T.C.
YAŞAR UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
DEPARTMENT OF BUSINESS ADMINISTRATION
DOCTOR OF PHILOSOPHY

THE EFFECTS OF TECHNOLOGY ORIENTATION ON FIRM PERFORMANCE

DUYGU SEÇKİN HALAÇ

ADVISOR: PROF. DR. ŞEVKİNAZ GÜMÜŞOĞLU

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DUYGU SEÇKİN HALAÇ

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DOCTOR OF PHILOSOPHY

As members of the Dissertation Committee, we certify that we have read and participated in the oral presentation of the dissertation prepared by **Duygu Seçkin Halaç** entitled **"The Effects of Technology Orientation on Firm Performance"** and we approved that this dissertation is qualified to fulfil the dissertation requirement for the Degree of Doctor of Philosophy.

Prof. Dr. Şevkinaz Gümüşoğlu
(Dissertation Advisor) _____

Prof. Dr. M. Hulusi Demir _____

Prof. Dr. Doğan Altuner _____

Assoc. Prof. Dr. Osman Gök _____

Assoc. Prof. Dr. Pınar Süral Özer _____

Date of Approval 19.11.2013

DECLARATION ON LIEU OF OATH

I hereby declare under oath that this submitted PhD dissertation with the title "**The Effects of Technology Orientation on Firm Performance"** has been composed by myself without any inadmissible help. I declare, to the best of my knowledge and belief, that all content and ideas drawn directly or indirectly from external sources are indicated in the text and listed in the list of references. The dissertation has not been submitted to any other examining body and has not been published.

I dedicate this dissertation to
our upcoming baby girl Derin
who has been under stress with me
during the dissertation completion process
and has motivated me in every pace of it.

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ABBREVIATIONS

CFA – Confirmatory Factor Analysis
CAD – Computer-Aided Design
CAM – Computer-Aided Manufacture
CNC – Computer Numerical Control
CommChange – Commitment to Change
CommLearn – Commitment to Learning
CRM – Customer Relationship Management
EGIAD – Aegean Young Businessmen Association
EFA – Exploratory Factor Analysis
e.g –for example (exempli gratia in Latin)
EQS – Structural Equation Modelling Software
EUROSTAT – European Statistics
ERP – Enterprise Resource Planning
FP – Financial Performance
IAOSB – Izmir Ataturk Organized Industrial Zone
LC – Learning
IP – Innovative Performance
ManP – Manufacturing Performance
MC – Top Management Capability
MGP – Marketing Performance
MIS – Management Information System
MP – Market Performance
OECD – Organization for Economic Co-operation and Development
R&D (AR&GE in Turkish) – Research and Development
RBV – Resource Based View
SBU – Strategic Business Units
TC – Technological Capability
TO – Technology Orientation
TUBITAK – The Scientific and Technological Research Council of Turkey
ULC – Unlearning

ABSTRACT

Technology orientation is one of the mostly acknowledged strategic orientations in the field of strategic marketing management. In a narrow sense, technology orientation is characterized by the degree of commitment to R&D, acquisition of new technologies and applications of the latest technologies. In this regard, technology orientation has mostly been associated with manufacturing and R&D departments of the organizations and considered as a single dimensional structure. In addition, technology orientation studies, both narrative and empirical, have not been investigated solely in the literature.

This dissertation proposed that, as being a culture-based strategic orientation, technology orientation needs to be taken into account at firm/strategic business units (SBU) level and studied in a multi-dimensional construct. Thus, the main objective of this dissertation is to constitute and operationalize the multidimensional construct of technology orientation, and even to redefine technology-orientation if necessary. Besides, as a firm-level strategic orientation, the effects of technology orientation on both innovative performance and business performance was also investigated.

After a comprehensive literature review, a comprehensive field study, in which a survey method was preferred, has been conducted. Manufacturing firms in Izmir were in the focus of the study where firm-level analysis was done. 224 employees from 147 firms participated into this dissertation. Exploratory factor analysis (EFA), confirmatory factor analysis (CFA), multiple regression analysis and structural modelling were executed throughout the analysis process.

Four-dimensional technology orientation construct was achieved where the dimensions were named as top management capability, technological capability, commitment to learning and commitment to change. Research hypotheses were partially supported. Structural model indicated that technological capability alone has no effects on business performance. Moreover, being committed to learning does not lead to an increase in innovative performance unless being committed to change.

Key words: Technology Orientation, Multidimensional Factor Construct, Firm Performance, Manufacturing Firms, Structural Model

ÖZ

Teknoloji oryantasyonu, stratejik pazarlama alanında en çok kabul görmüş stratejik oryantasyonlardan bir tanesidir. Teknoloji oryantasyonu en genel hali ile Araştırma-Geliştirme'ye (AR&GE) olan bağlılık, yeni teknolojilerin firma bünyesine kazandırılması ve son teknolojilerin firma prosedürlerine adapte edilmesi ile tanımlanmaktadır. Bu bağlamda, teknoloji oryantasyonunun mevcut literatürde, tek boyutlu bir yapıda ele alındığı ve üretim/AR&GE departmanları ile eşleştirildiği göze çarpmaktadır. Ayrıca, literatürde hem kavramsal hem de ampirik çalışmalarda teknoloji oryantasyonun tek başına ele alınmadığı da ortadadır.

Bu doktora tezi ile kültür tabanlı bir stratejik oryantasyon olan teknoloji oryantasyonun firma ya da stratejik iş birimleri düzeyinde çok boyutlu bir yapıda ele alınması gerektiği savunulmaktadır. Bu doğrultuda, çalışmanın temel amacı, teknoloji oryantasyonun çok boyutlu yapısını ortaya koyabilmektir. Dahası, firm seviyesinde bir stratejik oryantasyon olarak teknoloji oryantasyonun hem innovatif performans hem de işletme performansı üzerindeki etkileri de araştırılmıştır.

Derinlemesine bir literatür taraması ardından, anket yönetiminin kullanıldığı kapsamlı bir saha çalışması yürütülmüştür. İzmir ilinde üretim yapan firmalar çalışmaya konu olurken, analiz seviyesi firma olarak ele alınmıştır. Sonuçta, 147 firmadan 224 çalışan çalışmada gönüllü olarak yer almıştır. Keşifsel faktör analizi, doğrulayıcı faktör analizi, çoklu regresyon analizi ve yapısal modelleme kullanılarak analiz süreci tamamlanmıştır.

Analizler sonunda, dört boyutlu teknoloji oryantasyonuna ulaşılmıştır. Bu boyutlar, üst yönetim yetenekleri, teknolojik yetenekleri, öğrenmeye bağlılık ve değişime bağlılık olarak adlandırılmıştır. Araştırma hipotezleri kısmen desteklenmiştir. Yapısal modelin işaret ettiği önemli bulgulardan bir tanesi teknolojik yeteneklerin varlığının tek başına işletme performansına etkisinin olmadığıdır. Bir diğer bulgu ise, öğrenmeye bağlılığın ancak değişime olan bağlılık ile birlikte yürümesinin innovatif performans artışını sağlayabileceğidir.

Anahtar Kelimeler: Teknoloji Oryantasyonu, Çok Boyutlu Faktör Yapısı, Firma Performansı, Üretim Firmaları, Yapısal Model

INTRODUCTION

Neo-classical economic thought considers technology as an intermediary in production process that configures the way of how inputs transform into outputs (Ansal, 2004). Thus, technology consists of all external factors that affect productivity of a firm. Starting with Schumpeter's "creative destruction", technology management has attracted the attentions (Berry & Taggart, 1994). Schumpeter (1943) stated the economic value of "technological innovation". Schumpeter internalized the technology concept while he imputed the most of the responsibility and importance to the entrepreneurs. He further claimed that supernormal profits could only be gained by radical innovations in which technology takes its part. In line with the Schumpeterian idea, Porter (2008, p.56, 201) implied that technology was in the heart of any strategy in order to provide competitive advantage in any industry.

Merrifield (1991) asserted that strategic use of technology has to be a concern regardless of firm size (as cited in Berry & Taggart, 1994). The importance of the role of technology in firm strategy has significantly been increasing. In designation of corporate strategy, the influence of technology depends upon the degree and significance of technology for the firm. Thus, determining a strategic posture heavily depends on corporate strategy, technology and cultural fit (Berry & Taggart, 1998). Technology integrates to firm strategic philosophy by providing to illustrate the range of its alternatives. In addition, once to chose from those alternatives, technology gives a good portion of the means in the implementation of that selected strategy (Kantrow, 1980).

Strategic orientations are defined as creating firm behaviors parallel with firm strategy to influence employee norms, beliefs and values in order to provide sustainable competitive advantage in the long run (Zhou, Yim & Tse, 2005). Many studies in strategic orientation literature emphasize the greater effects of combination of strategic orientations on firm performance/competitiveness rather than only depending on one particular orientation (Zhou, Yim & Tse, 2005). Rather than sole effects of strategic orientations, a combined effect of two or more strategic

orientation was stated with the empirical findings of many studies (e.g. Gatignon & Xuereb, 1997; Li, 2005; Salavou, 2005; Yang et al, 2012). Some firms may be successful in pursuing more than one orientation. However, resources are limited and in most occasions firms need to make choices in their allocations (Hortinha, Lages & Lages, 2011) when dealing with bounded resources and capabilities (Spanjol, Qualls & Rosa, 2011). Moreover, seeding strong sub-cultural value systems are hard to reach while especially expectations and values are conflicting because of the nature of the strategic orientations. Therefore, even though being aware of the accelerated positive combined effects of strategic orientations, many firms need to make choices between them, prioritize and go for one over others (Danneels, 2007; Hortinha, Lages & Lages, 2011; Spanjol, Qualls & Rosa, 2011).

Technology orientation as one of the highly recognized strategic orientations is in the heart of this dissertation. Technology orientation, in a narrow sense, is considered in functional level as a reflection of technology-push approach in the current literature (Day, 1998). Technology orientation assumes that technological superiority is favorable in the eyes of the consumers. By this means, technology orientation is characterized by the degree of commitment to R&D, acquisition of new technologies and applications of the latest technologies (Gatignon & Xuereb, 1997).

Technology orientation aims at first to create a knowledge and technology based organizational culture, and then to employ these knowledge and technology into the production process in order to satisfy current or latent customer needs (Kanter, 1996; Gatignon & Xuereb, 1997; Bulut, 2007). According to resource based view of the firm (Barney, 1991) technology orientation as a culture needs to be taken as one of hard to imitate, hard to substitute, valuable and rare resource which can provide a sustainable competitive advantage over competitors. Therefore, a cultural-based strong strategic orientation may be the key to stay competitive in the current industry as well as to create new markets.

Technology orientation studies have not been investigated solely in the literature. There are few studies focused on the relation between technology and strategy interaction (e.g. Kantrow, 1980; Morone, 1989; Berry & Taggart, 1994; Levy & Kuo, 1991) however, they do not mention this technology-strategy relation

as an orientation. Thus, some early works discussed the strategic use and importance of technology. However, they approached to the concept from strategic (technology) management point of view and did not consider the cultural-based points as in strategic marketing management literature. In the following studies, from the strategic marketing management stream, handle several strategic orientations. In most studies, a mixed effect of several orientations was in the focus, including technology orientation or the interrelatedness of orientations was investigated (e.g. Gatignon & Xuereb, 1997; Zhou, Yim & Tse, 2005; Hakala & Kohtamaki, 2010). Bulut, Alpkan & Yılmaz (2009) mentioned that technology orientation has been considered as a single dimensional structure in empirical studies even though it is mentioned multidimensionally in conceptual works.

Technology orientation is in the crossroads of strategic management and strategic marketing management and technology orientation was explained in a related manner but from different angles. Morone (1989) did not mention the word "orientation" rather he used the phrase of "strategic use of technology" in his narrative study. According to his study, technology management consists of deciding on strategies of acquiring externally generated technologies and/or developed technologies as well as internally developed technologies and introducing these technologies into the use in all corporate functions throughout the firm. Eventhough it is not possible to consider them as an exact match, technology oriented firms show similar nature to Miles and Snow's (1978) prospectors (Zhou & Li, 2007). Prospector firms perform well in dynamic environments with their prime capabilities of finding and exploiting new product and market opportunities. They heavily invest in individuals who scan the environment for potential opportunities. They rely upon a management group who are keen on facilitation rather than control, deploy and coordinate resources among various decentralize units and projects. They require flexibility in its technology and administrative systems which emphasizes to adopt change. Furthermore, other than strongly keen on following changing technology, they also heavily depend on technological capabilities. This technological capability not only highlights the current use but also includes openness to possible future requirements (Miles et al., 1978).

Technology orientation from strategic marketing management point of view needs to be nourished with some considerations of strategic management. Therefore, as a culture-based orientation, technology orientation was proposed to examine in a multidimensional construct as opposed to current operationalization in the literature. Considering this gap in the literature, the main objective of this dissertation is to constitute and operationalize the multidimensional construct of technology orientation, and even to redefine technology-orientation if necessary. In this regard, technological capability, top management capability, learning and unlearning were proposed as dimensions of technology orientation in this dissertation. Complementary aim is to investigate the effect of technology orientation on business and innovative performance. Therefore, expected contributions of this dissertation were:

(1) to constitute and operationalize a multidimensional technological orientation construct,

(2) being the first study which examines technology orientation solely,

(3) to constitute and operationalize a multidimensional innovative performance construct, to show the effect of dimensions of technology orientation on firm performance (both on dimensions of business and innovative performances),

(4) to construct a scale of unlearning on firm level while current scales are on project team level,

(5) to provide a picture of how the dimensions of technology orientation and overall business and innovative performance criteria were in relation as a whole picture.

In the next section, a conceptual framework and the research model including the construct proposals were presented. In the methodology section, scale development process, instruments used in the study, questionnaire design and data collection and sampling procedures were explained in details. Then pilot study and final analyses were discussed. Finally, the study was concluded with results, implications and limitations.

1. CONCEPTUAL FRAMEWORK OF TECHNOLOGY ORIENTATION

Technology orientation is indispensable to strategic orientation literature. Therefore, this section begins with a background to build technology orientation concept properly. In this regard, at first, definitions and historical development of strategy and strategic orientations were presented in a nutshell. After stating where technology orientation was originated, literature review of the concept was introduced in details. At last, definition of firm performance, which indicators will be used in the study and the relation between research variables -technology orientation and firm performance- will be discussed in detail.

1.1. A General View of Strategic Orientations

The word strategy was originated from the name of Greek general Strategos and known to be used first in 1810 (Merriam-Webster Dictionary, 2013). Once progressed as a discipline in military related area, strategy now one of the key terms of business world (Eren, 2010, p.1). In many textbooks, strategy was defined as a comprehensive blueprint of a corporation which sets the corporate vision and mission to achieve corporate goals (e.g: Wheelen & Hunger, 2010, p.966). Mintzberg considered strategy a more complex concept that it could not be defined in such a simple form. Further, he defined strategy with five P's, all of which are considered to define the concept. This five P's are stand for **P**lan, **P**attern, **P**osition, **P**erspective and **P**loy (Mintzberg, 1987 as cited in Mintzberg, Ahlstrand & Lampel, 2005, p. 26-28). Strategy consists of series of activities to choose among alternatives in order to reach the final aim. Firm strategy can be discussed in two different levels within the firms. The first one is strategic business units (SBUs), where the focus is how to gain competitive advantage in the operating industry. The second one is corporate level, where the decisions of how the whole portfolio can be managed and which business fields are to be chosen to operate (Porter, 2008, p. 163).

Strategic orientation[1] of a business enterprise is a firm's strategic directions/choices to construct appropriate ways to handle competition and to survive

[1] Orientation is defined as *"a usually general or lasting direction of thought, inclination, or interest"* (Merriam-Webster Dictionary, 2013)

in the market (Narver & Slater, 1990; Gatignon & Xuereb, 1997). A strategic orientation is a notion which characterizes the appearance of a firm (Lynch, Mason, Beresford & Found, 2012). Instead of strategic orientation, Hamel and Prahalad (1989) used the term "strategic intent" and emphasized that *strategic intent captures the essence of winning*. There is no generally accepted definition of strategic orientation since strategic orientation literature has evolved from two distinct disciplines: strategic management and strategic marketing management (Zhou & Li, 2007).

From the strategic management point of view, strategic orientations are considered as strategies that firms keen on. This perspective mostly classified firm behaviors into patterns of decisions in their relations with competitors and outside the industry. One of the mostly recognized typology that is followed in this stream consists of Miles and Snow's (1978) work. Miles and Snow (1978) classified firm strategies into four groups: (1) Defenders, (2) Analyzers, (3) Prospectors and (4) Reactors. They further implied that the first three –defender, analyzer and prospector- group indicates strategic directions where reactors are indeed strategic failures that inconsistencies exist in structure, technology and process in such organizations (Miles et al, 1978). Defenders are the firms that aim to reach a stable environment. They likely do not pay attention to trends and changes outside of their domain, and end up with difficulties in an attempt to penetrating small niche within the industry. In other words, they attempt to develop their efficiency in existing operations. Prospectors are the firms that operate in a dynamic environment and their ability of finding and exploiting new products and market opportunities are seen as their prime capabilities. The analyzers are considered as a unique mixed of defenders and prospectors. They operate with minimum risk while maximizing their opportunity for profit. Thus, over the time firms come to a balance where consistency and stability is acquired. Reactors, on the other hand, represent inconsistency and instability. They desperately respond to the changes in a reactive way to survive.

Venkatraman (1989) aggregated strategic orientation studies in the vein of strategic management literature under three groups and entitled those as alternate approaches to strategy. Venkatraman (1989) named those alternate approaches as:

(1) narrative approach which includes case-based tradition,

(2) classificatory approach which consists of classifications as termed "typologies" or "taxonomies",

(3) comparative approach which identifies the key traits as termed "dimensions".

Furthermore, Venkatraman (1989) considered Miles and Snow's (1978) work in classificatory approach and proposed six dimensions of strategic orientation from viewpoint of comparative approach. Those dimensions were tagged as aggressiveness, analysis, defensiveness, futurity, proactiveness, riskiness. Venkatraman (1989) explained those six dimensions in details. Aggressiveness is about being able to adopt a posture for improving market positions in an industry, which is faster than the competitors in resources allocations; beating competitors. Analysis refers to having a tendency to search for deeper roots of problems in decision-making and generating optimum solutions. Defensiveness refers protecting a firm's current position by means of cost reduction and efficiency seeking methods of a business. Futurity reflects being prepared to compete in future environment by means of organizational readiness and product/market requirements. Proactiveness refers continuously seeking for new market opportunities in order to be ahead of the competition. Riskiness reflects the decision-making on resources allocations, choices of products and markets; considering possible ways of losses and gains. Some studies build on this construct in the literature such as Morgan & Strong (1998, 2003), Camelo-Ordaza, Martin-Alcazar & Valle-Cabrera (2003), Tan & Tan (2005), Guan, Yam, Tang & Lau (2009), Joachim, Omotayo & Omotayo (2011) and Johnson, Martin & Saini (2012). Similarly, Porter's (1980) three main generic strategies- as known as cost leadership, differentiation and focus- also considered as strategic orientations in some studies (e.g. Durand & Coeurderoy, 2001).

The discipline of strategic marketing management acknowledges strategic orientations as corporate culture or subcultures of a corporate culture. This vein of strategic orientations grew out of market orientation literature. With additional contributions to the literature, this vein has enriched to a point that there are several mostly discussed orientations such as market orientation which also consists of customer orientation and competitor orientation (e.g. Kohli & Jaworski, 1990; Narver & Slater, 1990; Desphande & Farley, 2004; Atuahene-Gima, 2005),

technology orientation, entrepreneurial orientation (Covin & Covin, 1990; Lumpkin & Dess, 1996; 2001), learning orientation (Calantone, Cavusgil & Zhao, 2002; Baker & Sinkula, 1999). There are also several studies that examine the combined effects of orientations and/or the interrelations of orientations (Gatignon & Xuereb, 1997; Zhou, Yim & Tse, 2005; Yılmaz, Alpkan & Ergün, 2005; Jeong, Pae & Zhou, 2006; Liu, Luo & Shi, 2002; Hult, Hurley & Knight, 2004; Bulut, 2007; Yılmaz, Alpkan & Bulut, 2009; Horintha, Lages & Lages, 2011, Hakala & Kohtamaki, 2010; Hakala, 2011).

Market orientation was defined as *"organization wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization wide responsiveness to it"* (Kohli and Jaworski, 1990). Narver and Slater (1990) characterized market orientation as a business culture that consists of three behavioral components mostly overlap with Kohli and Jaworski's elements, namely customer orientation, competitor orientation, and inter functional coordination. Thus, the aim of market orientation is to build a corporate culture that meets the current and latent needs and expectations of customers.

Entrepreneurial orientation is a cultural based firm behavior that characterizes principal entrepreneurial traits of a firm like; opportunity focus, risk taking, proactiveness, and innovativeness in order to remain competitive in the market (Slevin & Covin, 1990; Lumpkin & Dess, 1996; 2001).

Learning orientation as a corporate culture aims to provide competitive advantage through a shared understanding of strategic targets and how to reach them which is supported continuously by a collective firm memory (Calantone, Cavusgil & Zhao, 2002; Baker & Sinkula, 1999).

Technology orientation aims to create added value through technological knowledge based on organizational (sub)culture, and then to employ these knowledge and technology into the production process in order to satisfy current or latent customer needs (Kanter, 1996; Gatignon & Xuereb, 1997).

Hakala (2011) recently proposed that strategic orientations may be seen as adaptive mechanisms rather than corporate cultures. In his literature review study, Hakala (2011) organized different approaches and classify three different adaptive mechanisms based on studies conducted to analyze interactions of multiple strategic orientations. Therefore, he categorized orientations as:

(1) sequences in development- there is a best orientation,

(2) alternatives to choose from- there is a best orientation depends on the contingency,

(3) complementary patterns- there is a unique pattern of several orientations that fits.

Regardless of research stream and approaches, the effects of strategic orientations on firm performance and competitiveness in the market are commonly accepted. Strategic orientations of a firm mirror its operationalization of firm strategy in chasing for survival in competition (Sainio, Ritala & Hurmelinna-Laukkanen, 2012). In other words, strategic orientations characterize different views of thinking on how to perform the business (Li, 2005). From the strategic marketing management point of view, strategic orientations have been considered as bridges between firm strategy and firm culture. Thus, the aim of strategic orientations is to provide a firm culture that supports innovativeness and superior performance as a firm strategy (Bulut, Alpkan & Yılmaz, 2009).

