ayrıca, seri aracı değişken analizi sonucunda, sosyal sermayenin firma performansına olan etkisinin bilgi paylaşımı ve örgütsel çift yönlülük üzerinden ortaya çıktığı görülmüştür.

İkinci aracı değişken analizi sonucunda, sosyal sermayenin iki boyutu ile firma performansı arasında örgütsel çift yönlülüğün yararlanma bileşeninin aracı etkiye sahip olduğu ancak geliştirme bileşeninin olmadığı görülmüştür. Sonuçlara göre yapısal sosyal sermaye bilgi paylaşımını olumlu yönde etkilemekte, ilişkisel sosyal sermaye bilgi paylaşımı, geliştirme ve firma performansını olumlu yönde etkilemektedir. Bilgi paylaşımı hem yararlanma hem geliştirmeye anlamlı katkıda bulunurken, firma performansı yalnızca yararlanmadan etkilenmektedir.

Bulgulara göre, bir firmanın sosyal sermayesi artırılarak bilgi paylaşımı sağlanabilir, örgütsel çift yönlülük seviyesi yükseltilebilir ve böylece daha iyi bir performans elde edilebilir. Bu bulgular, yazındaki birçok diğer çalışmanın bulguları ile tutarlıdır. Çok uluslu bir elektronik firmasının birimleri arasında (Tsai ve Ghoshal, 1998), bir imalat firması ile iş ortakları arasında (Wu, 2008), teknoloji girişimleri ile müşterileri arasında (Yli-Renko vd., 2001) ve bir mühendislik firmasının çalışanları arasında (Maurer vd., 2011) olmak üzere farklı bağlamlarda sosyal sermaye ile bilgi paylaşımı arasında bağ bulunmuştur. Bu çalışma ile, bu bulgu Türk teknoparkları bağlamına da genişletilmiştir. Sosyal sermayenin ayrıca örgütsel çift yönlülük ve firma performansı üzerine doğrudan da etkisi olduğu görülmüştür. Bu bulgu da, Atuahene-Gima ve

Murray'in (2007) ve Rogan ve Mors'un (2014) bulguları ile paralellik taşımaktadır. Seri aracı değişken analizi ise, yazında şimdiye kadar araştırılmamış olan sosyal sermaye – bilgi paylaşımı – örgütsel çift yönlülük – firma performansı arasındaki zincirleme ilişkiyi incelemiş ve bulmuştur.

Bilgi paylaşımının geliştirme faaliyetlerine yararlanma faaliyetlerinden daha yüksek ölçüde katkıda bulunduğu görülmüştür. Bu bulgu, Raisch'in (2009) dışarıdan edinilen bilginin geliştirmeye faydalanmadan daha çok katkısı olacağı önermesini desteklemektedir. Bu bulgu ayrıca teknopark firmalarının geliştirici faaliyetlere daha fazla katkı sağlayacak bilgileri daha çok paylaştığı gibi bir sonuca da yol açabilir.

Örgütsel çift yönlülüğün firma performansına olan pozitif etkisi Gibson ve Birkinshaw (2004), Andriopoulos ve Lewis (2009), Atuahene-Gima ve Murray (2007) ve Hill ve Birkinshaw (2012)'un bulgularıyla paralellik taşımaktadır. Yapısal sosyal sermayenin yalnızca bilgi paylaşımını artırırken ilişkisel sosyal sermayenin faydalanma ile örgüt performansına da olan etkisi, firmaların birbirine güven duymasının önemini ortaya koymaktadır. İlişkisel sosyal sermaye Maurer ve diğerleri (2011) tarafından da özellikle teknoloji ve pazar ile ilgili bilgilerin paylaşılmasında etkili bulunmuştur. Ancak bu çalışmanın bulguları ile örtüşmeyen şekilde, Maurer ve diğerleri (2011) ilişkisel sosyal sermaye ve bilgi paylaşımı arasında anlamlı bir ilişki bulamamıştır. İlişkisel sosyal sermayenin geliştirmeyi olumlu yönde etkilemesinden, firmalar arası güven arttıkça, yenilikçi, yeni ürünler ve yeni pazarlar ile kaynaklarını ve bilgilerini daha çok paylaştıkları sonucu çıkarılabilir. Kauppila'nın (2010) bulgularına göre, firmalar arası ortaklık geliştirici faaliyetlerle sonuçlanmaktadır. Dolayısıyla bu çalışmada incelenen modele bir eklenti olarak, firmalar arası işbirlikleri de aracı değişken olarak modele eklenerek incelenebilir.

Geliştirmenin örgüt performansı ile anlamlı bir ilişkisi yokken, faydalanmanın performansa olan etkisi ise, faydalanma kısa vadeli getiri sağladığından, genç firmalar için anlamlı bir bulgudur (March, 1991). Ayrıca Cao ve diğerlerinin (2009)

bulgularına göre, küçük firmaların aynı anda yararlanıcı ve geliştirici olmaya çalışmaları, kaynak kısıtlarından dolayı firma performansını olumsuz etkileyebilir.

Çalışmada elde edilen bulguların teknopark ve firma yönetimlerine oldukça fayda sağlaması beklenmektedir. Öncelikle, yönetimler bilgi paylaşımının önemi ve sosyal sermayenin bilgi paylaşımı ve örgütsel çift yönlülük üzerindeki etkisinin farkında olmalıdır. Firmaların çift yönlü ve başarılı olabilmeleri için, teknopark gibi kümelenmelerde sosyal paylaşım ve güven ortamı oluşturulmalıdır. Teknoparkların yönetimleri bu doğrultuda firmaların bir araya gelmesi ve paylaşımında bulunması için elverişli ortamlar oluşturmayı, yarışmalar veya paneller gibi çeşitli etkinlikler düzenlemeyi değerlendirebilir.

Firma yöneticileri, yüksek performans için çift yönlülüğün önemini kavramalı ve edindikleri bilgilerden çift yönlülük adına maksimum düzeyde fayalanmak için çabalamalıdır. Çift yönlülük seviyelerini takip etmeli, inovasyon, yeni ürün tasarlama gibi geliştirme faaliyetlerine fazlaca odaklanıp yararlanma faaliyetlerini ihmal etmemelidir. Bilgi paylaşımının özellikle geliştirme faaliyetlerine etki ettiği göz önünde bulundurularak, inovasyon ve yeni pazarlara açılma gibi geliştirme faaliyetleri için bilgi paylaşımı yüksek düzeyde tutulmalıdır.

Bu çalışmanın en önemli kısıtlarından biri, düşük veri sayısıdır (N=93). Daha büyük bir veri setiyle, daha güçlü istatistiksel sonuçlara ulaşmak mümkündür. Bir başka kısıt, veri toplanan tüm teknoparkların Ankara'da yer alması olabilir. Şehirler arası kültür farkı gibi farklılıklar olduğu varsayımıyla, farklı şehirlerdeki teknoparklarda gerçekleştirilecek bir çalışma, söz konusu kavramlar arasındaki ilişkiyi daha derinlemesine açıklayabilir. Bir başka kısıt, yazında çokça kullanılmasına rağmen, sübjektif performans ölçüsü kullanılmasıdır. İncelenen firmalara genç ve küçük-orta ölçekli firmalar olduğundan, yayınlanmış objektif performans verisi bulmak mümkün değildir. Ancak başka bir bağlamda veri toplanarak araştırma tekrarlanabilir ve performans objektif veya sübjektif ve objektif ölçülerin birleşimi ile ölçülebilir. Bu

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