Although there are several studies consisting of technology orientation, there is no empirical evidence on focusing just technology orientation and firm performance relation either narratively or empirically. Moreover, considering the bounded resources and capabilities in adapting more than one orientation, technology orientation as a sole strategic orientation is in the focus in this dissertation. In the following part, technology orientation mainly from the strategic marketing management point of view and corresponding literature will be discussed in detail.

1.2. Construct of Technology Orientation

The meaning of technology has been long discussed, sometimes blurred while confused with similar words and it took almost 200 years to stick with a general definite meaning. German word “die technik” which means “science of arts” was first integrated to American concept of “technology” by Veblen. In 1920s, Beard dissociated technology from capitalism and finally by 1930s the meaning transformed to “applied science” (Schatzberg, 2006). As to Bain (1937), technology was strongly associated with culture and even more, it was considered as the most important single factor in shaping cultural phenomenon. *Technology includes all tools, machines, weapons, instruments, housing, clothing, communicating and transporting devices and the skills by which we produce and use them* (Bain, 1937). Nowadays, technology is defined as “*the application of scientific knowledge for practical purposes, especially in industry”* (oxforddictionaries.com, 2013). Thus, technology is a combination of software -know-how which indicates knowledge to find solutions for practical problems- and hardware -tools and artifacts used in reaching the solutions- (Berry & Taggart, 1994).

Technology is accounted for one of the most important drivers of competition. Technology push orientation responds to the demands of tomorrow’s world. If the world of tomorrow is similar to that of today, the prospectors more likely cannot maximize profit (Miles et al, 1978). In a stable market, customer preferences remain unchanged where only incremental changes may satisfy customers. However, if consumer preferences change quickly then drastic changes in products would be necessary (Zhou, Yim & Tse, 2005). Similarly, fast changing technologies shorten product life cycles and required flexible and easy to adopt technological background to stay competitive (Zhou, Yim & Tse, 2005).

Morone (1989) made a clear statement about strategic use of technology. He denoted that many firms are confronted by a range of technology-based opportunities like cooperative R&D endeavors, internal technology advancement; possible joint ventures/licensing agreements, industry-university research center collaborations or entrepreneurial start-ups etc. The question was stated as why just few of them are successful to build upon technology-based strategies while most of them fail. Thus,

he asserted that strategic use of technology is to find out advantageous technological possibilities among many and building a strategy upon appropriate opportunities and gain advantage over competitors.

"Technology orientation" was first pronounced in the study of Gatignon & Xuereb (1997). Referring to common characteristics of innovative firms such as strong R&D background, proactiveness in technology acquiring and sophisticated technology use in production, Gatignon & Xuereb (1997) defined technology orientation as employing technical knowledge in order to build a new technical solution to answer and meet new needs of the users. Furthermore, they described a technology-oriented firm with strength to acquire a sound technological experience and an ability to make use this background in development of new products. After Gatignon and Xuereb's study, many others have build on the concept by taking that study as a base.

Technology orientation covers adopting new technologies during the process of product development in defining the concept (e.g. Li, 2005). However, when defining technology orientation in such a context, technology orientation seems to be synonymous with innovation orientation. Levy & Kuo (1991) drew a line between technology and innovation orientations. As to their study, innovation-oriented activities were not necessarily need to include technological mastery or complexity where technology-oriented activities are those heavily engaged in high-tech applications or introduce a high-tech output at the end of the process. In this regard, it is better to emphasize that the study of Levy and Kuo (1991) made a sharp distinction between innovation and technology orientation. Innovation orientation refers to a firm's openness to new ideas and tendency to change which consists of new technologies, procedures and administrative systems (Hurley & Hult, 1998; Zhou, Gao, Yang & Zhou, 2005). Technology orientation on the other hand is knowledge and technology based organizational culture which aims to provide competitiveness through making decisions about:

(1) how to acquire which technology,

(2) choosing among technology related strategic opportunities to fully utilize technological capabilities, and

(3) employing owned technology into the firm's functions including especially production process (Morone, 1989; Gatignon & Xuereb, 1997).

Firms, which are strongly keen on technology-push approach, assume that technological superiority is favorable in the eyes of the consumers. From the technology orientation point of view "openness to new ideas" mostly means "employing state-of-the-art technologies". Technology-oriented firms are characterized by employing state-of-the-art technologies in their operations. Thus, these firms are considered to direct their resources heavily to R&D activities, be flexible in their production process, and be proficient in technical aspects. These specific characteristics are thought to provide a ground for breakthrough innovations. Breakthrough innovations have the potential to change basic consumer behaviors where to shape consumer preferences and create new markets (Zhou, Yim & Tse, 2005).

Technology oriented firms persist on chasing advances in technology and innovations while focusing on products rather than markets (Urban & Barreria, 2010). In this regard, technology orientation was considered as an internally focused orientation considering it is less related to customers or competitors (Gatignon & Xuereb, 1997; Spanjol, Qualls & Rosa, 2012). Consequently, technology oriented firms are more likely to rely on acquiring new technologies and building up technological new solutions to existing knowledge rather than sophisticated and continuous market research (Berry, 1996; Spanjol, Qualls & Rosa, 2012).

Technology orientation is also referring to product-oriented management approach and expected to lead more radical innovations on the one hand. Technology orientation satisfy customers through technological solutions they introduce to the market, enlarge product range by presenting differentiated products and on the other hand gain cost advantages in production process by using high-tech, highly effective infrastructures (Hakala & Kohtamai, 2010).

Technology orientation studies mostly investigated technology orientation as a driver of new product innovation (e.g. Jeong, Pae & Zhou, 2006; Gao, Zhou & Yim, 2007; Hakala & Kohtamaki, 2010 & 2011). Put it differently, technology

orientation was basically acknowledged as main component of technological innovations and way of creating unique products. High degree of technology orientation is more likely to result in new products with a high degree of newness to customers (Salvaou, 2005). Technology-oriented firms are more likely to engage in innovative products that customers at first may react to the products since they are beyond their imagination. However, firms may even turn such a situation into their best interest by introducing several side products and informative means to make customer getting used to the new products (Salvaou, 2005).

On the other hand, it is expected to obtain cost advantages while innovation expenses are mostly disregarded (Gatignon & Xuereb, 1997). Even though a strong emphasize made on introduction of radical technological innovations by technology-oriented firms as pioneers, it does not necessarily result in huge success in terms of value creation. Moreover, it is also possible that followers or imitators that copy and modify first movers' technologies may even outperform first movers in the market (Chen & Lien, 2013). They explained the reason behind by being somewhat aware customers, reduced risks, large-scale manufacturing, ease in marketing and distribution. Therefore, technology orientation not only composed of creating a new technology but also noticing a promising technology and imitating it in order to stay competitive. Although technology orientation has its costs and baring much uncertainty in it, in a rapidly changing environment where the products most probably become out-of-date/old-fashioned/unnecessary, technology orientation may only be the way to survival (Hakala & Kohtamai, 2010).

In the literature, many studies highlighted the importance of market characteristics like market growth, competitive intensity, demand uncertainty and technology turbulence were highlighted. Firms operating in an environment that characterizes with uncertain demand and high technology turbulence are expected to be more successful/competitive if they adopt a technology-orientated culture (e.g. Gatignon & Xuereb, 1997; Zhou, Yim & Tse, 2005; Li, 2005; Gao, Zhou & Yim, 2007; Zhou & Li, 2010). Moreover, it is also suggested that when the level of technological change is low, firms can fully benefit from relying on current technology. However, technology oriented firms suffer from such a situation; because of their commitment to invest on new technologies and R&D activities their

costs and expenses will no longer covered by the gained profits (Gao, Zhou & Yim, 2007).

From Table 1a to 1t, empirical studies that consisting of technology orientation and performance criteria were summarized. As can be observed from the tables, there are only 19 empirical studies consisting technology orientation as one of the variables.

Table 1a. Summary of Technology Orientation Studies in the Literature:

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Gatignon & Xuereb, 1997 (Journal of Marketing Research)	Model A. ✓ Innovative Performance *3 items (derived from literature: e.g: Moenaert et al 1994 and Deshpande, Farley & Webster, 1993)* Model B. ✓ Innovation characteristics - Product radicalness - Product advantage - Product costs	Model A. ✓ Firm resource ✓ Innovation characteristics - Product radicalness/similarity - Product advantage - Product costs ✓ Firm strategic orientations - Customer - Competitor - Technology *2 items (newly developed questionnaire)* ✓ Interfunctional coordination Model B. ✓ Firm resources ✓ Firm strategic orientations ✓ Interfunctional coordination	✓ Mail survey ✓ SBU level analysis ✓ Marketing executives ✓ 393 participants ✓ 14 % response rate ✓ Conducted in the US	✓ Two different model was tested (A & B) ✓ Market growth, competition intensity and demand uncertainty were considered as control variables. ✓ Strong TO leads to superior innovative performance. ✓ When market growth is low, TO is recommended; when demand uncertainty and market growth high firms should be both TO & CO.
	Findings Related to Technology Orientation and Performance f(Innovative Performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Innovative Characteristics) = $\alpha_0 + \alpha_1$(Innovative Performance) + ε_1 f(Product Advantage) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Product Radicalness) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1			

Table 1b. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Zhou, Yim & Tse, 2005 (Journal of Marketing)	✓ Organizational Learning ✓ Types of Innovations - Technology Based - Market Based ✓ Firm Performance *4 items (Slater & Narver, 1994)* ✓ Product Performance 2 *items (Gatignon & Xuereb, 1997)*	✓ Strategic Orientations - Market Orientation - Technology Orientation *4 items (Gatignon & Xuereb, 1997; Hurley & Hult, 1998)* - Entrepreneurial Orientation ✓ Market Forces - Demand uncertainty - Technology turbulence - Competitive intensity	✓ Interview / Survey methods ✓ Firm level analysis ✓ Marketing managers responded ✓ 350 participants ✓ Conducted in China	✓ TO is beneficial to tech-based innovations but no impact on market-based innovations. ✓ Through tech-based innovations, TO has effect on firm and product performance. ✓ Market forces have effects on TO ✓ TO have a weaker impact on tech-based innovation when technology is more turbulent.
	Findings Related to Technology Orientation and Performance f(Organizational Learning) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Technology Based Innovations) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Firm Performance) = $\alpha_0 + \alpha_1$(Technology Based Innovations) + ε_1 f(Product Performance) = $\alpha_0 + \alpha_1$(Technology Based Innovations) + ε_1			

Table 1c. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Li, 2005 (Asia Pacific Journal of Management)	✓ Network building - Ties with government - Ties with business ✓ Firm Performance *1 item (Law, Tse & Zhou, 2003)*	✓ Strategic Orientations - Market Orientation - Technology Orientation *4 items (Gatignon & Xuereb, 1997)* - Entrepreneurial Orientation	✓ Interview / Survey methods ✓ Firm level analysis ✓ Local senior managers of Foreign-Invested Enterprises (FIEs) ✓ 181 participants ✓ 30.2% response rate ✓ Conducted in China	✓ Competitive intensity considered as moderator between strategic orientations and network building. ✓ TO exerts a positive relationship on ties with business community where, a negative relationship on ties with government officials ✓ Interaction between competitive intensity and TO positively affect the ties with business community.
	Findings Related to Technology Orientation and Performance f(Network building ties with government) = $\alpha_0 - \alpha_1$(Technology Orientation) + ε_1 f(Network building ties with business) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Firm Performance) = $\alpha_0 + \alpha_1$(Network building ties with government) + α_2(Network building ties with business) + ε_1			

Table 1d. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Salavou, 2005 (Journal of Marketing Management)	✓ Product Performance - Product Newness to Customers *4 items (Atuahene-Gima, 1995)* - New Product Uniqueness *6 items (Cooper, 1979)*	✓ Customer Orientation ✓ Technology Orientation *5 items (Ettlie, 1983)* ✓ Learning orientation	✓ Personal interviews ✓ Firm level analysis ✓ Top managers of 150 manufacturing firms ✓ 126 participants ✓ 67% response rate ✓ Conducted in Greece	✓ TO positively influence on product newness to customers ✓ TO directly and positively associated with learning orientation ✓ TO indirectly effect through learning orientation on new product uniqueness
	Findings Related to Technology Orientation and Performance f(Product newness to customers) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Learning Orientation) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Learning Orientation) = $\alpha_0 + \alpha_1$(New Product Uniqueness) + ε_1			

Table 1e. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Jeong, Pae & Zhou, 2006 (Industrial Marketing Management)	✓ New Product Development Perf**or**mance - Consumer acceptance *1 item (drawn from previous studies)* - Technical product performance *1 item (drawn from previous studies)* - Profitability *2 items (drawn from previous studies)*	✓ Internal Factor - Organizational Support ✓ External Factors - Market turbulence - Technology turbulence ✓ Strategic orientations - Customer orientation - Technology orientation *4 items (drawn from previous studies)*	✓ Interview and survey ✓ Firm level analysis ✓ executives ✓ 232firm participants ✓ 90 % response rate ✓ Conducted in China	✓ Market turbulence is not significantly effects TO but CO. ✓ TO have a strong influence on technical acceptance and profitability but relatively a weaker influence on consumer acceptance
	Findings Related to Technology Orientation and Performance f(Consumer acceptance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Technical product performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Profitability) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Technology Orientation) = $\alpha_0 + \alpha_1$(Organizational support) + α_2(Technology turbulence) + ε_1			

Table 1f. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Bulut, 2007 (unpublished PhD Dissertation – in Turkish)	✓ Firm performance *14 items in total (Denison, 2000; Yılmaz, Alpkan & Ergün, 2005)* - Financial performance *3 items* - Marketing performance *8 items* - Qualitative performance *3 items* ✓ Innovative Performance *6 items (Antoncic & Hisrich; 2001, Neely & Hii, 1998; Hagedoorn & Cloodt, 2003)*	✓ Strategic orientations - Market orientation - Entrepreneurial orientation - Learning orientation - Technology orientation *4 items (Zhou, Yim & Tse, 2005)*	✓ Interview and survey ✓ Firm level analysis ✓ 2032 participants from 312 firms ✓ 32 % response rate (considering number of firms) ✓ Conducted in Turkey	✓ Three different sets of analyses were conducted; results were separated by dashes ✓ First three functions are indicating the result of multiple regression analyses results. ✓ Functions from fourth to seven are the results of first SEM results. ✓ Functions from eighth to eleven are the results of second SEM results
	Findings Related to Technology Orientation and Performance f(Financial performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Marketing performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Innovative performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Financial performance) = $\alpha_0 + \alpha_1$(Entrepreneurial orientation) + α_2(Market orientation) – α_3(Technology Orientation) + ε_1 f(Marketing performance) = $\alpha_0 + \alpha_1$(Entrepreneurial orientation) + α_2(Market orientation) + α_3(Technology Orientation) + ε_1 f(Innovative performance) = $\alpha_0 + \alpha_1$(Entrepreneurial orientation) + α_2(Market orientation) + α_3(Technology Orientation) + ε_1 f(Technology orientation) = $\alpha_0 + \alpha_1$(Learning orientation) + α_2(Market orientation) + α_3(Technology Orientation) + ε_1 f(Qualitative performance) = $\alpha_0 + \alpha_1$(Learning orientation) + α_2(Market orientation) + ε_1 f(Entrepreneurial performance) = $\alpha_0 + \alpha_1$(Technology orientation) + ε_1 f(Market orientation) = $\alpha_0 + \alpha_1$(Entrepreneurial orientation) + α_2 (Technology Orientation) + ε_1 f(Learning orientation) = $\alpha_0 + \alpha_1$(Entrepreneurial orientation) + α_2 (Market Orientation) + ε_1			

Table 1g. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Gao, Zhou & Yim, 2007 (International Journal of Research in Marketing)	✓ Business performance - Profitability *2 items (Slater & Narver, 1994)* - Sales growth *2 items (Gatignon & Xuereb, 1997)* - Product performance *2 items (Gatignon & Xuereb, 1997)* ✓ Technology turbulence - Average level - High Level ✓ Competitive intensity ✓ Demand uncertainty - Average level High Level	✓ Customer Orientation ✓ Competitor Orientation ✓ Technology Orientation *4 items (Gatignon & Xuereb, 1997)*	✓ Face-to-face interviews ✓ SBU level analysis ✓ Staff with a title of marketing executives, marketing managers, product managers ✓ 408 brands from 380 firms ✓ 20 % response rate ✓ Conducted in China	✓ Technology turbulence, competitive intensity and demand uncertainty were considered as moderators ✓ TO has a negative effect on business performance at low levels of technology turbulence and a positive effect at high levels of technology turbulence ✓ TO positively effects product performance and profitability at the average level of technology turbulence ✓ In terms of moderating effect, the interaction of technology turbulence and TO positively effects product performance and profitability.
	Findings Related to Technology Orientation and Performance f(Business performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Profitability) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Product performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1			

Table 1h. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Akman, Ozkan & Eris, 2008 (Istanbul Ticaret Universitesi Fen Bilimleri Dergisi- in Turkish)	✓ Firm performance *5 items (source was not mentioned)*	✓ Strategic orientations - Customer orientation - Competitor orientation - Technology orientation *4 items (source was not mentioned)* ✓ Firm Strategy - Aggressive - Reactive - Proactive ✓ Total quality management	✓ Surveys ✓ Firm level analysis ✓ 76 manufacturing firm participation ✓ Conducted in Turkey	
	Findings Related to Technology Orientation and Performance f(Firm performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1			

Table 1i. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Hakala & Kohtamaki, 2010 (Journal of Enterprising Culture)	✓ Company performance *3 items (Gibson & Birkinsha, 2004; Wolff & Pett, 2006)*	✓ Entreprenaurial orientation ✓ Technology orientation *5 items (Drozier, 2003)* ✓ Customer orientation	✓ Survey ✓ Firm level analysis ✓ Managing directors ✓ 164 software firms participants ✓ 13 % response rate ✓ Conducted in Finland	✓ Environmental uncertainty and firm size were chosen as control variables. ✓ All variables were significantly correlated to each other. ✓ TO has no direct effect on company performance.
	Findings Related to Technology Orientation and Performance f(Company performance) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Company performance) = $\alpha_0 + \alpha_1$(Customer orientation) + α_2(Entrepreneurial orientation) + α_3(Technological orientation) + ε_1			

Table 1j. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Zhou & Li, 2010 (Journal of Business Research)	✓ Adaptive capability ✓ High competitive intensity ✓ High demand uncertainty	✓ Customer Orientation ✓ Competitor Orientation ✓ Technology Orientation *4 items (Gatignon & Xuereb, 1997)*	✓ Face-to-face interviews ✓ SBU level analysis ✓ One senior managers from each firms ✓ 380 firms ✓ 90.5 % response rate ✓ Conducted in China	✓ Competitive intensity and demand uncertainty were considered as moderators ✓ In terms of moderating effect, the interaction of both competitive intensity and demand uncertainty with TO positively effects adaptive capability
	Findings Related to Technology Orientation and Performance $f(\text{Adaptive capability}) = \alpha_0 + \alpha_1(\text{Technology Orientation}) + \varepsilon_1$			

Table 1k. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Urban, 2010 (Journal of Human Research Management)	✓ Entrepreneurship orientations ✓ Technology Orientation *categorical questions (Gartner et al., 2004; Allen & Stearns, 2004)*	✓ Environmental hostility ✓ Environmental dynamism	✓ Survey ✓ Firm level analysis ✓ 236 respondents ✓ Conducted in Johannesburg, South Africa	✓ The author only examined the reliability and validity of scales and investigated whether those four variables are significantly correlated to each other. ✓ The author cluster firms depend on categorical questions of TO instrument into three: first mover (21,74% of sample), innovator (9,57% of sample), and practitioners (68,69% of sample). ✓ EO and TO are not significantly correlated to each other, but EO and TO significantly associated with environmental dynamism and hostility.

Table 1l. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Urban & Barreria, 2010 (International Journal of Innovation and Technology Management)	✓ Entrepreneurship orientations ✓ Technology Orientation 6 items-*categorical questions (Gartner et al., 2004; Allen & Stearns, 2004)*	✓ Environmental hostility ✓ Environmental dynamism	✓ Survey ✓ Firm level analysis ✓ 229 respondents ✓ 30.3% response rate ✓ Conducted in Johannesburg, South Africa	✓ The author only examined the reliability and validity of scales and investigated whether those four variables are significantly correlated to each other. ✓ The author cluster firms depend on categorical questions of TO instrument into three: first mover (21,74% of sample), innovator (9,57% of sample), and practitioners (68,69% of sample). ✓ EO and TO are not significantly correlated to each other, but EO and TO significantly associated with environmental dynamism and hostility.

Table 1m. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Hortinha, Lages & Lages, 2011 (Journal of International Marketing)	✓ Export Performance *3 items (Zou, Taylor & Osland, 1998)*	✓ Strategic orientations - Customer relationship orientation - Technology orientation *4 items (Zhou et al., 2005)* ✓ Innovation capabilities - Exploratory innovation - Exploitative innovation ✓ Past Performance - Low past ROA - High past ROA	✓ Online surveys ✓ Firm level analysis ✓ R&D managers and export managers of manufacturer exporter firms ✓ 170 firm participation ✓ 26 % response rate ✓ Conducted in Portugal	✓ Past performance (high past ROA & low past ROA) was taken as moderator variable. ✓ CO relates more strongly than TO to exploitative innovation but is equally important to exploratory innovation. ✓ No significant effect of interaction effects of TO and and past ROA was found on neither perceived export performance nor innovation capabilities.
	Findings Related to Technology Orientation and Performance f(Exploratory innovation) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1 f(Exploitative innovation) = $\alpha_0 + \alpha_1$(Technology Orientation) + ε_1			

Table 1n. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Spanjol, Qualls & Rosa, 2011 (Journal of Product Innovation Management)	✓ New product ideation *(Moorman, 1995)* - Novelty *4 items* - Volume *3 items*	✓ Market research behavior ✓ Customer orientation ✓ Technology orientation *11 items (Gatignon & Xuereb, 1997)* ✓ Learning orientation	✓ Mail or online surveys ✓ SBU level analysis ✓ Both marketing and R&D executives from personal and household products industry ✓ 182 participants ✓ 12.1% response rate ✓ Conducted in the USA	✓ Firm level designed scale for TO was modified to Strategic Business Units (SBU). ✓ Organization size and market turbulence were taken as control variables. ✓ There is a marginally significant negative relation between TO and market research behavior ✓ TO positively effects new product ideation novelty
	Findings Related to Technology Orientation and Performance f(Market research behavior) = $\alpha_0 - \alpha_1$(Technology Orientation) + ε_1 f(New product ideation novelty) = $\alpha_0 + \alpha_1$(Market research behavior) + ε_1 f(New product ideation volume) = $\alpha_0 + \alpha_1$(Market research behavior) + ε_1 f(New product ideation volume) = $\alpha_0 + \alpha_1$(Technology orientation) + ε_1			

Table 1o. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Hakala & Kohtamaki, 2011 (International Journal of Entrepreneurial Behavior & Research)	✓ Company performance *3 items (Gibson & Birkinshaw, 2004; Wolff & Pett, 2006)*	✓ Entreprenaurial orientation ✓ Technology orientation *5 items (Drozier, 2003)* ✓ Customer orientation ✓ Organizational learning	✓ Survey ✓ Firm level analysis ✓ Managing directors ✓ 164 software firms participants ✓ 13 % response rate ✓ Conducted in Finland	✓ Firms were clustered on the base of strategic orientations, and then analysis of variance was performed to detect differences in measures of performance and learning. ✓ Three types of groups had emerged as to the cluster analysis: Servant (S), Player (P) and Integrator (I) ✓ Servant firms: moderate CO and low TO and EO; Integrator firms: integrate TO, CO and EO simultaneously; Player firms: high CO and moderate EO and TO ✓ The difference between the clusters was significant in both learning and performance. ✓ Their results suggested that firms which combines CO with other strategic orientations have higher learning capability and perform better

Table 1p. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Sainio, Ritala & Hurmelinna-Laukkanen, 2012 (Technovation)	✓ Radicalness of the firm's innovation output *(Source was not mentioned)* - Technological radicalness *3 items* - Business model radicalness *2 items* - Market radicalness *3 items*	✓ Firm-level strategic orientation ✓ Customer relationship orientation ✓ Technology orientation *4 items (Zhou et al., 2005)*	✓ Mail or online surveys ✓ Firm level analysis ✓ CEO, managing director, R&D managers or development officers ✓ 213 firm participation from 570 ✓ 37.4 % response rate ✓ Conducted in Finland	✓ Market uncertainty was taken as moderator variable. ✓ Market uncertainty influences the effect of TO on technological and market radicalness. ✓ High market uncertainty only slightly diminishes the emergence of technological radicalness where negatively effects market radicalness
	Findings Related to Technology Orientation and Performance f(Technological radicalness) = $\alpha_0 - \alpha_1$(Technology orientation) + ε_1 f(Market radicalness) = $\alpha_0 + \alpha_1$(Technology orientation) + ε_1 f(Business model radicalness) = $\alpha_0 + \alpha_1$(Technology orientation) + ε_1			

Table 1r. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Rajala & Westerlund, 2012 (45th Hawaii International Conference on System Science)	✓ Firm Performance - Market performance *3 items (Lucas et al, 1988; Park, Chen & Gallagher, 2002)* - Financial performance *2 items (source were not specified)*	✓ Service Orientation ✓ Technology Orientation *Number of items and source were not specified (drawn from prior studies)* - *Firm responsiveness to technological change* - *Technological capabilities* ✓ Openness of innovative activity ✓ Customer proximity ✓ Product uniformity	✓ Online survey methods ✓ Firm level analysis ✓ Senior managers of 179 software firms ✓ 197 participants ✓ 13.2% response rate ✓ Conducted in Finland	✓ Customer proximity and product uniformity was considered as intermediary variables. ✓ The first study that considers TO in a multidimensional construct: exogenous environment & endogenous context; however, there were no further information was given in the analysis part: neither factor analysis results was presented to show the multidimensional construct of TO nor individual effects of these two supposed dimensions' effects on dependent variable. Authors only presented the effects of TO on customer proximity and product uniformity. ✓ Customer proximity and product uniformity- focus were considered as moderators. ✓ TO positively related to customer proximity and product uniformity.
	Findings Related to Technology Orientation and Performance f(Customer proximity) = $\alpha_0 + \alpha_1$(Technology orientation) + ε_1 f(Financial performance) = $\alpha_0 + \alpha_1$(Customer proximity) + ε_1 f(Product uniformity) = $\alpha_0 + \alpha_1$(Technology orientation) + ε_1 f(Market performance) = $\alpha_0 + \alpha_1$(Product uniformity) + α_2(Customer proximity) + ε_1			

Table 1s. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Yang, Wang, Zhu & Wu, 2012 (Journal of Product Innovation Management)	✓ Product innovation performance *4 items* (Wei & Morgan, 2004)	✓ Business Environment - Market Growth (High/Low) - Competition intensity (High/Low) ✓ Strategic orientations - Customer orientation - Competitor orientation - Interfunctional coordination - Technology orientation *5 items (Gatignon & Xuereb, 1997)*	✓ Interview and survey ✓ Firm level analysis ✓ Chief executives, marketing managers, R&D managers and project managers ✓ 501 firm participants ✓ 20 % response rate ✓ Conducted in China	✓ Firms were clustered into four groups according to business environment variables. ✓ TO has a positive and significant impact on innovation performance (NPD) in all four clusters. ✓ TO exerts larger effects in high market growth & high competition intensity cluster than the other clusters regards to regression coeffient values. Thus, TO has a significantly larger impact on product innovation performance under the high market growth & high competition intensity condition than any other conditions.
	Findings Related to Technology Orientation and Performance f(Product innovation performance) = $\alpha_0 + \alpha_1$(Technology orientation) + ε_1			

Table 1t. Summary of Technology Orientation Studies in the Literature (con't.):

Author(s) &Study	Dependent Variable(s)	Independent Variable(s)	Research Design & Sample	Notes
Surer & Mutlu, 2012 (IUYD - in Turkish)	✓ Export Performance *5 items (Navarro et al, 2010)*	✓ Market orientation - Customer - Competitor - Interrelational ✓ E-marketing orientation - Cognitive - Behavioral - Acceptance ✓ Entrepreneurial orientation ✓ Technology orientation *5 items (Gatignon & Xuereb, 1997)*	✓ Surveys ✓ Firm level analysis ✓ 144 firm participation ✓ Conducted in Gaziantep, Turkey	✓ There is significant correlation between TO and export performance. ✓ However, in the multiple regression analysis, there was not any significant relation between technology orientation and export performance while other orientation either partially or fully effected the export performance
	Findings Related to Technology Orientation and Performance $f(\text{Export performance}) = \alpha_0 + \alpha_1(\text{Market orientation}) + \alpha_2(\text{E-marketing orientation}) + \alpha_3(\text{Entrepreneurial orientation}) + \varepsilon_1$			

In Table 1a to 1t, the empirical studies that consisted of technology orientation as a variable were summarized. As indicated earlier, there were not any studies that solely studied on technology orientation, however; there are 19 empirical studies that investigated the relation and/or effects of combinations of strategic orientations on selected variables. Those empirical studies were listed upon paper publishing date. In the first columns of Table 1a to 1t, the authors, year of publishing and the journal were presented. In the second and third columns, dependent and independent variables were listed respectively. In addition to listing variables, the scale sources and number of items for those scales were also indicated only for the variables in request in this dissertation. Therefore, technology orientation and any kind of firm performance criteria were drawn and indicated with related scale sources. In cases of using structural equation modeling (SEM), some independent variables repositioned as dependent variables and/or some variables took both independent and dependent positions in some studies. In those studies, variables were tagged either as independent or dependent based on corresponding authors' indications throughout the studies. Moreover, number of scale items and the sources of the scales related to technology orientation and performance criteria were also specified in italic writing. In the fourth column, questions such as research design, way of data collection, number of participants and their characteristics were addressed. In the second row, research findings, specifically statistically significant findings related to technology orientation and performance criteria were displayed in functional forms. Direct or in some cases, indirect effects of technology orientation on dependent variables were shown in the respected equations. In some cases, direct/indirect effects on technology orientation were indicated as well. Interrelatedness of all variables was presented in the studies where SEM method was preferred in order to provide a full impression of the studies.

These empirical studies were mostly conducted in China (six out of 19). Excluding six among remaining studies (four conducted in Finland and two in the USA), all others focused on emerging markets (six in China, three in Turkey, one in Greece, one in Portugal). Firm or Strategic Business Units (SBUs) were the level of analysis in all studies as expected. Survey or a combination of survey and interviews were preferred as method of data collection in all studies.

All studies except one (Rajala & Westerlund, 2012) considered technology orientation as a single-dimensional construct. Rajala and Westerlund (2012) proposed a two-dimensional-construct of technology orientation. They claimed that technology orientation should be investigated both as firm's responsiveness to technological change and as firm's technological capabilities. The first one is referring to exogenous environment, where the latter is addressing to endogenous environment (Rajala & Westerlund, 2012). However, they did not mention how they operationalized these two dimensions. In addition, neither any information about the instruments they used nor a valid factor analysis result existed in that study. There is no indication of the effects of those dimensions on dependent variables.

Gatignon and Xuereb (1997) developed an instrument for technology orientation and following seven other studies (Zhou, Yim & Tse, 2005; Li, 2005; Gao, Zhou & Yim, 2007; Zhou & Li, 2010; Spanjol, Qualls & Rosa, 2011; Yang, Wang, Zhu & Wu, 2012; Surer & Mutlu, 2012) also employed this instrument in their studies. Zhou, Yim and Tse (2005) adopted an instrument which was mostly based on Gatignon and Xuereb's (1997) instrument. Their scale was a version that a bit mixed with innovativeness and following them, three studies (Bulut, 2007; Hortinha, Lages & Lages, 2011; Sainio, Ritala & Hurmelinna-Laukkanen, 2012) used their adopted instrument in their studies. Thus, while counting all these instruments came from mostly same source it can be said that the instruments of 12 out of 19 studies were originated from Gatignon and Xuereb (1997). Remaining three studies (Jeong, Pae & Zhou, 2006; Akman, Ozkan & Eris, 2008; Rajala & Westerlund, 2012) only mentioned that they draw instruments from the current literature but did not specify any exact source.

When considering the variables and relations in request in those studies, demand uncertainty and technology turbulence were mostly included to analysis as control variables. Firm performance was also divided into sub categories like, financial or marketing performance, and product newness/performance, which mostly refer to product radicalness and therefore most preferred dependent variables in these studies. Furthermore, the positive effects of technology orientation on new product development, radicalness and newness were supported as to most studies,

while environmental conditions were found to be important indicators of strategic orientations.

2. RESEARCH MODEL

In this section, at first, the literature where the relation between technology orientation and any firm performance criteria were discussed was in the focus. Then, in the second part, multidimensional construct proposal of technology orientation was discussed in details. The question of which variables might be considered as the dimensions of technology orientation was built upon the theoretical framework in current literature. In the third part, research hypotheses were stated with which a schematic display of research model was presented.

2.1. The Literature of Technology Orientation and Firm Performance

Performance is defined as “implementation”; fulfillment of a claim, a promise or a request (Merriam-Webster Dictionary, 2013). Porter (1991) used the word “success” instead of “performance” and defined firm performance in relation to firm strategy. As to his definition, firm strategy is bundle of coordinated actions of different functions of a firm, which consists of planning, choosing among alternative, implementing, controlling and assessing, in order to stay competitive. Accordingly, firm performance is mentioned as the degree of achieving the set targets at the end of a previously specified date. Throughout his paper, he mentioned that the final aim is to reach a competitive financial competitive situation, however; he did not bounded performance with only financial performance. Performance improvement is considered in the center of strategic management where many studies aiming to provide some kind of prescriptions to improve firm performance (Venkatraman & Ramanujan, 1986).

As to Schendel and Hofer (1979) performance is “*the test of any strategy*” (as in Venkatraman & Ramanujan, 1986). Therefore, strategy is related to setting goals for a specified period where performance is about the level of achievement to these goals. Depending on the firm’s strategic posture, priority of performance indicators is most likely to be changed. For instance, a nonprofit organization’s top priority is to provide long-term satisfaction as qualitative performance criteria (Gainer & Padanyi, 2003). Therefore, even though the ultimate aim seems to be financial returns in for-profit sectors, supported indicators like market, marketing and manufacturing

effectiveness gain importance. In addition, employee satisfaction, quality improvements and new product innovativeness can also be taken into account as internal performance indicators (Yılmaz, Alpkan & Ergun, 2005). Venkatraman and Ramanujan (1986) considered financial performance as the narrowest concept of business performance and in a broader concept nonfinancial criteria such as market-share, manufacturing value-added, marketing effectiveness were also included to business performance under operational performance.

Financial performance is a term to determine firm success in terms of quantitative accounting terms. Mostly preferred financial performance indicators are return on assets (ROA), return on investment (ROI), profitability (e.g. Zhou, Yim & Tse, 2005; Jeong, Pae & Zhou, 2006; Bulut, 2007; Gao, Zhou & Yim, 2007). In order to support financial performance, sales, customer satisfaction, market share, the effectiveness of marketing expenses/investments, speed and quality of manufacturing are likely to be taken into consideration in performance evaluation (Yılmaz, Alpkan & Ergun, 2005, Bulut, 2007; Morgan, 2012).

As can be seen in Tables 1a – 1t, most of the technology orientation studies included several performance criteria as dependent variables. As it can be followed from Table 1, most studies assumed technology orientation in functional level. Those studies mostly prefer new product performance which refers to commercial success of new products. New product performance was considered one of the dimensions of innovative performance in this dissertation.

Gatignon & Xuereb (1997) stated that value of strategic orientations depends on environmental factors. Their findings showed that technology orientation improves innovative performance especially in uncertain market. In other words, adopting a technology orientation leads to a better innovative performance when operating in a market that demand is unpredictable. Their study mentioned that technology orientation effects innovative firm performance, which in the end effects innovation characteristics (radical or incremental).

As to the findings of Zhou, Yim & Tse (2005), technology orientation by increasing technology-based innovations have positive impacts on both new product

performance and firm performance. In the study, four firm performance items consists of financial performance (return on investment and profit), marketing performance (market share) and market performance (sales growth). They further claimed that when technology turbulent is high, these mentioned affects of technology orientation on several performance criteria are getting lower.

Li (2005) also investigated the relation between technology orientation and firm performance. However; as opposed to other studies, he preferred secondary data. He defined firm performance as logarithm of income divided by firm size (number of employees) and data in his calculation was reached from secondary sources. The findings supported that technology orientation increased firm performance via increased ties with business. Therefore, he argued that if a firm strenght its business ties with other firms, the effects of technology orientation on firm performance are likely to increase.

Salavou (2005) divided innovative performance into two dimensions as new product uniqueness and product newness to customers- which refers to degree of change in customer behavior or customer adoption to new products. He found that technology orientation leads to increase in both innovative performance dimensions however, change in new product uniqueness was occur through learning orientation.

As to Jeong, Pae and Zhou (2006) new product development performance can be scaled by customer acceptance, technical product performance and profitability. The findings also indicated that technology orientation positively affects those three dimensions of new product development performance.

Bulut (2007) discussed firm performance indicators in a more detailed way. He dimensionalized firm performance into four distinct groups, which consists of financial, marketing, qualitative and innovative performances. All four-performance indicators were found to be affected by technology orientation directly where qualitative performance was also affected by technology orientation through learning orientation.

The selected performance criteria by Gao, Zhou and Yim (2007) were profitability, product performance and sales growth. Those three performance criteria named as business performance and found to be affected by technology orientation. One-by-one analyses showed that profitability and product performance were positively affected by technology orientation under high demand uncertainty and technology turbulence.

The rough findings of Akman, Ozkan and Eris (2008) also supported the positive effects of technology orientation on firm performance.

Hakala and Kohtamaki (2010) preferred employee perceptions of benchmarking while scaling performance. The results of their study showed that technology orientation leads to an increase in company performance directly. Moreover, technology orientation also plays moderating role in leading an increase in company performance by entrepreneurial performance.

Hortinha, Lages & Lages (2011) indicated no direct effect of strategic orientations on perceived export performance where they includes profit, sales and sales growth to scale financial means. In addition, high and low ROA was also considered as the indicator of past performance by which decisions are made. Findings pointed out that, firms with high ROA can afford to invest on new technologies in their operations; however, that does not guarantee customer adaptation to the new products.

Spanjol, Qualls & Rosa (2011) named product performance as new product ideation and investigated the effects of strategic orientations on new product ideation novelty and new product ideation volume separately. There is a positive relation between technology orientation and new product ideation volume, where no significant relation was found between technology orientation and new product ideation novelty.

In Hakala & Kohtamaki's (2011) study, three different types of software companies emerged where those clusters differed in terms of their mix of customer, technology and entrepreneurial orientations. They used perception based company

performance consisting of owners' satisfaction, profitability in comparison with competitors and growth in comparison with competitors where the mixed of those three criteria named as overall performance. In the study, only performance criteria "growth" differs significantly among three clusters constituted from strategic orientations. However, when considering overall performance, the difference was significant among clusters.

Sainio, Ritala & Hurmelinna-Laukkanen (2012) chose radicalness of the firm's innovation output as dependent variable, which refers to innovative performance. They divided it into three groups as technological (referring technological superiority), business model (referring required changes in the management and production process) and market (referring market acceptance/adaptation) radicalness. All three indicators were found to be effected by technology orientation.

Rajala & Westerlund (2012) divided firm performance into two categories: market and financial. As to their study, technology orientation has indirect effects on company performance. Furthermore, market performance found to effect financial performance.

Yang et al (2012) clustered their sample into four groups as to strategic orientations based on market growth and competition intensity. Then, they looked for whether there is any difference on performance among the clusters. In all four clusters technology orientation was found to be effective on innovative performance, specifically product innovation performance.

Surer and Mutlu's (2012) study aimed to find the relations between four strategic orientations (market, e-marketing, entrepreneurial and technology) and export performance. As to findings of that study, three strategic orientations effects export performance where no significant relation was found as to the regression analysis between technology orientation and export performance.

Table 2. Technology Orientation-Performance Relation in the Literature

Author(s) &Study	**Selected Performance Criteria & Measurement Source**	**Indicators**
Gatignon & Xuereb, 1997 (Journal of Marketing Research)	- Innovative Performance *3 items (derived from literature: e.g: Moenaert et al 1994 and Deshpande, Farley & Webster, 1993)*	Items related to new product performance
Zhou, Yim & Tse, 2005 (Journal of Marketing)	- Firm Performance *4 items(Slater& Narver, 1994)* - Product Performance *2 items(Gatignon & Xuereb, 1997)*	Relative to major competitors: -Sales growth -ROI -Profit level -Product quality -Value to customers
Li, 2005 (Journal of Marketing)	- Firm Performance *1 item (Law, Tse &Zhou,2005)*	-Log(income)/firm size (where firm size = # of employees)
Salavou, 2005 (Journal of Marketing Management)	<u>Product Innovativeness Performance</u> - Product newness to customers *4 items (Atuahene-Gima, 1995)* - New Product Uniqueness *6 items(Cooper, 1979)*	-degree of change in customer behaviors -efforts to adopt new products -new products qualities & characteristics in comparison with competitors' similar products
Jeong, Pae & Zhou 2006 (Industrial Marketing Management)	- New Product Performance *4 items (drawn from literature)*	Comparing new product performance satisfaction over 3 years period: - Consumer acceptance -Technical product performance -Profitability: contribution of new products to overall profit margin & attaining profitability goals
Bulut, 2007 (Unpublished PhD DİssertatIon)	<u>Firm Performance</u> (Denison, 2000; Yılmaz, Alpkan & Ergün, 2005) - Financial Performance *3 items* - Marketing Performance 8 items - Qualitative Performance 3 items <u>Innovative Performance</u> 6 items (Antoncic & Hisrich, 2001; Neely & Hii, 1998; Hagedoorn & Cloodt, 2003)	-Profitability Customer satisfaction, loyalty & communication; total sales, market share, cost and pricing strategies -Employee quality, commitment and satisfaction -new product performance related questions
Gao, Zhou & Yim, 2007 (International Journal of Research in Marketing)	<u>Business Performance</u> - Profitability *2 items (Slater & Narver, 1994)* - Sales Growth 2 items (Gatignon&Xuereb, 1997) - Product Performance 2 items (Gatignon&Xuereb, 1997)	-ROI, profit level -judgemental measure for sales growth in the past 2 and 5 years -product quality, new product introduction pace, value to customers relative to major competitors, brand building

Akman, Ozkan & Eris, 2008 (Istanbul Ticaret Universitesi, FBE Dergisi-in Turkish)	- Firm Performance 2 items (source was not mentioned)	-increase in profitability -increase in market share -sales -product quality
Hakala & Kohtamaki, 2010 (Journal of Enterprising Culture)	- Company Performance 3 items (Gibson & Birkinsha, 2004; Wolff & Pett, 2006)	benchmarking the respondent firm against competitors based on: -profitability -growth -owners' overall satisfaction with the company performance
Zhou & Li, 2010 (Journal of Business Research)	- No performance criteria	
Urban, 2010 (Journal of Human Research Management)	- No performance criteria	
Urban & Barreria, 2010 (International Journal of Innovation and Technology Management)	- No performance criteria	
Hortinha, Lages & Lages 2011 (Journal of International Marketing)	- Export Performance 3 items (Zou, Taylor & Osland, 1998)	Perceived performance based on: -profit -sales -sales growth
Spanjol, Qualls & Rosa, 2011 (Journal of Product Innovation Management)	<u>New Product Ideation</u> (Moorman, 1995) - Novelty 2 items - Volume 3 items	-exact number of new product ideas generated during the preceding calendar year -number of new ideas rather than specific launched ideas
Hakala & Kohtamaki, 2011 (International journal of Entrepreneurial Behavior and Research)	- Company Performance 3 items (Gibson & Birkinsha, 2004; Wolff & Pett, 2006)	benchmarking the respondent firm against competitors based on: -profitability -growth -owners' overall satisfaction with the company performance
Saninio, Ritala & Hurmelinna-Laukkanen, 2012 (Technovation)	- Innovative Performance 8 items (Source was not mentioned)	-technological radicalness - business model radicalness -market radicalness
Rajala & Westerlund, 2012 (45th Hawaii International Conference on System Science)	<u>Firm Performance</u> - Market performance 3 items (Lucas et al, 1988; Park, Chen & Gallagher, 2002) - Financial performance 2 items (source was not specified)	-market share, changes the firm has induced in the market & growth relative to competitors during the last 3 years -profitability and product&service sales during the last 3 years
Yang, Wang, Zhu & Wu, 2012 (Journal of Product Innovation Management)	- Product innovation performance 4 items (Wei & Morgan, 2004)	-overall product success -new product's profit to firm -product's sustainability in the market -customers' satisfaction with the new product
Sürer & Mutlu, 2012 (IUYD-in Turkish)	- Export performance 5 items (Navarro et al, 2010)	Perception based; indicators were not specified

A summary table of current literature on technology orientation and performance relation was also provided in Table 2. As can be seen from this table, there were only three studies out of 19 technology orientation studies did not investigate the performance relation. As indicated in Table 2, previous studies that focused on the relation between technology orientation and performance, preferred new product performance as the performance criteria in the literature in the first place. However, in some studies that published during 1997-2007, it was called as "innovative performance", in some studies, "product innovativeness performance", in some "new product performance". After 2007, the need for differentiating new product performance and innovative performance was started as can be seen in Table 2. Other than new product performance, financial performance and market performance criteria were in the consideration with a general title of "firm performance", "business performance" or "company performance" from 1997 to up to date. In those studies except one, it is salient that, by including one or two indicators from financial or market related area, a general performance criteria for a firm was in the consideration. One more performance criteria, "export performance" was started to catch attentions by 2011. In the following section, which performance indicators were chosen in this dissertation was discussed in detail.

2.2. Construct Proposal of Firm Performance

Referring to the section 2.1 where a summary of current literature on technology orientation and performance relation presented in Table 2, this dissertation included business performance and innovative performance criteria. This dissertation contributed to the current literature in a couple of ways regarding to firm performance.

First, a multidimensional innovative performance scale was used. An innovation is defined by OECD-EUROSTAT-TUBITAK (2005), which is a translation of OECD-EUROSTAT Oslo Manual, as the actualization of new or significantly improved product, service, process; a new marketing or organizational technique that utilize in in-house operations and/or external networks. It is also emphasized that other than the increased and vital importance of R&D, not all innovations are R&D based. Therefore, in addition to R&D requirements, an

organizational structure consists of highly qualified employees, interactions between public and private sector stakeholders, learning and applying what is already learned were also emphasized in the same report of OECD. Four innovation categories are determined in the report: product innovation, process innovation, marketing innovation and organizational innovation. In addition, Wang and Ahmed (2004)'s comprehensive study summarized that five general innovation categories all of which were not mentioned in one study before. Therefore, they developed an attitude scale for innovativeness in their study including product, process, marketing, behavioral and strategic innovations. One of the contributions of this dissertation to the literature was to convert and adapt Wang and Ahmed (2004)'s attitude scale for innovativeness to a firm level innovative performance scale. Thus, innovative performance was examined on the bases of product, process, marketing, behavioral and strategic innovation dimensions in the study.

Secondly, in addition to typical business performance criteria like ROA, profitability and market share, several other criteria both quantitative or qualitative containing several functions of a firm were included in the scale. For instance in addition to financial performance, manufacturing related items like quality, cost, speed, flexibility; market related items such as the importance given to customer satisfaction, the ratio of gaining new customers and marketing related items like the effects of promotion activities to sales/profitability, the effects of investments on sales teams on total sales. Therefore, performance criteria tried to be enlarged aiming to reach to a more detailed results. In this way, as one of the expected contribution of this dissertation, a comprehensive and detailed analysis may be provided by using well differentiating and dimensionalized performance criteria.

There is one more classification according to source of collecting data: primary and secondary (Venkatraman & Ramanujan, 1986). Both types of method of collecting data have their difficulties. However, considering difficulties of reaching secondary data especially for financial measures, it is decided to get perceptions of participants for all performance indicators. In sum, multidimensional performance criteria (both innovative performance and business performance) which based on perceptions of participants included to the research model. A detailed summary of

which items were selected to measure which performance indicators was also displayed in Figure 2 as well as listed in Appendix- A and Appendix-B.

2.3. Multidimensional Construct Proposal of Technology Orientation

Each firm in an industry has its own strengths and weaknesses. In order to distinguish their firm from the others, every firm needs to identify what they are, what they have, what opportunities they have faced with and how they can leap at the opportunities. Therefore, the disciplines of strategic management and strategic marketing management mainly address this issue and question why some firms perform better than their rivals in the same industry. In the field, there are just a few approaches to explain performance differences among firms. This dissertation constructed on two of the main approaches in the field. One of them is organizational learning theory and the other is resource-based view (RBV) of the firm.

Four-dimensional construct of technology orientation was proposed in this dissertation. Two of the dimensions, learning and unlearning, were based on organizational learning theory. Remaining two dimensions, namely top management capability and technological capability were based on RBV theory of the firm along with multidimensional construct of technology orientation itself.

Organizational learning is a complicated concept which refers to new knowledge development (Huber, 1991). Argyris and Schön (1978) proposed three types of learning: single-loop, double-loop and a mix of single- and double-loops. Single-loop emphasizes the detection and correction of errors in an incremental manner (Mohanty & Kar, 2012) and explained as *thermostat-like adjustments* (Steensma, 1996). Double-loop learning is related to modifying an organization's underlying norms, routines and procedures, thus require unlearning what was considered true previously (Steensma, 1996; Chiva, Grandino & Alegre, 2010). In order to actualize learning as a continuous process, previously held beliefs should be given up when necessary. Organizational culture is considered as a template of commonly shared assumptions in the process of coping with the firm's problems concerning external adaptation and internal integration (Schein, 2009: p.27). During the survival process, these commonly invented or developed guidelines are learned

by employees including new comers and change behaviors (Skerlavaj, Song & Lee, 2010). Therefore, as a culture-based orientation, technology orientation is expected to consist of learning and unlearning as dimensions of technology orientation to strengthen a firm's culture as well as providing sustainable competitiveness.

According to RBV of the firm, firms carried out heterogeneous characteristics that drive performance differences among them depending on their internal strengths which are resources and capabilities (Teece, Pisano & Shuen, 1997; Acar & Zehir, 2010). Therefore, only when necessary resources and capabilities are deployed in a proper way, a firm may reach out the expected and differentiated performance outcomes (Sok & O'Cass, 2011).

Capabilities are the organizational abilities to deploy the firm's current resources as well as to develop new capabilities (Henderson & Cockburn, 1994). Celuch, Kasouf and Peruvemba (2002), Acar and Zehir (2008) and Acar and Zehir (2010) studied organizational/business capabilities in details. In those studies, two of the mentioned business capabilities were top management capability and technological capability. In this dissertation, top management capability and technological capability were proposed as two of the dimensions of technology orientation and discussed mainly based on definitions of those three studies. Therefore, in line with those studies, top management capability included leadership, vision and mission in this dissertation. Technological capability included physical materials and R&D capabilities as to those studies. In addition to that, in this dissertation technological capability also considered to include practical and theoretical know-how, methods, procedures, experiences and physical devices and equipments as mentioned in Wang et al.'s (2006) study which specifically focused on the relation between technological capability and firm performance.

Capabilities are also defined as "*complex bundles of skills and collective learning, exercised through organizational processes that ensure superior coordination of functional activities*" (Day, 1994). In his capability definition, Day (1994) especially highlighted the points such as collective learning, bundle of skills, coordination of functional activities and embedded routines in organizational

processes. Capabilities make use of their assets and orientate firms to develop more capabilities through management tasks.

Technology orientation as a strategic orientation is a *culture-based, firm-specific and consisting of complex capabilities* that fitting with RBV of the firm (Day, 1994; Zhou, Yim & Tse, 2005). Built upon RBV of the firm (Wernerfelt, 1984; Barney, 1991), a corporate/business level culture-based strategic orientation which composed of hard to imitate, hard to substitute, rare and valuable capabilities may provide competitiveness and superior performance as expected from a strategic orientation.

Technology orientation studies mostly investigated technology orientation as a driver of new product innovation (e.g. Zhou, Yim & Tse, 2005; Salavou, 2005). Put it differently, technology orientation was basically acknowledged as a main component of technological innovations and way of creating unique products. In this view, technology orientation mostly associated with a functional level strategy and specifically perceived with production. In line with the idea, Roberts (1987) discussed that instead of focusing at functional level as in R&D and/or manufacturing, technology strategy should be discussed at corporate or business unit level (as in Berry & Taggart, 1998). Technology component of a business strategy was discussed to include a firm's technological resources, types of R&D programs, R&D investments, internally developed or externally adopted technologies and organizational policies for development and use of technology (Zahra & Covin, 1993). Kantrow (1980) also implied that, a technology-based innovative success could only be a result of a good interrelated communication, top management support, an effective resource allocation and a fit between technology and market. Lindman (2000) ascertained that technology orientation is more than organizing R&D operations through technological innovation or in other words to catch a "commercial opportunity". Indeed, it is the strategic use of technology; what makes some firms more competitive/successful than others which indicate that why some firms better at employing their abilities to take advantage of any new technological options (Morone, 1989). Therefore, know-how, technical skills, the vision and mission of a firm, leader's perspective and perceptions, fast adaptation to new technology advancements, being flexible and being ready to give up what is in use

and all such firm specific resources and capabilities are needed to be considered with technology orientation. In the current literature, strategic management stream discuss the concept as "strategic use of technology/technology strategy/technology management" where strategic marketing management stream discuss technology orientation as culture-based behavior at functional level. However, when considering the impact of technology and its increasing importance on firm performances a mix of both streams seems to be more favorable and complementary to a better performance. Thus, as opposed to its common single-dimension construct consideration of empirical current literature, technology orientation may need to be taken into account in a multi-dimensional construct. In other words, a cultural based corporate/business level technology strategy which is called technology orientation is most probably required more than a strong R&D and high-technology background.

In sum, considering all the facts, this dissertation proposed that technology orientation needs to be studied at firm and/or business unit level in a multidimensional construct rather than a single dimensional construct. Considering Day's (1994) capabilities definition, technology orientation could be seen as a complex combination of capabilities that are glued with learning and unlearning to put together all the assets of a firm and enable to deploy them in an efficient and effective way. Taking one step further from the current literature, this dissertation proposed technology orientation in a multidimensional construct. Those proposed dimensions which are top management capability, technological capability, learning and unlearning were explained in details in the following sub-sections. In the previous studies, none of these four proposed dimensions were considered as the dimensions of technology orientation. Moreover, these four dimensions mostly discussed as separate concepts in separate studies. Therefore, the explanations of these proposed dimensions in the following section were a mix of several studies where most of them discussed the individual concepts separately.

2.3.1. Top management capability

A strategic orientation is expected to be in the context of the general corporate strategies as well reflecting the firm culture. Thus, a technology oriented firm is needed to be in line with the mission and vision of the firm. Therefore,

according to the strategic direction, top management should decide on whether to develop technology internally or acquired from the outside; in what extent to invest on R&D; to compete or to cooperate with the rivals; which alternative way is the best for the firm now and for future (Morone, 1989). Moreover, assuring the firm's operations are executed with up-to-date technologies and deciding on R&D investment amounts and directions, considering possible future projections are also management's responsibility (Antoniou & Ansoff, 2004).

One of top management roles is to identify and select all the key resources and then to transform them into capabilities. As a reflection of corporate leadership, management skills may be configured as management capabilities which composed of especially leadership, vision and planning (Celuch, Kasouf & Peruvemba, 2002; Acar & Zehir, 2009).

The main source of being competitive is tied to top managements' capability of combining other organizational capabilities and skills to adapt to fast changing environment rapidly (Prahalad & Hamel, 1990). Moreover, technically trained managers and/or managers that interact with technical/technological operations extensively are more likely to integrate technology into strategic decision-making (Morone, 1989). Managers make difference in how they see the environment, evaluate the alternatives, the decisions they made. In terms of new product development perspective, because no innovation can be created in a vacuum, top management support and resource commitment have utmost importance (Jeong, Pae & Zhou, 2006). Prahalad and Hamel (1990) argued that one of the core capabilities of a firm is management's ability to consolidate companywide technologies, skills and other resources into competencies and capabilities to adapt quickly to changing opportunities.

Managers apply their skills in deploying other firm resources or capabilities. Therefore, the difference in top management capability among firms is one of the key capabilities that leads to competitive advantage (Thompson & Heron, 2005). Capabilities make use of their assets and lead to develop more capabilities throughout the firm by the way of management tasks (Day, 1994). RBV of the firm further claim that managerial strategies are needed in order to develop new

capabilities enhance current ones, skill development, management of know-how, making the learning a fundamental issue and accumulation of intangible assets (Teece, Pisano & Shuen, 1997). Therefore, management capability plays a crucial role in bundling of entire resources and capabilities (Thompson & Heron, 2005).

Top management is responsible for strategic direction and shaping the operations of the firm (Antoniou & Ansoff, 2004; Lau, Yiu, Yeung & Lu, 2008). Top management need to consider which strategic orientation fit best with the firm culture; what if there is a need to change or modify strategic orientation. Even constructing a technology orientation is not enough. Management then needs to consider whether to be to pioneer or the follower in the market and/or to produce technology internally or to acquire from the outside according to the firm's overall strategy (Morone, 1989). Therefore, management executes several strategic roles such as determining the strategic way of the firm; constructing and/or sustaining and/or transforming organizational culture; effective resource allocation; combining appropriate resources and capabilities and direct them to organizational aims; making important decisions. In this regard, top management expected to be good at leadership, planning, communicating with all the stakeholders, scanning and interpreting external environment. They need to share the mission and vision of the firm and be competent on the core technical competencies of the firm. In line with several studies (e.g. Celuch, Kasouf & Peruvemba, 2002; Acar & Zehir, 2008; 2009; 2010), this dissertation proposed that top management capability is one of the key sources of a firm competitiveness.

2.3.2. Technological capability

Technology is proposed as a firm's most essential core capability (Itami & Numagami, 1992). Technology resources are in the center of competitive advantage because specific technology resource combinations provide hard to imitate and unique positions (Voudouris, Lioukas, Iatrelli & Caloghirou, 2012). Voudouris et al.'s (2012) study pronounces these "specific technology resource combinations" as technological capability.

Technological capability is *"a set of pieces of knowledge that includes both practical and theoretical know-how, methods, procedures, experience and physical devices and equipment."* This capability is closely associated with product, design, process and information technologies (Wang, Lo, Zhang & Xue, 2006). Panda and Ramanathan (1996) defined technological capability as "*a set of functional abilities, reflected in the firm's performance through various technological activities and whose ultimate purpose is firm level value management by developing difficult-to-copy organizational abilities."*

Technological capability is defined as the knowledge and skills that are necessary tools for firms to choose, install, operate, maintain, adapt, improve and develop technologies. The strength of technological capability depends on how effective the components of the capability have been bundled. Therefore, the components, namely R&D commitments and expenditures, technical skills of personnel and how to improve these skills especially by trainings in order to increase technological capability endowments are seemed to strengthen this capability (Madanmohan, Kumar & Kumar, 2004).

Tsai (2004) summarized the core components of technological capability based on definitions in the literature: development, absorption and application of technical skills generated from the technological knowledge of scientific research. Hao and Yu (2011) denoted that the basic components of technological capability are R&D resources, highly qualified personnel, a corporate culture supporting learning and creativity. Technology dimension of a firm acquired to be discussed in several topics such as firm's technological resources, types and organization of R&D programs, R&D spending, sources of technology both internally and externally (Zahra & Covin, 1993).

Firms that aim to reach competitiveness by technology-based product innovation should have a strong technological capability (Li, 2005; Hakala & Kohtamai, 2010). A firm's technical skills, R&D resources and technological base are also seen to be the crucial factors that bring competitiveness through innovations (Jeong, Pae & Zhou, 2006). Furthermore, they also considered to improve their

technological capability continuously in order to offer new and advance products to market, hence to customers (Gao, Zhou & Yim, 2007).

Several studies (e.g. Celuch, Kasouf & Peruvemba, 2002; Tsai, 2004; Song, Droge, Hanvanich & Calantone, 2005; Acar and Zehir; 2009; Acar & Zehir, 2010) handled technological capability similar to production capabilities where they include product/service processing, R&D resources, product quality and after sales services into the definition of the concept. This view especially overlaps with the perceptions where technology orientation is associated with new product development and production processes. Thus, considering the general tendency in the literature, most studies handle technological capability in functional level. In a similar vein, Song, Nason, Anthony and Benedetto (2008) emphasized that technological capability enables an organization to improve production processes while reducing costs. They highlighted that technological capability involves manufacturing processes, new product development, production facilities and forecasting of technological change in the corresponding industry.

A technology-oriented firm has an ability to match internal technological capability such as scientific expertise and/or internal communication with external technological opportunities like intelligence gathering and/or technological scanning which in the end likely to provide competitive advantage (Yang, Wang, Zhu & Wu, 2012). At least firms that use technology strategically must have the capacity to develop or identify technology-based opportunities for dealing with the environment in a way to realize their strategic vision (Morone, 1989). Therefore, in order to be stay competitive, technological capability is needed to be considered as one of the dimensions of technology orientation.

2.3.3. Learning

The fields of strategic management and strategic marketing management consider organizational learning as one of the principle sources of competitive advantage and organizational performance (Jimenez-Jimenez & Sanz-Valle, 2011). *Organizational learning is defined as a process of creation, acquisition and integration of knowledge aimed at the development of resources and capabilities that*

contribute to better organizational performance (Lopez, Peon & Ordas, 2005). Learning in organizational level is an organizational ability that provide insight and understanding from experience through experimentation, observation, analysis and a willingness to examine both successes and failures; then responding to that learning (Mohanty & Kar, 2012). The ability to learn faster than the competitors is believed to bring competitive advantage (De Geus, 1988:71 as cited in Lopez, Peon & Ordas, 2005).

In contrast to physical resources/assets, capabilities do not deteriorate as they applied and shared; instead, they grow (Prahalad & Hamel, 1990). Learning is the mechanism that makes resources turn into valuable, rare, inimitable and nonsubstitutable capabilities by experiences and repetition. During this process, experience and converting every bit of information to the permanent corporate knowledge was highlighted (Acar & Zehir, 2009). Organizational learning mostly discussed as a combination of four processes. These are knowledge acquisition through external and internal sources, information distribution among members, information interpretation in order to achieve a common understanding and organizational memory which aims to store accumulated knowledge in order to use when necessary (Huber, 1991; Lopez, Peon & Ordas, 2005; Skerlavaj, Stemberger, Skrinjar & Dimovski, 2007; Acar & Zehir, 2009).

Because information need to be converted into knowledge throughout the organizations, organizational learning need to be considered in all strategic orientations including technology-orientation (Hortinha, Lages & Lages, 2011). In many studies (e.g. Chidamber & Kon, 1993; Day, 1998; Hortinha, Lages & Lages, 2011), technology-related/strong R&D based innovations are considered ignoring customer expectations; rather there is misconnection between R&D personnel and market demand. In a technology-oriented firm, it is not necessarily the case. On the other hand, leading customers may also be risky. Thus, continuous learning and refining judgments would provide more expected outcomes (Day, 1998). In a competitive environment gathering information from the inside of the organization along with outside of industry would probably provide a clear and broad perspective to where and how to employ technology-based infrastructure.

Technological learning is mentioned as a cumulative process which can be formed over time, very specific to each firm because of the embeddedness to a specific culture, and collective in sense that involves shared beliefs (Zhao & Arvanitis, 2010; Li, 2012).

Learning related activities in an organization was characterized as diagnosing staff training needs, analyzing a firm's ineffective operations and activities, communicating and sharing lessons learnt from past experiences throughout the organization and learning new and relevant knowledge (Sok & O'Cass, 2011).

Because of resource constraints, some firms may need to prioritize their market intelligence activities. However, even in the case of bounded resources, it does not necessarily mean that technology-oriented firms do not learn from markets/customers (Spanjol, Qualls & Rosa, 2011). Even if they do not allocate some resources to market intelligence, they eventually learn from their customers by introducing new products from new product development perspective based on their experiences (Cyerth & March, 1963). They get feedbacks about the new products; failure or success of these newly introduced technologically superior products in the eyes of customers; what improvements they need to do in order to be successful next time, and etc. From the perspective of searching technological opportunities for instance deciding to merge with another high-tech company, again a market research which consists of a learning activity consisted is needed. A technology oriented firm may stay competitive not only introducing new technologies/technology-based products but also imitate a first-mover's introduced technology/product. Thus, learning component of technology orientation may also bring one more advantage to a firm by the way of learning, specifically market research and/or competitor scanning.

Picking up a strategic orientation obviously will not lead to a higher performance; instead exceedingly implanted a value and belief system needs to be constructed throughout the organization (Zhou, Yim & Tse, 2005). They claimed that dissemination and acceptance of such a strong belief system could be a result of effective tool namely organizational learning. Therefore, in this dissertation learning was proposed as one of the dimensions of technology orientation.

2.3.4. Unlearning

Unlearning is removing something intentionally which is well established in an organization's memory, routines and beliefs. This process is seemed to be a precondition for learning something new. Thus, leaving behind accustomed practices/strategies which are blocking the new ways of learning is also considered as organizational competitiveness (Holan, Philips & Lawrence, 2004; Cegarra-Navarro & Moya, 2005).

Unlearning is a fundamental process that facilitates new learning. Unlearning (a) is concerned with removing/discarding knowledge, (b) can have subjective value attached to it such as irrelevant, obsolete etc., and (c) can either be an end by itself or act as a means to an end: learning or change (Srithika & Bhattacharyya, 2009).

Unlearning is removing old routines and procedures if necessary to make room for new ones if there is any. Therefore, learning and unlearning are closely linked with each other. However, unlearning is an intentional process where learning can also be serendipitously. Moreover, they may occur at the same time or as in new firms, unlearning may not be necessary because of unsettled current routines and beliefs (Tsang & Zahra, 2008).

Unlearning has three dimensions: cognitive- to receive new knowledge, behavioral – the changes in routines, and normative- removing all discarded routines from organizational memory (Yıldız & Fey, 2010). Unlearning incorporates both cognitive and behavioral dimensions by Tsang and Zahra (2008). "As much as change is about adapting the new, it is about detaching from the old" (Burt, 1890 as cited in Yıldız & Fey, 2010). Therefore, in order to utilize unlearning commitment to learning and commitment to change may seem to be required. In a similar manner, this dissertation handled unlearning in a two-dimensional construct which consists of attitudinal and behavioral components.

It is managers' job to move quickly to break the established routines and provide a venue to create a more suitable reestablished working environment in line

with the new strategic requirements. Especially innovative firms expected to be good at unlearning (Holan, Philips & Lawrence, 2004).

The operationalization of unlearning involves the attitude aspect in which a process is followed by an outcome (Akgun, Lynn & Byrne, 2006). Unlearning involves the combination of the changes in beliefs and routines, and these two components of unlearning must exist in tandem for unlearning to occur (Akgun & Lynn, 2003). Therefore, unlearning was proposed as a dimension of technology orientation in this dissertation.

2.4. Research Hypotheses and Model

Recalling the definition of technology orientation in this dissertation, the concept highlighted either externally generated or internally developed technologies and introducing these technologies in all functions throughout the organization. In order to be competitive and to make above average returns, an organization requires a wide range of capabilities (Song, Nason, Anthony & Benedetto, 2008). However, prioritization and a right combination of capabilities which are parallel to strategic direction can provide sustainable competitive position.

Primary strategy determines the characteristics of distinctive capabilities that a firm needs to build, combine and develop in order to stay competitive (Weerawardena, O'Cass & Julian, 2006). Therefore, a combination of capabilities and skills were decided to consider as the dimensions of a technology orientation. In this direction, top management capability, technological capability, learning and unlearning were proposed as the dimensions of such a culture-based primary strategy. These capabilities and skills are indeed interconnected with each other.

Any strategic orientation is shaped by top manager cognitions which may be listed as current operations and performance, perceived resource combinations and future projections of the industry, and actual organizational resources (Lau, Yiu, Yeung & Lu, 2008). In the context of corporate strategy and choice of orientation, management make decisions on which is best suited. This choice guides a firm accumulation and deployment of technological resources and capabilities (Zahra,

1996a; Zahra, 1996b). In their decisions making processes, managers are highly keen on relevant and a wide range of information. Management information system (MIS) provides a wide variety of information to equipped managers with the applications such as decision support systems, enterprise resource planning (ERP), customer relationship management (CRM) (Demir & Gümüşoğlu, 2009: 75-86). Technological capability is expressed as a knowledge-based capability, which is embodied in skills and build upon experiences, organizational systems and prior learning (Figueiredo, 2008; Haeussler, Patzelt & Zahra, 2012). Frohman (1982) ascertained that only investing on R&D merely contribute to competitive position of a firm by the way of technology exploitation. In addition to R&D investment, a top management who has required knowledge on job and technical background, good at selecting and supporting technology in the operations and reinforces systems and structures of the firm by vision most likely work out.

In contrast to some kind of resources, capabilities cannot easily be transferred to other firms, bought or imitated. Firms mostly developed those capabilities through organizational routines that are commonly shared and which involves the development, collection and exchange of information (Killen, Hunt & Kleinschmidt, 2008). Learning is considered as a catalyst. The firms which purposefully and consciously integrate learning in utilizing their traditional resources and capabilities, they can create more valuable outputs in comparison with their competitors (Süral-Özer, Özmen & Saatçioğlu, 2004). Paladino (2007) and Acar and Zehir (2009) argued that repetition and putting what is learned into the routine procedures make permanent organizational information which indeed turned resources into capabilities. However, besides utilizing learning throughout the organization, firms need to question their current routines, procedures and processes in order to cope with changing requirements (Sok & O'Cass, 2011). Therefore, firms need to utilize unlearning processes, besides learning.

Indicators of a superior technological capability were distinguished as increase in investment willingness of investors' and increased number and quality of innovations in the firm (Renko, Carsrud & Brannback, 2009). As to the findings, investment on technology has a positive effect on firm performance (Zahra, 1996a; Zahra, 1996b; Wang, Lo, Zhang & Xue, 2006; Garcia-Muina & Navas-Lopez, 2007;

Renko, Carsrud & Brannback, 2009). In addition, “the speed” which comes with technology-based applications throughout the firm also leads a firm to a higher performance level. Those leaps with speed can be a result of production techniques (for e.g. CNC), improved efficiency by the way of management techniques (for e.g. ERP, CAD and CAM), efficiently coordinated production, R&D and market relations in order to enter a market earlier than the major competitors (Demir & Gümüşoğlu, 2009). As shown, technological capabilities, by leading above average performance, to be the one of the key elements, thus provide competitive advantage in a market.

In addition to underpinning efficiently combine and use of resources and developing necessary capabilities, learning also help provide cost reductions, improved productivity and faster recognition of market needs and/or opportunities (Sok & O’Cass, 2011). Lau et al. (2008) indicated that the role of top management in evaluating the environment in the learning process and make decisions on strategic directions and employing necessary resources in that direction have effects on firm performance. Goh, Elliott and Quon (2012) conducted a meta-analytic examination on the relation between learning capability and firm performance. Several empirical studies investigated the relation between organizational learning and firm performance (Lopez, Peon & Ordas, 2005; Jimenez-Jimenez & Sanz-Valle, 2011). The findings indicate that there is a positive relationship between learning capability and firm performance. Moreover, there is a stronger relation between learning and non-financial performance indicators than financial performance indicators. Past performance was also found to be related with technology orientation while considering past performance as a way of learning. Firms with higher performance were perceived as more ready to make more investment on R&D and sophisticated technologies. In addition, by the way of learning from experiences and positive impressions of experiences also made executives more supportive in their decisions about technology investment (Hortinha, Lages & Lages, 2011). There was not any empirical study on organizational level unlearning and its effect on firm performance. However, considering an organization’s need to shed old beliefs, structures and procedures at times of learning new ones (Akgun, Lynn & Byrne, 2006), unlearning as a complementary dimension to learning was expected to have a considerable effect or impact on firm performance.

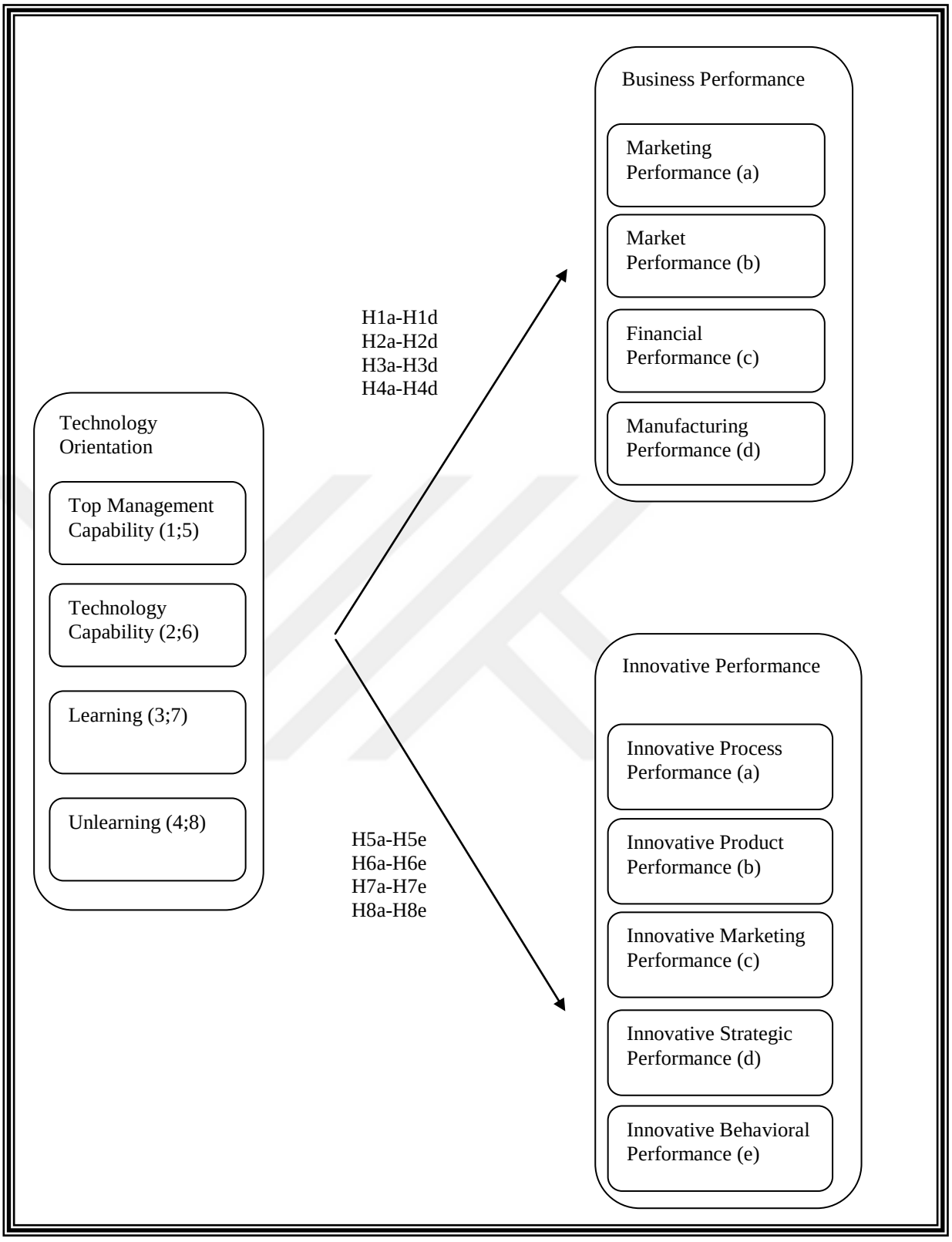

Figure 1. Research Model: Technology Orientation - Business & Innovative Performance Relation

After a comprehensive literature review on strategic orientations, technology orientation, capabilities, learning and firm performance, the research model as illustrated in Figure 1 was developed.

As schematically presented in Figure 1, research hypotheses were stated in Table 3:

Table 3. Research Hypotheses

Hypothesis 1.	*Top Management capability affects;* *(a) marketing performance* *(b) market performance* *(c) financial performance* *(d) manufacturing performance within an organization*
Hypothesis 2.	*Technological capability affects;* *(a) marketing performance* *(b) market performance* *(c) financial performance* *(d) manufacturing performance within an organization*
Hypothesis 3.	*Learning affects;* *(a) marketing performance* *(b) market performance* *(c) financial performance* *(d) manufacturing performance within an organization*
Hypothesis 4.	*Unlearning affects;* *(a) marketing performance* *(b) market performance* *(c) financial performance* *(d) manufacturing performance within an organization*
Hypothesis 5.	*Top management capability affects;* *(a) process innovative performance* *(b) product innovative performance* *(c) marketing innovative performance* *(d) strategic innovative performance* *(e) behavioral innovative performance within an organization*
Hypothesis 6.	*Technological capability affects;* *(a) process innovative performance* *(b) product innovative performance* *(c) marketing innovative performance* *(d) strategic innovative performance* *(e) behavioral innovative performance within an organization*
Hypothesis 7.	*Learning affects;* *(a) process innovative performance* *(b) product innovative performance* *(c) marketing innovative performance* *(d) strategic innovative performance* *(e) behavioral innovative performance within an organization*
Hypothesis 8.	*Unlearning affects;* *(a) process innovative performance* *(b) product innovative performance* *(c) marketing innovative performance* *(d) strategic innovative performance* *(e) behavioral innovative performance within an organization*

3. METHODOLOGY

This section outlined the methodology of this dissertation. In this section research design, questionnaire development, data collection, sampling procedure and sample characteristics were discussed in details.

3.1. Research Design

This dissertation was progressed in three phases. Exploratory research was conducted in the first phase of the study. A comprehensive literature review on the concept “technology orientation” was done. The basic research questions were reached based on this through literature review:

- “Is technology orientation really a single dimensional construct?”
- “If it is a culture-based strategic orientation as mentioned in the current literature, then why does technology orientation only discussed in functional level instead of firm level?”
- “As a firm-level and a culture based orientation why technology orientation is not be discussed individually and combined with other strategic orientation in all empirical studies?”
- “As a firm level culture based orientation, has technology orientation direct effects on firm performance?”

Then, the second phase, descriptive research stage came to surface. In this stage of the study, how many studies concerned with technology orientation, what were the aims of this studies, what were the research questions in request, what were the findings were all summarized. According to the general picture had been reached in mind, the research model was constructed. Therefore, a descriptive research has been conducted to find out if a multi-dimensional construct for technology orientation can be reached. In this phase, a pilot study was conducted to decide on to continue and further the study.

Based on pilot study analysis, one-step further descriptive analysis was conducted to support pilot study findings and a causal research between technology orientation dimensions and selected performance criteria was conducted.

3.2. Methodology for Pilot Study

Field study was conducted in two stages: a pilot study and a final study. In order to reach applicable, valid and reliable instruments for the final field study questionnaire, a pilot study was conducted. Therefore, following parts -scale development, instruments, questionnaire development, data collection and sampling- although very similar, described pilot study stages.

3.2.1. Scale Development

In order to collect primary data, a survey method was preferred. There were a couple of reasons to choose this method of data collection. The most important reason to prefer primary data was not having any stored secondary data on the subject in request. Although some performance criteria such as financial or market share measures could be provided, firms in general are uncomfortable to share such data with third parties due to tax or competitiveness issues. The other reason behind choosing the survey method was, the time and budget constraints as well as to increase the number of participants. Therefore, to reach a valid and reliable measuring instrument and a well-constructed questionnaire were utmost important.

In this dissertation, agreement and quality types of scales were selected where in both, five point Likert type scaling was used. In agreement type, as being the most commonly used format of “1.Strongly Disagree, 2. Disagree, 3. Neither Disagree Nor Agree, 4. Agree, 5.Strongly Agree” was used to measure in what extend the survey respondents agree or disagree with a statement in the questionnaire. Quality scales were used to determine the performance perceptions of survey respondents. In quality type, five point Likert type scaling was used with the format of “1. Much Below Average, 2. Below Average, 3. Average, 4. Above Average, 5. Much Above Average” comparing the firm’s situation with competitors’ in the last three years. In addition, nominal scales in order to collect nominal and categorical data like

demographics of participants and their firms were also used. All likert type scales were composed of close-ended questions in order to decrease the completion time of questionnaire and not to lead participant to skip some of the questions.

For the scales which were adapted, equivalences of vocabulary, idioms, grammar and syntax, and concept were kept in mind in scale development process (Sekaran, 1983: 62; Bulut, 2007; Brymen & Bell, 2011: 247-266). Thus, adapted scales were constructed by using translation and back translation method, considering Turkish social culture as suggested in the literature (such as Ronen and Shenkar, 1985). First, all English to Turkish translations were done by a bilingual Turkish native. After reviewing the original and the translated questions by a group of people, who are competent in both English and the field of study, the questionnaire was translated back into the source questionnaire language. These two questionnaire versions in the source language were compared for differences or comparability. Back-translated text with minor adjustments was 'like' the original source questionnaire, so the translated text is considered to be the final version of the survey.

In this dissertation, renewed scales took place where major changes/revisions were done according to research necessities. These scales can also be categorized. Technology orientation scale was proposed in a multidimensional construct where formerly used in a single dimensional structure, however; sub-dimensions were mostly adopted from current literature. Unlearning scale was formerly used to measure at the level of team based perceptions. In this dissertation, this scale was revised to measure the variable in firm level instead of a group level. Innovative performance scale was adapted to measure performance where formerly used to measure perceptions of innovativeness. In addition, this adapted innovative performance scale was became the first multidimensional innovative performance scale so far. Thus, after a comprehensive literature review, depending on the conceptual studies definitions and propositions, scale items were (re)constructed. These scales were formed by taking into account of a group of competent academics' opinions from strategic management, entrepreneurship, and innovation management and practitioners' opinions from the industry.

3.2.2. Instruments

In the literature, technology orientation was considered as a single dimensional structure and used as a single dimensional construct as opposed to other strategic orientations such as market orientation and entrepreneurial orientation (e.g. Venkatraman, 1898; Gatignon & Xuereb, 1997; Zhou, Yim & Tse, 2005; Li, 2005; Jeong, Pae & Zhou, 2006). In this dissertation, "technology orientation" has been proposed and considered as a multidimensional structure, which composed of top management capability, technological capability, learning and unlearning.

For top management capability, seven items from Acar & Zehir (2010) and two items from Akgun et al (2011) were adapted. However, Akgun et al's (2011) items were also adapted to firm level from group level. For technological capability, 11 items of the scale of Wang et al (2006) were adapted. In addition, in this dissertation, two items (TC4 and TC13; see Appendix-A) were added in order to provide a better construct. For learning, nine items of Acar & Zehir (2010) and one item of Wong et al (2011) were adapted. In this dissertation, Wong et al's (2011) one item was adapted to firm level from group level and in addition, one more item was added in order to provide a better construct. For unlearning, a new construct was developed considering definitions and propositions of unlearning in the literature and especially Akgun et al's (2007) team-based scale and Cegarra-Navarro, Cepeda-Carrion, G. & Jimenez-Jimenez's (2010) scale.

For innovative performance, the scale of Wang and Ahmed (2004) was adapted where they their scale to measure innovativeness mostly based on OECD-EUROSTAT-TUBITAK (2005) Oslo Manual. In this dissertation, this scale was converted to a performance measurement which was called as scale of "innovative performance". For business performance criteria, the studies of Denison (2000), Yılmaz, Alpkan & Ergun (2005) and Bulut (2007) were utilized. Moreover, performance criteria were proposed to have four dimensions, namely financial performance, marketing performance, market performance and manufacturing performance.

Table 4. Questionnaire Development

Subjects	# of items	References
Top Management Capability	9	Celuch, Kasouf & Peruvemba (2002); Acar & Zehir (2010); Akgun, Keskin, Byrne & Gunsel (2011)
Technological Capability	13	11 items Wang et al. (2006); 2 items were added
Learning	11	Acar & Zehir (2009)
Unlearning	16	Firm-based new construct considering team-based studies of Cegarra-Cegarra-Navarro, Cepeda-Carrion, G. & Jimenez-Jimenez's (2010); Akgun, Byrne, Lynn & Keskin (2007)
Innovative Performance	29	New performance construct based on innovativeness construct of Wang & Ahmed (2004)
Business Performance	9	New performance construct based on Denison (2000); Yılmaz, Alpkan & Ergun (2005); Bulut (2007)

Therefore, all scales -technology orientation, firm performance and innovative performance- were employed with multidimensional factor structure. Table 4 also summarizes the variables and the related sources which were used to construct scales. In total of 96 items were included to the questionnaire, where six of them are related to demographics, two of them are related to firm's profile, 49 of them are related technology orientation, 38 of them are related to performance.

3.2.3. Questionnaire Design

During the questionnaire design, the aspects mentioned in literature were taken into consideration. The questionnaire was designed to attract attention and create a desire to understand the mission of the items and to create a positive attitude towards answering them. A booklet format consisting of four pages in one sheet of paper was chosen to overcome the negative prejudices before answering.

At the right-top of the first page a logo of Yasar University was put to provide trust and also a brief explanation about the content, the intend of the study and its possible scientific contribution were addresses to participants. Respondents were given a guarantee that their answers would not be disclosed and would be used for scientific purposes only. Contact information both including mail address of the institutional and personal e-mail address were also added in order to get any

comments or questions from participants as well as to be informed if any of the participants make a request to be notified about the study outcome.

The questionnaire contained only necessary items that supposed to measure proposed relations and was composed of two main parts. First part intended to measure demographics of participants such as gender, job experience in general and in the current organization and position as well as to measure firm related items such as the age of the firm and the number of employees. In the second part, the questions were designed to test the proposed relations between the dimensions of technology orientation and firm performance. A last question was designed to understand the informational capability of the participant to answer the questions.

Questions were grouped considering the related variables. One reason of this grouping was to provide a reader-friendly form. Common sentence headings were put beforehand which is binding with the all following items at the top line. In this way smaller statements were placed in each line. Thus, questionnaire was seemed shorter and readability was increased. The second reason was to increase response rate. The proposed model is quite complex and is required to include quite many items so as to measure the supposed relations. If the questions were separated randomly through the questionnaire form, it would have made participants confused and made bored quickly and gave up continuing. Thus, as a result, variables were grouped but there were no leading words put to make participants understand what the scales are about. The questionnaires used in the study pilot and final study can be seen in Appendix A and Appendix B.

3.2.4. Sampling and Data Collection

For the pilot study, Yasar University graduate students who are working for a manufacturing firm located in Izmir was included. All graduate students who works for a manufacturing firm located in Izmir were asked for to participate to the study voluntarily. In the end, voluntarily participated 58 graduate students were composed of the pilot study sample. In the pilot study, graduate students were informed about the scope of the study. Their comments were asked about the questionnaire form, clarity of the items, readability, and asked for any comments related to questionnaire

form and questions. Based on their opinions, formerly A-4 paper size printed booklet questionnaire form was decided to print on A-3 paper size as to make it easily read.

3.3. Methodology for Final Study

After pilot study data collection, a series of analysis were utilized in order to understand how valid and reliable the instruments and if they are appropriate to continue to the study. These analyses and findings were presented in “4.1. Pilot Study Analysis” part in details. In this section, in a nutshell, why some changes were needed, what changes has been done in the questionnaire was explained. Then, sampling and data collection procedure during the final study was explained.

3.3.1. Revised Instruments and Questionnaire

Exploratory factor analysis conducted in regards to pilot study data indicated that some of the items were needed to be excluded from the scales. One item (TC3) from technological capability, one item (MC9) from top management capability and one item (ULC5) from unlearning were excluded. The items of “learning”, on the other hand, were decided to exclude from the questionnaire as a whole group regarding to destructive effects on factor structure. However, unlearning divided into two distinct factors which were named commitment to learning and commitment to change based on their contents.

The part where the questions related to demographic characteristics took place was decided to be kept same.

As to the data, some items were assumed to be eliminated for performance criteria. However, taking into consideration of expert opinions, it was decided not to exclude any items from the questionnaire for innovative performance and business performance scales. However, some major revisions made on sentence structures and include extra two items to business performance scale and four items to innovative performance scale.

In the revised questionnaire consist of eight questions for management capability, twelve questions for technological capability, nine questions for commitment to learning, six questions for commitment to change, eighteen questions for business performance and thirty-three questions for innovative performance. In Appendix-B, the reconstructed questionnaire form was also displayed. This revised form was used in the second-step data collection period and the data collected from this second-step were used in final analyses.

3.3.2. Sampling and Data Collection

In the final study, with an aim to investigate the multidimensional construct of technology orientation and the effects of technology orientation on firm performance, manufacturing firms operating in Izmir were decided to focus on. Thus, the population of the study was "manufacturing firms operating in Izmir" where the level of analysis was "individual firms". By this mean, as being the biggest industrial zone in Izmir, Izmir Ataturk Organized Industrial Zone (IAOSB) was selected as the sample. From the website of IAOSB (http://www.iaosb.org.tr/), list of manufacturing firms operating in the industrial zone was downloaded. Considering this list as sample frame, 250 firms out of 364 were randomly selected. As the first step, telephone calls was used to inform contact persons from those firms about scope of the study and to ask for appointments to visit them one by one in order to conduct the self-administered questionnaires. 102 firms were agreed to give appointment. Some of them required an electronic form of the questionnaire. However, during the visits three firms gave up participating to the study where six firms did not return electronically send questionnaire. E-mail and telephone follow-ups were done by the researcher. In the end, 83 firms delivered usable forms.

Number of received forms were considered inadequate considering the planned analyses. Therefore, as a second step it was decided to contact with people from other organized industrial zones and business associations like Aegean Young Businessmen Association (EGIAD). After communicating with concerned people from the mentioned organizations, voluntarily participation requests were internally asked by these contact people. Therefore, calling a kind of snowballing technique for this part of the filed study seemed appropriate. Again, both firm visit and electronic

connections were used simultaneously. In the end of the second field study, 23 firms from Tire Organized Industrial Zone, 28 firms from Kemalpaşa Organized Industrial Zone and additional of 13 firms from IAOSB were also participated.

The goal of the sampling was to reach multiple informants from each firm. The informants requested to work especially for R&D, quality or manufacturing departments in management, specialist or foremen positions. If not possible, than management-level administrative positions were acceptable.

3.3.3. Participant Characteristics

A total of 224 participants from 147 firms took place in the final field study. The average employee working for participant firms were 265 where number of employee ranges from 6 to 1500. The participant firms displayed an average of 30 years operations from the build up where it ranges from one year to 150 years. 46% of 224 participants were women. Participants had an average of 12 years of work experience where they have worked for the current organization for 5,6 years on average. 56% of the participants indicated their position as white-collar worker including R&D specialists in this category, 31% of the were middle-level managers and remaining 13% were either high-level managers or firm owner/partner. 54% of them indicated that they were work for/with R&D department in their organizations where 50% of them work with or in a direct connection with manufacturing department.

4. ANALYSIS AND FINDINGS

In accordance with two-step data collection, data analyses were also occurred in two main steps. First, a pilot study was conducted in order to test validity and reliability of the instruments and to make sure if the instruments were appropriate to further the field study. In this section, first, pilot study analyses results were presented which primarily consists of factor analyses and indications of validity, reliability. Then, final analyses and results were presented in which a revised questionnaire was employed in the second-step field study due to the required changes based on pilot study analyses results. In analyzing data, SPSS 17.0 program was utilized in pilot study analyses where SPSS 17.0 and EQS 6.1 software programs were both utilized in final study analyses.

4.1. Pilot Study Analysis

Pilot study analyses were based on the data collected from voluntarily participated 58 graduate students of Yasar University who are working for different manufacturing firms located in Izmir. Collected data were assessed with SPSS 17.0 software package. Only agreement and quality type scales were in concern.

The questionnaire items were constructed in accordance with the theoretical frame. However, a pilot study was held in order to investigate if they measure what it meant to measure consistently. In other words, a pilot study was conducted to investigate reliability and validity of employed instruments. The questionnaire form of pilot study can be seen on Appendix-A.

Validity refers to the degree to which an instrument truly measures the construct it is supposed to measure. Reliability is the degree to which instruments are free from error and thereby yield consistently accurate measures of the construct of interest (Churchill, 1979). A prerequisite for validity is that of reliability. Cronbach's alpha as being the most popular method for assessing reliability was employed in this dissertation. The generally accepted lower limit for Cronbach’s alpha is .70 (Hair, Black, Babin & Anderson, 2010) denoting the internal consistency of an instrument

although higher values of alpha considered to be a prerequisite for internal consistency are disputable in the literature.

There are many labels for different types of validity. Content validity as being one of the essential validity types is the extent to which items as a group correlate with a construct (Dunn, Seaker & Waller, 1994). Content validity in essence was subjectively tested during the development and adaptation process of previously constructed measures. In this stage, in order to eliminate translation errors based on cultural differences, biased, ambiguous and inappropriate meaning items were required considerable effort and time. Thus, content validity was firstly ensured personally in an intuitive manner. Then, a group of competent academics from business, strategic management and entrepreneurship fields were asked for content validity, whether the measure is appropriate and what if the number of items was adequate.

Construct validity, which composed of unidimensionality, convergent and discriminant validity dimensions, were examined to ensure validity of measures. Unidimensionality is the exclusiveness of items measuring a construct. In other words, unidimensionality signals when loading of a set of items significantly to a single factor. Convergent validity is loading of multiple independent items significantly to the corresponding factors which are measuring a construct. Discriminant validity refers to what extend measures of different constructs are distinct (Gerbing & Anderson, 1988).

Factor analysis is a multivariate analysis technique that determines underlying dimensions or factors in a set of correlated variables (Hair, Black, Babin & Anderson, 2010). In the study, as being a popular technique to test validity, exploratory factor analysis (EFA) was utilized. EFA is used when the underlying factors are not known a priori to explore the data for such factors.

Exploratory factor analysis (EFA) was also utilized in order to investigate the proposed component structure. The objective was to summarize most of the variance in a minimum number of factors for prediction purposes. Thereby, the major part of total variance could be explained by fewer components (Hair, Black, Babin &

Anderson, 2010). To determine the appropriateness of factor analysis, the Kaiser–Meyer–Olkin (KMO) measure of sample adequacy and Bartlett's test of sphericity were used. The KMO measure compares the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients. This indicator should be 0.5 or greater. Smaller values indicate that factor analysis is not a good choice (Kaiser, 1974). The results of the KMO measure showed a level of 0.843, which is acceptable for further analysis. Bartlett's test revealed a significance at a level of 0.000 ($\chi^2_{(595)}$=2302.005, p<.000). Thus, sample was considered appropriate for factor analysis. Factors with eigenvalues-represents the amount of variance accounted for by a factor- (Hair, Black, Babin & Anderson, 2010) "1.00" and greater were taken into the consideration during the data reduction procedure. Factor analyses were performed where supposed technology orientation dimensions were taken in the first step, in the second step business performance was taken together and in the last step innovative performance was taken. In exploratory factor analyses, number of factors was determined by eigenvalue of one or above, which represents the amount of variance accounted for by a factor (Hair, Black, Babin & Anderson, 2010).

Factor loadings were investigated in order to understand if the instrument items match with and meaningfully explain the corresponding variables. In order to interpret the factors adequately and redistribute the variance from earlier factors to later ones and to achieve a simpler and theoretically more meaningful factor pattern (Hair, Black, Babin & Anderson, 2010), Kaiser's Varimax Rotation was conducted for factor analysis procedure.

Factor loadings of 0.45 and above are considered satisfactory. Thus, this value was considered as cutting point. In the factor analysis of supposed technology orientation, as to the destructive effects to the factor structure, the items of learning were excluded as a whole (EFA table including learning was presented in Appendix C). Thus, factor analysis of technology orientation was continued with the remaining three supposed dimensions, namely technology capability, management capability and unlearning. As can be seen on Table 5, technology orientation was composed of four factors. The supposed dimension of unlearning was divided into two dimensions in which the first part includes the items related to attitudinal change according to

learning (which is called commitment to learning during the study) and the second part includes the items related to behavioral learning (which is called commitment to change) (see Table 5).

Table 5. Factor Analysis for Technology Orientation

Variables	**Factors**			
1-Technological Capability	**1**	**2**	**3**	**4**
TC8-Our firm is one of the leaders in our industry to establish technology standards	**,845**			
TC9-Our firm is one of the leaders in our industry to upgrade technology standards	**,841**			
TC11-Our firm has competitive and powerful technology strategy	**,828**			
TC2-Our firm has strong technological skills in various fields	**,812**			
TC10-Our firm leads technology innovation in our industry	**,795**			
TC7-Our firm is skillful in applying new technologies to problem solving	**,768**			
TC6-Our firm has the ability to accurately predict future technological trends	**,716**			
TC12-Our firm has strong capabilities to integrate external technological resources with in-house resources	**,700**			
TC5-Our firm is qualified to attract and motivate talented experts	,690			
TC13-Our firm monitors up-to-date technological changes and developments closely	,631			
TC1-Our firm makes required investment in R&D activities	,592			
TC4-Our firm improves technical skills of employees by frequently held training programs	,576			
2-Management Capability				
MC8-Our firm's upper management team has knowledge about firm's principle field of operation		**,835**		
MC5-Our firm's upper management team has required technical capabilities for the industry in which we operate		**,799**		
MC7-Our firm's upper management team is in good relations with customers and suppliers		**,774**		
MC1-Our firm's upper management team has proper leadership capabilities		**,763**		
MC4-Our firm's upper management team has understanding capabilities to change environment		**,736**		
MC2-Our firm's upper management team shares firm's vision		**,720**		
MC3-Our firm's upper management team has strategic planning abilities		**,717**		
MC6-Our firm's upper management team is in good relations with employees		**,701**		
3-Commitment to Learning				
ULC7-In light of the new knowledge, if necessary, our firm revises routines and procedures			**,804**	
ULC8-In light of the new knowledge, if necessary, our firm revises current technical infrastructure elements (e.g. storage or assembly line)			**,751**	
ULC9-In light of the new knowledge, if necessary, our firm revises current practices to reach better working approaches			**,718**	
ULC3-In light of the new knowledge, our firm questioned the effectiveness of current routines and procedures			**,704**	

ULC6-In light of the new knowledge, if necessary, our firm revises current tools in working approaches			,679	
ULC2-In light of the new knowledge, our firm questioned the old ones			,674	
ULC1-Our firm values information sharing/flows within the organization			,672	
ULC10-In light of the new knowledge, if it is considered more effective, implement new working approaches into practice immediately			,571	
ULC4-Our firm shares new information if it is considered to have a high potential to apply			,479	
4-Commitment to Change				
ULC13-In light of the new knowledge, employees adopt themselves to change easily				**,754**
ULC12-In light of the new knowledge, employees do not resist to change				**,722**
ULC16-In light of the new knowledge, employees do not regret that we change the working approaches				**,707**
ULC11-In light of the new knowledge, employees have positive opinions about change				,678
ULC14-In light of the new knowledge, employees do not hesitate to implement changed ideas				,646
ULC15-In light of the new knowledge, employees accept revised routines and procedures easily concerning change				,645
Total explained variance: %78,582				

High degree explained variance in multidimensional construct is an indicator that shows the construct is well measured. This proposed four-dimensional technology orientation structure explains %78,582 of total variance.

During the procedure, one item from technological capability (item coded as TC3), one item from top management capability (item coded as MC9) and one item from earlier named unlearning capability (item coded as ULC5) were eliminated (see Appendix A for deleted items).

As being one of the validity indicators, unidimensionality was provided considering the factor analyses results. The variables concerning every factor were found to be highly loaded on a single factor with an eigenvalue of 1 is considered as cutting point, which is the indicator of factor unidimensionality. In addition, factor analysis also provides the test of convergent validity if the latent variable significantly loads to its respective items. Thus, significantly loaded variables as can be seen on Table 5 also confirmed convergent validity of the scales.

Cronbach's alpha coefficient is supposed to be 0.70 or more to consider the scale is reliable. As can be seen on Table 6, all scales were quite satisfactory with above 0,94 Cronbach Alpha values considering the criteria of above 0.70.

Table 6. Reliability of Technology Orientation Scales

Variables	Number of Items	Alpha Coefficients (α)
Technological Capability	12	,963
Top Management Capability	8	,958
Commitment to Learning	9	,944
Commitment to Change	6	,946

During the process, items regarding to "learning" were excluded as whole and unlearning items were decided to divide into two different dimensions namely "commitment to learn" which can be considered as attitudinal learning and "commitment to change" which can be considered as behavioral learning. Apart from these changes, technology orientation instrument was reached in a multidimensional structure. In sum, the measurement of technology orientation was constructed based upon the following four factors: technological capability (TC), top management capability (MC), commitment to learning (CommLearn), and commitment to change (CommChange).

After technology orientation, items of innovative performance were taken to the factor analysis. The results of the KMO measure showed a level of 0.888, which is acceptable for further analysis. Bartlett's test revealed a significance at a level of 0.000 ($\chi^2_{(171)}$=1045.690, p<.000). Thus, sample was considered appropriate for factor analysis. Factor loadings of 0.45 and above were considered satisfactory. Thus, this value was considered as cutting point. However, as can be seen on Table 7, all factor loadings were satisfactory considering the lowest one of ,624.

Innovative performance scale was constructed concerning the study of Wang and Ahmed (2004) and OECD Oslo Manuel (2005). In this mean, it was expected to divide into five dimensions. However, expected strategic innovative performance and behavioral innovative performance dimensions were perceived as one dimension which was named as "organizational innovative performance".

Table 7. Factor Analysis for Innovative Performance

INNOVATIVE PERFORMANCE	Factors			
	1	2	3	4
1-Organizational Innovative Performance				
IP29-Employees are willing to implement new ways of doing things	**,840**			
IP28-Employees are willing to seek novel ways of doing things	**,818**			
IP20-Our firm is tolerant to employees who wants to do thing differently	**,801**			
IP27-Adequate R&D and product development resources	**,701**			
IP24-Our firm supports new ways of doing things	,687			
2-Process Innovative Performance				
IP10-Change speed in production methods		**,761**		
IP8-Continuously developed ways of doing things		**,726**		
IP9-Continuously improving business processes		**,722**		
IP12-Novel solutions in problem solving		,669		
IP11-Development of new management approaches		,646		
IP23-Speed in adopting new ways of doing things		,624		
3-Product Innovative Performance				
IP2-Being first-to-market in product introduction			**,856**	
IP1-Introducing innovative products to market			**,768**	
IP14-Novel products for customers			**,744**	
IP3-Number of new products introduced to market			**,714**	
IP4-Success rate of introduced products			,669	
4-Marketing Innovative Performance				
IP16-Attributes of marketing tactics in introducing new products to the market				**,810**
IP17-New forms of advertising and promotion in introducing new products to the market				**,754**
IP18-At the cutting edge technology introducing new products to the market				,672
Total explained variance: % 80,793				

The items IP5, IP6, IP7, IP13, IP15, IP19, IP21, IP22, IP25 and IP26 were excluded (see Appendix A for deleted items).

Table 8. Reliability of Innovative Performance

Variables	Number of Items	Alpha Coefficients (α)
Organizational Innovative Performance	5	,944
Process Innovative Performance	5	,913
Product Innovative Performance	5	,923
Marketing Innovative Performance	3	,900

Cronbach Alpha (α) coefficient values were all above expected value of ,70 which is quite satisfactory (see Table 8). Thus, innovative performance scales were considered as reliable. Therefore, innovative performance construct was reached in a multidimensional construct as expected.

In the third step of principle component analysis, business performance variables were taken together to investigate the factor structure. The results of the KMO measure showed a level of 0.843, which is acceptable for further analysis. Bartlett's test revealed a significance at a level of 0.000 ($\chi^2_{(66)}$= 619.034, p<.000). Thus, sample was considered appropriate for factor analysis. As in Table 9, factor structure of business performance is shown.

Table 9. Factor Analysis of Business Performance

Variables	**Factors**	
1- Performance Criteria 1	**1**	**2**
FP2- Return on Asset (Profit /Total Assets)	**,903**	
FP3- General Profitability of the Firm	**,893**	
FP1- Turnover Profitability (Profit/Total Sales)	**,875**	
MGP3- Return on investment	**,836**	
MGP1- Sales Expectations	**,819**	
MP2- Total Sales	**,815**	
MGP4- Market share enlargement	**,780**	
2- Performance Criteria 2		
ManP5- Speed of delivery		**,865**
ManP1- Quality of manufacturing		**,848**
ManP4- Speed of manufacturing		**,764**
MP1- Customer satisfaction		**,712**
ManP3- Manufacturing flexibility		,556
Total explained variance: % 72,732		

The business performance scale was constructed based upon the following four factors: financial performance, marketing performance, market performance and manufacturing performance. However, loadings were occurred somehow different from expected. Marketing, market and financial performance items were loaded to single factor. One item of market performance was loaded to manufacturing performance. One item from manufacturing performance (ManP2), one item from marketing performance (MGP2), one item from financial performance (FP4) and one item from market performance were excluded because of their destructive effects on

factor structure. Therefore, the expected four dimensional construct was occurred as two dimensional construct.

Factor loadings of 0.45 and above were considered as satisfactory. Thus, this value was considered as minimum factor loading point. However, as can be seen on Table 9, all factor loadings were higher than 0.45 -the lowest one of ,556. In addition, this two-dimensional construct explained %72,732 of the total variance.

Cronbach Alpha (α) coefficient values are above ,850, which is satisfactory (see Table 10). Thus, business performance scales were considered as reliable.

Table 10. Reliability of Business Performance

Variables	**Number of Items**	**Alpha Coefficients (α)**
Performance Criteria 1	7	,948
Perfromance Criteria 2	5	,850

Pilot study analyses provided insights about the construct. In addition, expert opinions were taken into account. In the end, making some revisions was decided on questionnaire items. In this regard, one of the supposed dimensions of technology orientation, formerly named “learning” was decided to exclude from the questionnaire form as a whole. Three items named TC3, MC9 and ULC5 from technology capability, management capability and unlearning were also decided to exclude from the questionnaire form. Moreover, like the item ULC1, some of the items were rewritten in order to enhance content validity.

Exploratory factor analysis conducted in regards to pilot study data indicated that some of the items were needed to be excluded from the innovative performance and business performance scales. However, taking into consideration of expert opinions, it was decided not to exclude any items from the questionnaire. Therefore, in the end, it was decided to made some revisions on sentence structures and include extra two items to business performance scale and four items to innovative performance scale.

4.2. Final Study Analysis

Data were analyzed using SPSS 16.0 and EQS 6.1. Descriptive statistics, both exploratory and confirmatory factor analyses, multiple regression and structural analysis were used to analyze data, to examine instrument reliability and validity, and to test hypotheses and the model.

In Figure 2, research model of this dissertation was provided with the proposed dimensional construct where all respective related questionnaire items of all those dimensions were grouped and presented as a whole. In Figure 2, strikethrough items were the ones which were excluded from the analysis based on factor analysis result as explained in details in the following section.

This section started with the findings from reliability analysis and exploratory factor analysis performed for scale refinement. Then, scale validity was tested using both exploratory and confirmatory factor analyses. Findings from descriptive statistics and correlation analysis were also included in this chapter followed by findings on relational hypotheses of the research model. In the end, a path diagram was reached in which the relational mechanism in a single picture was provided.

This dissertation level of analysis was firm and/or SBUs. Before starting to analyze data, 224 participants' responds from 147 firms were aggregated. Therefore, final analyses were utilized with 147 aggregated data.

4.3. Exploratory Factor Analysis (EFA)

Exploratory factor analysis (EFA) is a data reduction technique that explores the data and provides information about how many factors are needed to best represent the data (Hair, Black, Babin & Anderson, 2010). In this dissertation, as being one of the popular approaches to utilize EFA, principle component analysis and varimax rotation option of SPSS were selected.

Technology Orientation

Top Management Capability
Our firm's top management team….
MC1-has proper leadership capabilities
MC2-shares firm's vision
MC3- has strategic planning abilities
MC4- has understanding capabilities to change environment
MC5- has required technical capabilities for the industry in which we operate
MC6- is in good relations with employees
MC7- is in good relations with customers and suppliers
MC8- has knowledge about firm's principle field of operation

Technological Capability
Our firm…
TC1-makes required investment in R&D activities
TC2-has strong technological skills in various fields
TC3-improves technical skills of employees by frequently held training programs
TC4-is qualified to attract and motivate talented experts
TC5- has the ability to accurately predict future technological trends
TC6- is skillful in applying new technologies to problem solving
TC7- is one of the leaders in our industry to establish technology standards
TC8- is one of the leaders in our industry to upgrade technology standards
TC9- leads technology innovation in our industry
TC10- has competitive and powerful technology strategy
TC11- has strong technological skills in various fields
TC12- has strong capabilities to integrate external

Commitment to Learning
ULC1- Our firm values information sharing/flows within the organization
ULC2- In light of the new knowledge, our firm questioned the old ones
ULC3- In light of the new knowledge, our firm questioned the effectiveness of current routines and procedures
ULC4- Our firm shares new information if it is considered to have a high potential to apply
ULC6-In light of the new knowledge, if necessary, our firm revises current tools in working approaches
ULC7-In light of the new knowledge, if necessary, our firm revises routines and procedures
ULC8-In light of the new knowledge, if necessary, our firm revises current technical infrastructure elements (e.g. storage or assembly line)
ULC9-In light of the new knowledge, if necessary, our firm revises current practices to reach better working approaches
ULC10-In light of the new knowledge, if it is considered more

Commitment to Change
ULC11-In light of the new knowledge, employees have positive opinions about change
ULC12-In light of the new knowledge, employees do not resist to change
ULC13-In light of the new knowledge, employees adopt themselves to change easily
ULC14-In light of the new knowledge, employees do not hesitate to implement changed ideas
ULC15-In light of the new knowledge, employees accept revised routines and procedures easily concerning change
ULC16-In light of the new knowledge, employees do not regret that we change the working approaches

Business Performance

Marketing Performance
The effects of…
MGP1- Commercials and promotion activities on sales
~~MGP2- Marketing activities investment on number of current customers~~
MGP3-Marketing activities on sales
MGP4-Marketing team investments on total sales
MGP5-Marketing activities investment on market share expansion

Market Performance
MP1-The importance of customer satisfaction
MP2-Share on current customers on total sales
MP3-Increase in current customers' purchases
MP4-The ratio of gaining new customers

Financial Performance
FP1- Profit/Total Sales
FP2-Profit /Total Assets
FP3-General Profitability
FP4-Cash flow (excluding investment)

Manufacturing Performance
ManP1-manufacturing quality
ManP2- manufacturing cost
ManP3- manufacturing flexibility
ManP4-Production speed
ManP5-Delivery speed of final products to customers

Innovative Performance

Innovative Process Performance
IP5-Using state-of-the-art technologies in production
IP9-Newness of product line and processes
IP10-Continuous improvement on operating processes
IP11-Speed of changing production methods
IP12-improvement in management processes
IP13-Using new methods in problem solving

Innovative Marketing Performance
IP15-Significant difference among new and old version of the products
IP16-Increase in delivery speed of new products
IP17-Quality of marketing tactics of new products
IP18-significant difference on promotion and advertising of old and new products
IP19-Usage of new technologies on reaching to customers
IP20-Significant difference on packaging of new products
IP21-Significant improvements on after sales
~~IP22-Expanding production line and range~~

Innovative Product Performance
IP1-Being first in introducing a new product
IP2-Our products' being first to our customers
IP3-Number of new products
IP4-Successful rate of new products
~~IP6-Production investments' rate in turnover~~
~~IP7-Production methods investments' rate in turnover~~
IP8-Uniqueness of new products

Innovative Strategic Performance
IP23-Decision making speed on adopting new technologies into production and management systems
IP24-Sufficient resource transfer to R&D and new product development
IP25-New investment decisions to make catch new expansion opportunities
IP26-Increased importance of new method searches on problem solving

Innovative Behavioral Performance
~~IP27-Management support on innovation projects application to organizations like KOSGEB or TEYDEB~~
IP28-Management support to employees who are eager to try new business ways
IP29-Existance of open-minded managers to new ideas
IP30-Management efforts to improve processes and business ways
IP31-Tolerant behavior of management to employees who want to do things other than ordinary ways
IP32- Eagerness to use new methods in business manners
~~IP33-Employees attempts to do things other than ordinary ways~~

Figure 2. Variables and Revised Questionnaire Items Used in Final Analyses

Number of factors was basically determined by scree plot and criteria of Kaiser (eigen-value above 1.0). Moreover, for the factor loadings, only the values greater than 0,40 was accepted. Bartlett's sphericity test results were checked to see if the test results were significant. The Kaiser-Meyer-Olkin (KMO) test results were checked to see if the sampling was adequate. As to Kaiser (1974), the values between 0,5 and 0,7 were considered moderate, between 0,7 and 0,8 were considered good and 0,8 and above were considered highly satisfactory/excellent.

KMO and Barlett's test results was presented firstly for technology orientation. The results of the KMO measure showed a level of 0.937, which is highly satisfactory for further analysis. Bartlett's test revealed a significance at a level of 0,000 ($\chi^2_{(595)}$=4987,540, p<,000). Thus, sample was considered appropriate for factor analysis.

Pilot study results were also repeated in final study for the technology orientation factor construct. As indicated in pilot study, technology orientation were composed in a multidimensional construct namely; top management capability, technological capability, commitment to learning and commitment to change. In Table 11, factor loadings and four-dimensional construct of technology orientation were presented.

Table 11. Exploratory Factor Analysis for Technology Orientation

	Factors			
1-Technological Capability	**1**	**2**	**3**	**4**
TC7	**,856**			
TC8	**,848**			
TC9	**,842**			
TC10	**,829**			
TC2	**,740**			
TC12	,683			
TC1	,673			
TC5	,669			
TC4	,646			
TC6	,636			

TC11	,610			
TC3	,476			
2-Commitment to Learning	**1**	**2**	**3**	**4**
ULC7		**,812**		
ULC6		**,798**		
ULC2		**,765**		
ULC3		**,757**		
ULC8		**,714**		
ULC9		,699		
ULC4		,690		
ULC1		,684		
ULC10		,629		
3- Top Management Capability	**1**	**2**	**3**	**4**
MC8			**,813**	
MC4			**,781**	
MC5			**,776**	
MC7			**,762**	
MC1			**,747**	
MC6			**,732**	
MC3			**,707**	
MC2			,660	
4- Commitment to Change	**1**	**2**	**3**	**4**
ULC12				**,793**
ULC15				**,748**
ULC13				**,731**
ULC11				**,722**
ULC14				**,715**
ULC16				,693
Total Variance Explained : % 71,650				

Table 11 also indicated that proposed four-dimensional technology orientation construct explains %71,650 of total variance. This high degree was also an indicator of a well construct measure. No item was excluded during the procedure. Thus, all questionnaire items took place in the factor construct. High factor loadings to corresponding factors also indicated validity of the measures.

KMO and Barlett's test results for business performance was as follows. The results of the KMO measure showed a level of 0.853, which is highly satisfactory for further analysis. Bartlett's test revealed a significance at a level of 0,000 ($\chi^2_{(136)}$=1220,495 p<,000). Thus, sample was considered appropriate for factor analysis.

Table 12. Exploratory Factor Analysis for Business Performance

	Factors			
1-Marketing Performance	**1**	**2**	**3**	**4**
MGP4	**,900**			
MGP2	**,897**			
MGP5	**,885**			
MGP3	**,867**			
MGP1	**,797**			
2-Market Performance	**1**	**2**	**3**	**4**
MP2		**,867**		
MP3		**,819**		
MP1		**,764**		
MP4		**,712**		
3- Financial Performance	**1**	**2**	**3**	**4**
FP3			**,882**	
FP4			**,845**	
FP2			**,838**	
FP1			**,811**	
4-Manufacturing Performance	**1**	**2**	**3**	**4**
ManP5				**,825**
ManP4				**,786**
ManP3				**,719**
ManP1				,535
Total Variance Explained: % 77,131				

Table 12 indicated that four-dimensional business performance construct explains %77,131 of total variance. This high degree was also an indicator of a well construct measure. During the procedure, only one item (ManP2) was excluded due

to the altering effects to factor construct. High factor loadings to corresponding factors was also an indicator of validity of the measures.

KMO and Barlett's test results for business performance was as follows. The results of the KMO measure showed a level of 0.904, which is highly satisfactory for further analysis. Bartlett's test revealed a significance at a level of 0,000 ($\chi^2_{(378)}$=2060,975 p<,000). Thus, sample was considered appropriate for factor analysis.

Table 13. Exploratory Factor Analysis for Innovative Performance

	Factors				
1-Innovative Marketing Performance	**1**	**2**	**3**	**4**	**5**
IP21	**,780**				
IP20	**,769**				
IP15	**,766**				
IP17	**,706**				
IP16	,689				
IP18	,687				
IP19	,601				
2-Innovative Process Performance	**1**	**2**	**3**	**4**	**5**
IP11		**,763**			
IP12		**,741**			
IP10		,677			
IP9		,650			
IP5		,618			
IP13		,618			
IP14		,585			
3- Innovative Product Performance	**1**	**2**	**3**	**4**	**5**
IP2			**,826**		
IP1			**,786**		
IP3			**,768**		
IP4			**,717**		
IP8			,649		
4-Innovative Behavioral Performance	**1**	**2**	**3**	**4**	**5**
IP30				**,817**	

IP29				**,798**	
IP31				**,786**	
IP28				,671	
IP32				,659	
5-Innovative Strategic Performance	**1**	**2**	**3**	**4**	**5**
IP25					**,826**
IP24					**,808**
IP26					**,732**
IP23					**,718**
Total Variance Explained: % 73,306					

Table 13 indicated that five-dimensional innovative performance construct explains %73,306 of total variance. This high degree was also an indicator of a well construct measure. During the procedure, five items (IP6, IP7, IP22, IP27, IP33) were excluded due to the altering effects to factor construct. High factor loadings to corresponding factors also indicated validity of the measures.

The variables concerning every factor were found to be highly loaded on a single factor with an eigenvalue of 1 is considered as cutting point, which is the indicator of factor unidimensionality. In addition, factor analysis also provides the test of convergent validity if the latent variable significantly loads to its respective items. Thus, significantly loaded variables as can be seen on Table 13 also confirmed convergent validity of the scales.

4.4. Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) is a way of testing how well measured variables represent the theory. While EFA determines factors by statistical results, CFA derived factors from the theory. Therefore, CFA is a tool that enables researchers to either confirm or reject the preconceived theory (Hair, Black, Babin & Anderson, 2010). In addition, CFA also provides more adequate insight on refining scales regarding validity (Gerbing & Anderson, 1988). When factor loadings were examined, items loading to corresponding factors with significant coefficients indicates convergent validity. Therefore, in the study, CFA factor loading denoted

convergent validity (see Appendix D, Appendix E and Appendix F respectively for technology orientation, innovative performance and business performance) while supporting validity results reached in EFA.

After exploring that the variables were constituted expected factors by EFA, CFA was utilized to determine construct fitness. CFA was utilized based on factor construct reached at EFA results. The overall fit of the factor constructs were determined by commonly accepted fit indices. Several commonly used indices were run by using EQS 6.1. One of the most common fit indices is chi-square ($\chi 2$) relative to degrees of freedom (df). Acceptable value for ($\chi 2$/ df) mentioned as less than five (Marsh & Hocevar, 1985). Comparative Fit Index (CFI) examines the coherence of the tested and expected models. Normed Fit Index (NFI), Non-Normed Fit Index (NNFI) and Incremental Fit Index (IFI) assess the fit of a model relative to the fit of a null model. A conventional cutoff criterion of ,90 (Bentler and Bonett, 1980; Bollen, 1989) is accepted for all indices expect Root Mean Square Error of Estimation (RMSEA). RMSEA provides an understanding of whether observed data is eligible for the model and a value between ,05 and ,08 are considered as a satisfactory fit (Hu & Bentler, 1999).

CFA was conducted in three steps: technology orientation, business performance and innovative performance were individually tested. Observed items were associated to latent structure by fixing error terms to zero.

Fit indices findings were shown in Table 14. There is still a discussion on the cutpoints of fit indices; the overall fit is considered important. Therefore, CFA results depending on fit indices were found satisfactory to further analysis. Only NFI and GFI values were slighted below the set criteria for technology orientation and innovative performance and GFI value was slightly below for business performance. As to some other studies NFI value also acceptable above ,80. GFI is also considered that becoming less popular due to the sensitivity on degree of freedom and it is mentioned to use this index with caution Hooper, Coughlan, Mullen, 2008). This result would increase depends on increasing observed data as well. However, overall evaluation of newly developed and adapted scales, CFA gave a satisfactory solution.

Observed variables were significantly loaded to regarding factors where all factor loadings of respecting variables were presented schematically in Appendix D, Appendix E and Appendix F.

Table 14. Fit Indices based on CFA

Fit Indices	Findings			Reference values
	Technology Orientation	Innovative Performance	Business Performance	
$\chi 2$/ df	674,669 / 409 **1,60**	306,088/252 **1,21**	107,711/73 **1,47**	($\chi 2$/ df) < 5
CFI	**,95**	**,97**	**,97**	,9 < CFI < 1,0
NFI	**,89**	**,87**	**,92**	,9 < NFI< 1,0
NNFI	**,92**	**,96**	**,95**	,9 < NNFI < 1,0
IFI	**,95**	**,97**	**,97**	,9 < IFI < 1,0
GFI	**,85**	**,86**	**,89**	,9 < GFI < 1,0
RMSEA	**,06**	**,05**	**,07**	RMSEA< ,08

For the sake of preliminary analysis of CFA, a second order CFA was followed in the procedure. Table 15 presented fit indices for second order factor analysis for technology orientation, business performance and innovative performance.

Table 15.Fit Indices for Second Order CPA

Fit Indices	Findings			Reference values
	Technology Orientation	Innovative Performance	Business Performance	
$\chi 2$/ df	22,093/6 **3,68**	23,389/5 **4,67**	25,667/6 **4,27**	($\chi 2$/ df) < 5
CFI	**,94**	**,96**	**,92**	,9 < CFI < 1,0
NFI	**,89**	**,95**	**,86**	,9 < NFI< 1,0
NNFI	**,91**	**,93**	**,89**	,9 < NNFI < 1,0
IFI	**,93**	**,96**	**,93**	,9 < IFI < 1,0
GFI	**,87**	**,94**	**,89**	,9 < GFI < 1,0
RMSEA	**,07**	**,09**	**,07**	RMSEA< ,08

As to the second order CFA results, EFA results were also supported by considering fit indices as a whole. Therefore, EFA and CFA analyses indicated that

four-dimensional technology orientation; four-dimensional business performance and five-dimensional innovative performance constructs were achieved as proposed.

4.5. Correlation Coefficient, Mean and Standard Deviation Values of Variables

In Table 16, variables' mean and standard deviation values were presented along with the correlation coefficient values. Correlation matrix gave insights on if the variables are interrelated to each other. It may also provide a simple test for supposed relations. Therefore, two correlated variables might be thought to have a relation negatively or positively. In addition, Cronbach alpha (α) coefficient values to indicate reliability of instruments were also included to the table.

As to the correlation matrix in Table 16, all variables had significant one-to-one relation with each other (p<,01). Considering business performance sub-criteria and technology orientation, the highest correlation was between market performance and top management capability (r: ,571; p<,01) where the lowest correlation was between financial performance and technological capability (r: ,222; p<,01). Considering innovative performance sub-criteria and technology orientation, the highest correlation was between behavioral innovative performance and commitment to learning (r: ,681; p<,01) where the lowest correlation was between marketing innovative performance and commitment to learning (r: ,438; p<,01).

Table 16. Mean, Standard Deviation, Cronbach Alpha and Correlation Coefficient Values of All Variables

	Mean	Std. Dev.	Alpha (α)	1	2	3	4	5	6	7	8	9	10	11	12	13
1-Technological Capability	3,38	,84	,951		**,652****	**,585****	**,637****	**,429****	**,475****	**,222****	**,456****	**,579****	**,693****	**,588****	**,695****	**,693****
2-Top Management Capability	3,74	,85	,952			**,662****	**,665****	**,459****	**,571****	**,347****	**,486****	**,502****	**,628****	**,589****	**,649****	**,666****
3-Commitment to Learning	3,74	,68	,938				**,692****	**,340****	**,400****	**,261****	**,455****	**,438****	**,576****	**,489****	**,573****	**,681****
4-Commitment to Change	3,42	,87	,942					**,502****	**,439****	**,322****	**,393****	**,587****	**,642****	**,541****	**,595****	**,678****
5-Marketing Performance	3,25	,88	,953						**,645****	**,593****	**,320****	**,640****	**,502****	**,547****	**,377****	**,433****
6-Market Performance	3,57	,74	,879							**,608****	**,515****	**,574****	**,548****	**,588****	**,536****	**,488****
7-Financial Performance	3,43	,74	,927								**,351****	**,445****	**,325****	**,402****	**,337****	**,311****
8-Manufacturing Performance	3,71	,69	,777									**,484****	**,573****	**,648****	**,487****	**,508****
9-Marketing Innovative Performance	3,28	,76	,960										**,729****	**,697****	**,618****	**,610****
10-Process Innovative Performance	3,35	,71	,896											**,748****	**,735****	**,728****
11-Product Innovative Performance	3,47	,82	,927												**,572****	**,632****
12-Strategic Innovative Performance	3,31	,80	,927													**,749****
13-Behavioral Innovative Performance	3,33	,81	,925													

**Correlation is significant at 0,01 level for all variables

4.6. Hypothesis Testing

Relational research hypotheses were tested by multiple regression analysis. A simple regression provides information on direction and power of a relation between two variables where multiple regression provide information on how effective more than one independent variables on one dependent variable (Hair, Black, Babin & Anderson, 2010). Regression analyses in this section were utilized with SPSS 17.0.

F-value is an indicator used to test whether the model is statistically significant or not (p< 0, 01 or p< 0, 05). R^2 value denotes in what extent the change in dependent variable can be affected by the independent variables. Variance-Inflation Factor (VIF) and tolerance values are the indicators of existence of multicollinearity. Multicollinearity refers to excessive correlation of the predictor variables and a tolerance value less than .20 and/or a VIF values above 5.0 suggest a multicollinearity problem (Garson, 2010). Multicollinearity does not reduce the predictive power or reliability of the regression model as a whole; however, it does affect calculations regarding individual predictors (Boidin et. al., 2009).

4.6.1. The effects of technology orientation on business performance

In the study, exploratory and confirmatory factor analyses results supported the expected multidimensional business performance construct. Therefore, every dimensions of business performance taken into account as dependent variables one-by-one to test first group hypotheses displayed in research model (see Figure 1), where which questionnaire items were used to measure which variables was displayed in Figure 2.

Table 17 represented the effects of technology orientation dimensions on marketing performance dimension of business performance, where Figure 3 presented a schematic display for this relation.

F- value indicated that the model is significant as a whole (F=14,552 ρ= ,000). R^2 value indicated that independent variables as a whole explains % 27,5 of

marketing performance change. Tolerance and VIF values also indicated that there was no multicollinearity problem in the model.

Table 17.The Effects of TO on Business Performance/ Marketing

Independent Variables	B	t	p	Collinearity	
				Tolerance	VIF
Constant		3,760	,000		
Technological Capability	,132	1,303	,195	,492	2,031
Top Management Capability	,220	2,015	,046	,426	2,347
Commitment to Learning	-,135	-1,260	,210	,441	2,270
Commitment to Change	,365	3,286	,001	,410	2,437
R^2 = , 295		**F**= 14,552 p= ,000			

Findings indicated that technological capability and commitment to learning had no significant effects on marketing performance. On the other hand, management capability (β: ,220; p<,05) and commitment to change (β: ,365; p<,01) had positive effects on marketing performance. One unit increase in top management capability leads to ,220 unit increase on marketing performance where one unit increase in commitment to change lead to ,365 unit increase on marketing performance. Considering the analysis result, H1a was supported.

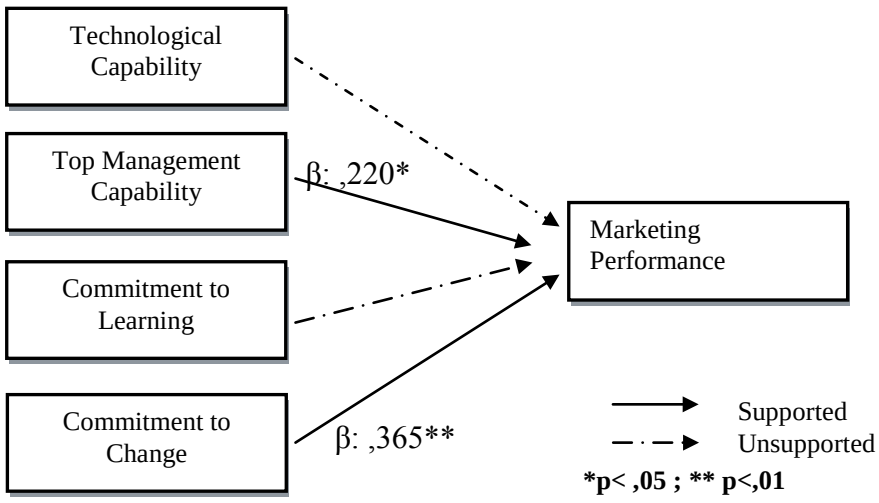

Figure 3. The Effects of TO on Business Performance/ Marketing

Table 17 represented the effects of technology orientation dimensions on market performance dimension of business performance where Figure 4 presented a schematic display for this relation.

F- value indicated that the model is significant as a whole (F=18,371 ρ= ,000). R^2 value denoted that independent variables as a whole explains % 36,4 of marketing performance change. Tolerance and VIF values also indicated that there was no multicollinearity problem in the model.

Table 18. The Effects of TO on Business Performance/ Market

Independent Variables	**B**	**t**	**P**	**Collinearity**	
				Tolerance	VIF
Constant		5,415	,000		
Technological Capability	,167	1,704	,091	,492	2,031
Top Management Capability	,443	4,215	,000	,426	2,347
Commitment to Learning	-,033	-,319	,750	,441	2,270
Commitment to Change	,062	,575	,566	,410	2,437
R^2 = , 364		**F**= 18,371 p= ,000			

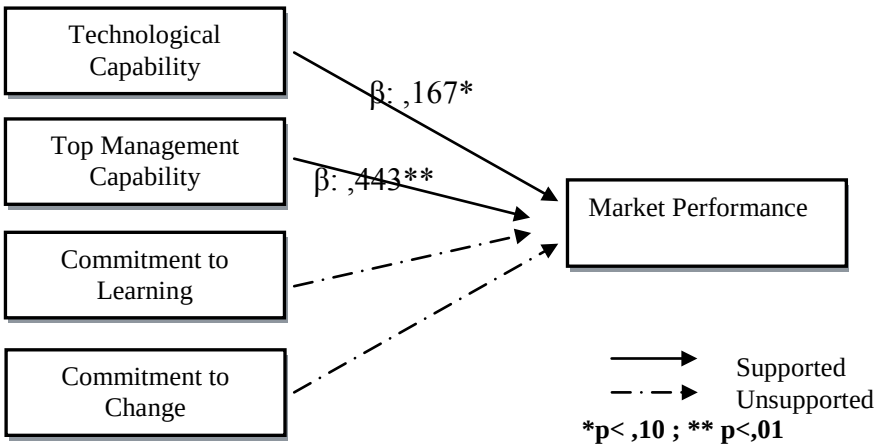

Figure 4.The Effects of TO on Business Performance/ Market

Findings showed that commitment to learning and commitment to change had no significant effects on marketing performance. On the other hand, technological capability (β: ,167; p<,10) and management capability (β: ,443; p<,01) had positive effects on marketing performance. One unit increase in top management capability

leads to ,167 units increase on market performance where one unit increase in technological capability leads ,443 units increase on market performance. Considering the analysis result, H1b and H2b were supported.

Table 19 represented the effects of technology orientation dimensions on financial performance dimension of business performance where Figure 5 was the schematic exhibit of this relation.

Table 19.The Effects of TO on Business Performance/ Financial

Independent Variables	**β**	**t**	**p**	**Collinearity**	
				Tolerance	VIF
Constant		6,731	,000		
Technological Capability	-,075	-,661	,510	,491	2,037
Top Management Capability	,273	2,251	,026	,424	2,357
Commitment to Learning	-,010	-,086	,932	,443	2,259
Commitment to Change	,194	1,571	,119	,409	2,446
R^2 = ,138		**F**= 5,530 p= ,000			

F- value designated that the model is significant as a whole (F=5,530 ρ= ,000). R^2 value expressed that independent variables as a whole explains % 13,8 of financial performance change. Tolerance and VIF values also indicated that there was no multicollinearity problem in the model.

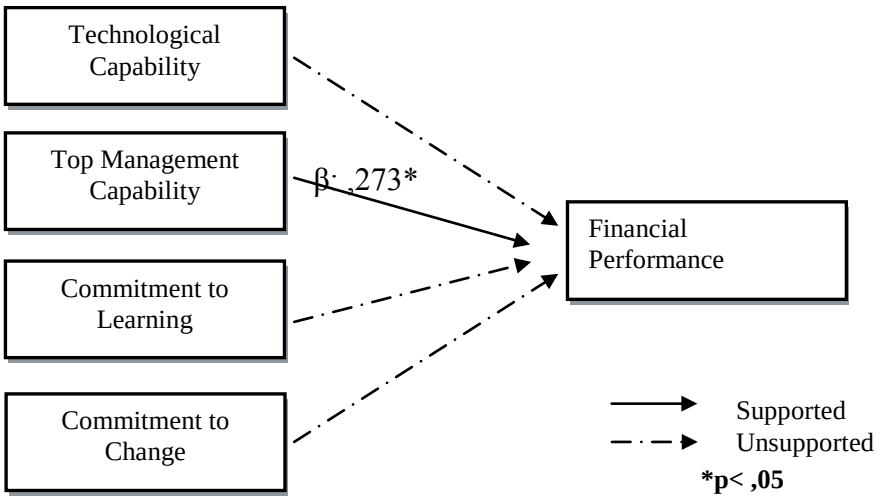

Figure 5.The Effects of TO on Business Performance/ Financial

Findings indicated that technological capability, commitment to learning and commitment to change had no significant effect on financial performance. Only management capability (β: ,273; p<,05) had a positive effect on financial performance. One unit increase in top management capability leads to ,273 units increase on financial performance. Considering the analysis result, H1c was supported.

Table 20 showed the effects of technology orientation dimensions on manufacturing performance dimension of business performance, where Figure 6 exhibited the relation schematically.

Table 20. The Effects of TO on Business Performance/ Manufacturing

Independent Variables	**β**	**t**	**p**	**Collinearity**	
				Tolerance	VIF
Constant		6,248	,000		
Technological Capability	,202	1,978	,050	,492	2,031
Top Management Capability	,248	2,266	,025	,426	2,347
Commitment to Learning	,199	1,842	,068	,441	2,270
Commitment to Change	,038	-,338	,736	,410	2,437
R^2 = ,268		**F**= 14,069 p= ,000			

F-value indicated that the model is significant as a whole (F=14,069 ρ= ,000). R^2 value implied that independent variables as a whole explains % 26,8 of manufacturing performance change. Tolerance and VIF values also signed that there was no multicollinearity problem in the model.

Findings revealed that only commitment to change had no significant effect on manufacturing performance. Technological capability (β: ,202; p<,05), management capability (β: ,248; p<,05) and commitment to learning (β: ,199; p<,10) had positive effect on manufacturing performance.

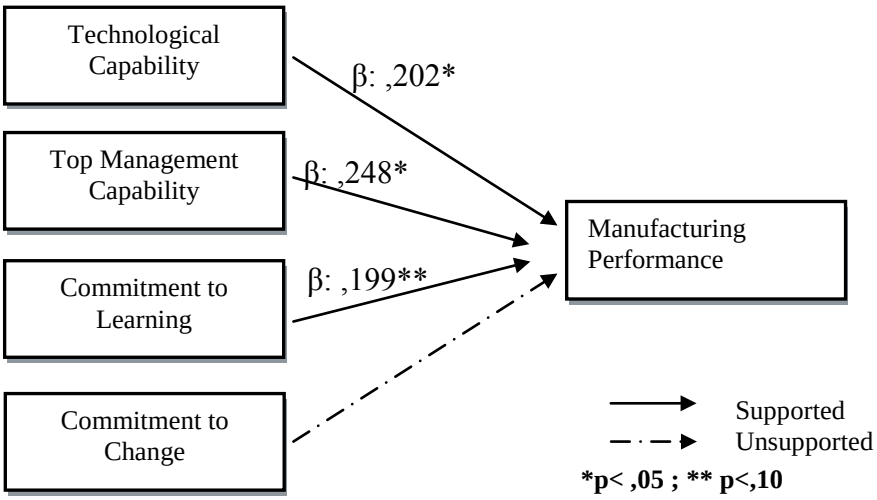

Figure 6. The Effects of TO on Business Performance/ Manufacturing

One unit increase in technological capability increased ,202 units of manufacturing performance, one unit increase in management capability increased ,248 units of manufacturing performance and one unit increase in commitment to learning increased ,199 units of manufacturing performance. Considering the analysis result, H1d and H2d were supported.

4.6.2. The effects of technology orientation on innovative performance

Multidimensional construct of innovative performance was previously supported based on the findings of exploratory and confirmatory factor analyses. In this section, every dimensions of innovative performance taken into account as dependent variables one-by-one to test second group hypotheses displayed in Figure 1.

Table 21 represented the effects of technology orientation dimensions on process innovative performance dimension of innovative performance, where Figure 7 presented a schematic display for this relation.

F-value indicated that the model is significant as a whole (F=45,716 ρ= ,000). R^2 value signaled that independent variables as a whole explains % 56,8 of process innovative performance change. Tolerance and VIF values also showed that there was no multicollinearity problem in the model.

Table 21. The Effects of TO on Process Innovative Performance

Independent Variables	β	t	p	Collinearity	
				Tolerance	VIF
Constant		3,455	,001		
Technological Capability	,392	4,940	,000	,492	2,031
Top Management Capability	,172	2,019	,045	,426	2,347
Commitment to Learning	,078	,933	,353	,441	2,270
Commitment to Change	,223	2,560	,012	,410	2,437
R^2 = ,568		**F**= 45,716 p= ,000			

Findings denoted that only commitment to learning had no significant effect on process innovative performance. Technological capability (β: ,392; p<,01), management capability (β: ,172; p<,05) and commitment to change (β: ,223; p<,05) had positive effects on process innovative performance. One unit increase in technological capability leads to ,392 units increase on process innovative performance, one unit increase in management capability leads to ,172 units increase on process innovative performance and one unit increase in commitment to change lead to ,223 units increase on process innovative performance. Considering the analysis result, H5a and H6a were supported.

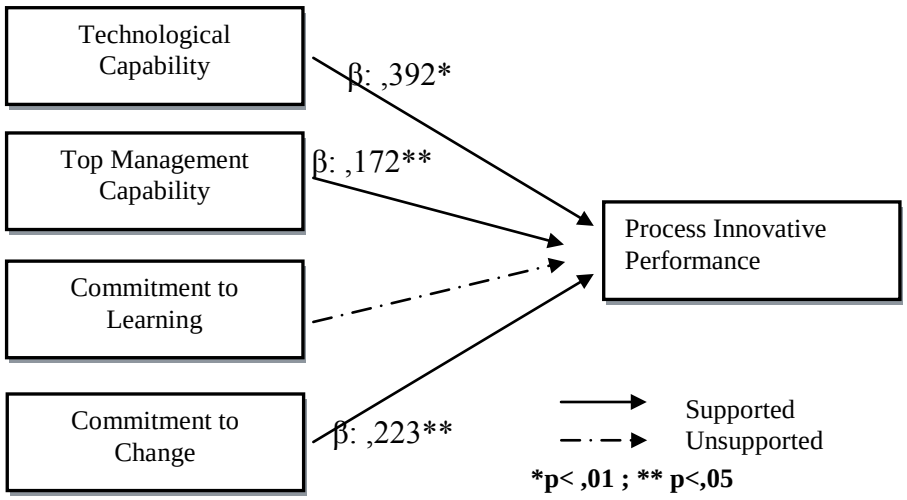

Figure 7. The Effects of TO on Process Innovative Performance

Table 22 showed the effects of technology orientation dimensions on product innovative performance dimension of innovative performance where Figure 8 schematically displayed the relation.

F-value indicated that the model is significant as a whole (F=26,453 ρ= ,000). R^2 value pointed out that independent variables as a whole explains % 43,2 of product innovative performance change. Tolerance and VIF values also showed that there was no multicollinearity problem in the model.

Table 22. The Effects of TO on Product Innovative Performance

Independent Variables	**β**	**t**	**p**	**Collinearity**	
				Tolerance	VIF
Constant		2,975	,003		
Technological Capability	,295	3,234	,002	,492	2,031
Top Management Capability	,280	2,860	,005	,426	2,347
Commitment to Learning	,031	,318	,751	,441	2,270
Commitment to Change	,146	1,464	,145	,410	2,437
R^2 = ,432		**F**= 26,453 p= ,000			

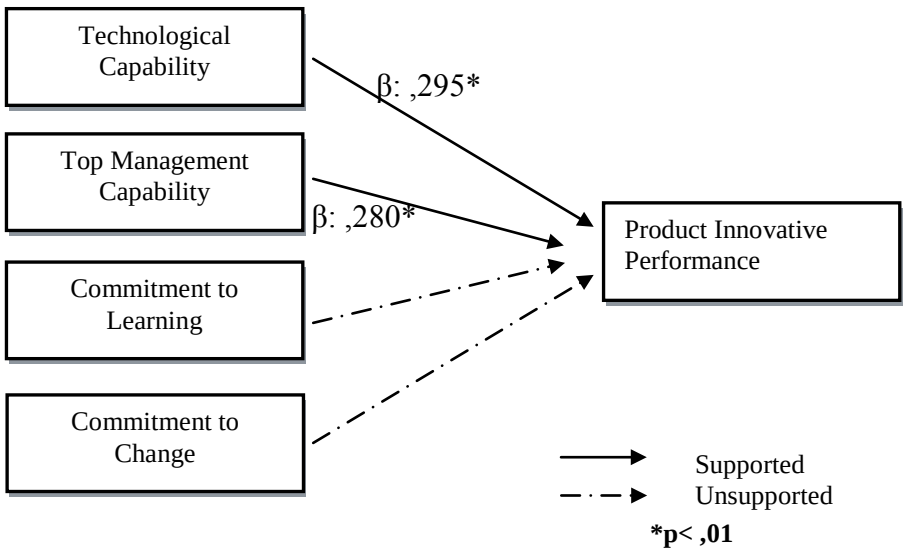

Figure 8. The Effects of TO on Product Innovative Performance

Findings indicated that commitment to learning and commitment to change had no significant effects on product innovative performance. Technological capability

(β: ,295; p<,01) and management capability (β: ,280; p<,01) had positive effects on product innovative performance. One unit increase in technological capability increased ,295 units of product innovative performance where one unit increase in management capability increased ,280 units of product innovative performance. Considering the analysis result, H5b and H6b were supported.

Table 23 displayed the effects of technology orientation dimensions on marketing innovative performance dimension of innovative performance where Figure 9 presented the relation schematically.

Table 23. The Effects of TO on Marketing Innovative Performance

Independent Variables	**B**	**t**	**p**	**Collinearity**	
				Tolerance	VIF
Constant		4,164	,000		
Technological Capability	,324	3,500	,001	,491	2,037
Top Management Capability	,090	,902	,369	,424	2,357
Commitment to Learning	-,061	-,622	,535	,443	2,249
Commitment to Change	,361	3,555	,001	,409	2,446
R^2 = ,418		**F**= 24,783 p= ,000			

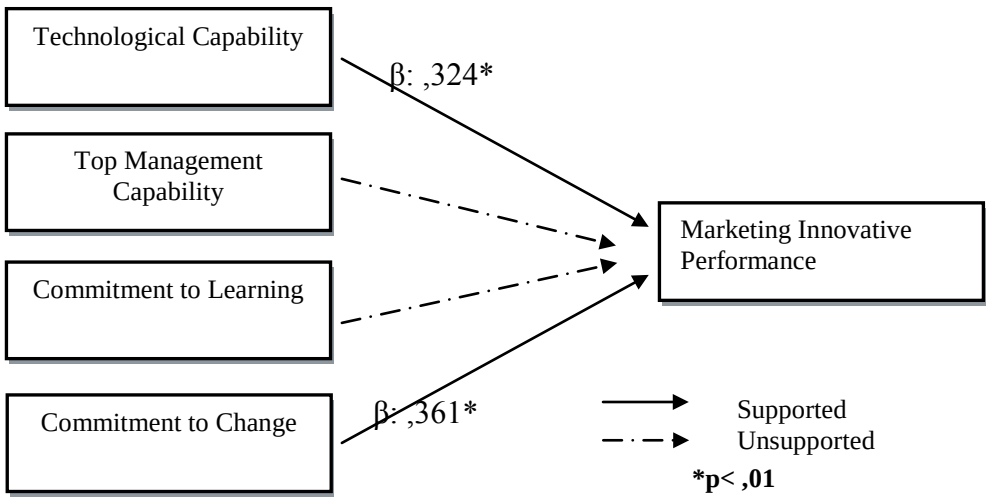

Figure 9. The Effects of TO on Marketing Innovative Performance

F-value indicated that the model is significant as a whole (F=24,783 ρ= ,000). R^2 value implied that independent variables as a whole explains % 41,8 of marketing

innovative performance change. Tolerance and VIF values also showed that there was no multicollinearity problem in the model.

Findings indicated that commitment to learning and management capability had no significant effects on marketing innovative performance. Technological capability (β: ,324; p<,01) and commitment to change (β: ,361; p<,01) had positive effects on marketing innovative performance. One unit increase in technological capability increased ,324 units of marketing innovative performance where one unit increase in commitment to change increased ,361 units of marketing innovative performance. Considering the analysis result, H6c was supported.

Table 24 presented the effects of technology orientation dimensions on strategic innovative performance dimension of innovative performance, where in Figure 10, a schematic display for this relation was provided.

Table 24. The Effects of TO on Strategic Innovative Performance

Independent Variables	**B**	**t**	**p**	**Collinearity**	
				Tolerance	VIF
Constant		1,493	,138		
Technological Capability	,411	5,145	,000	,492	2,031
Top Management Capability	,250	2,910	,004	,426	2,347
Commitment to Learning	,100	1,186	,238	,441	2,270
Commitment to Change	,098	1,115	,267	,410	2,437
R^2 = ,563		**F**= 44,797 p= ,000			

F-value implied that the model is significant as a whole (F=44,797 ρ= ,000). R^2 value signaled that independent variables as a whole explains % 56,3 of strategic innovative performance change. Tolerance and VIF values also indicated that there was no multicollinearity problem in the model.

Findings denoted that commitment to learning and commitment to change had no significant effects on strategic innovative performance. Technological capability (β: ,411; p<,01) and management capability (β: ,250; p<,01) had positive effects on strategic innovative performance.

One unit increase in technological capability leads to ,411 units increase on strategic innovative performance where one unit increase in top management capability leads to ,250 units increase on strategic innovative performance. Considering the analysis result, H5d and H6d were supported.

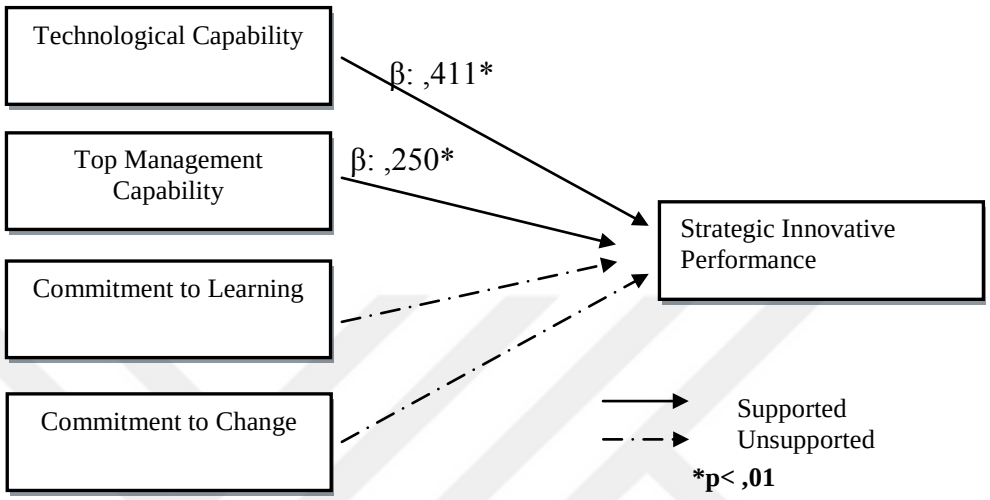

Figure 10. The Effects of TO on Strategic Innovative Performance

Table 25 represented the effects of technology orientation dimensions on behavioral innovative performance dimension of innovative performance, where Figure 11 presented a schematic display for this relation.

Table 25. The Effects of TO on Behavioral Innovative Performance

Independent Variables	**B**	**t**	**p**	**Collinearity**	
				Tolerance	VIF
Constant		-,026	,980		
Technological Capability	,314	4,283	,000	,492	2,031
Top Management Capability	,165	2,089	,038	,426	2,347
Commitment to Learning	,256	3,305	,001	,441	2,270
Commitment to Change	,191	2,383	,019	,410	2,437
R^2 = ,632		**F**= 59,653 p= ,000			

F-value indicated that the model is significant as a whole (F=59,653 ρ= ,000). R^2 value implied that independent variables as a whole explains % 63,2 of behavioral

innovative performance change. Tolerance and VIF values also showed that there was no multicollinearity problem in the model.

Findings indicated that all dimensions of technology orientation had significant effects on behavioral innovative performance. Technological capability (β: ,314; p<,01), management capability (β: ,165; p<,05), commitment to learning (β: ,256; p<,01) and commitment to change (β: ,191; p<,05) had positive effects on behavioral innovative performance. One unit increase in technological capability increased ,314 units of behavioral innovative performance, one unit increase in management capability increased ,165 units of behavioral innovative performance, one unit increase in commitment to learning increased ,256 units of behavioral innovative performance and one unit increase in commitment to change increased ,191 units of behavioral innovative performance. Considering the analysis result, H5e and H6e were supported.

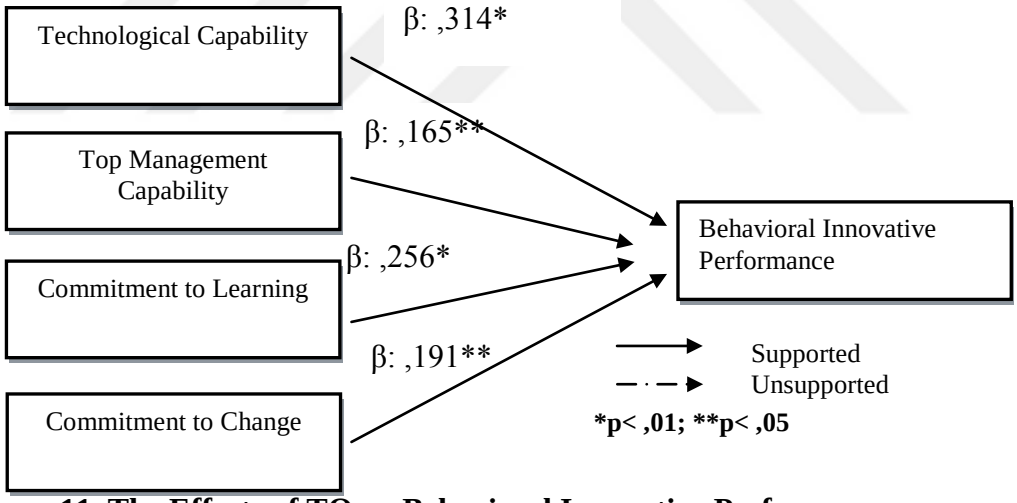

Figure 11. The Effects of TO on Behavioral Innovative Performance

Some of the proposed hypotheses became invalid after exploratory factor analyses results. The reason behind was twofold. One of them was excluding proposed "learning" dimension of technology orientation items from the analysis due to the destructive effects of the proposed dimension. The other one was constituted two-dimensional "unlearning" construct. According to hypothesis testing analysis, supported, not supported and invalid hypotheses were presented in Table 26.

Table 26. Summary of Supported/Unsupported/Invalid Hypotheses*

Hypothesis 1.	*Top Management capability affects;*	
	(a) marketing performance	S
	(b) market performance	S
	(c) financial performance	S
	(d)manufacturing performance within an organization	S
Hypothesis 2.	*Technological capability affects;*	
	(a) marketing performance	NS
	(b) market performance	S
	(c) financial performance	NS
	(d)manufacturing performance within an organization	S
Hypothesis 3.	*Learning affects;*	
	(a) marketing performance	I
	(b) market performance	I
	(c) financial performance	I
	(d)manufacturing performance within an organization	I
Hypothesis 4.	*Unlearning affects;*	
	(a) marketing performance	I
	(b) market performance	I
	(c) financial performance	I
	(d)manufacturing performance within an organization	I
Hypothesis 5.	*Top management capability affects;*	
	(a) process innovative performance	S
	(b) product innovative performance	S
	(c) marketing innovative performance	NS
	(d) strategic innovative performance	S
	(e)behavioral innovative performance within an organization	S
Hypothesis 6.	*Technological capability affects;*	
	(a) process innovative performance	S
	(b) product innovative performance	S
	(c) marketing innovative performance	S
	(d) strategic innovative performance	S
	(e)behavioral innovative performance within an organization	S

Hypothesis 7.	*Learning affects;*	
	(a) process innovative performance	I
	(b) product innovative performance	I
	(c) marketing innovative performance	I
	(d) strategic innovative performance	I
	(e)behavioral innovative performance within an organization	I
Hypothesis 8.	*Unlearning affects;*	
	(a) process innovative performance	I
	(b) product innovative performance	I
	(c) marketing innovative performance	I
	(d) strategic innovative performance	I
	(e)behavioral innovative performance within an organization	I

*S: Supported, NS: Not Supported, I: Invalid

Table 27. Functional Displays of Multiple Regression Analyses

	Equations
Business Performance	f(Marketing performance)= α_0+ ,220 (Top management capability)+,365 (Commitment to change) + ε_1
	f(Market performance)= α_0+ ,167 (Technological capability)+,443 (Top management capability) + ε_1
	f(Financial performance)= α_0+ ,273 (Top management capability) + ε_1
	f(Manufacturing performance)= α_0+ ,202 (Technological capability) + ,248 (Top management capability) +,199 (Commitment to learning) + ε_1
Innovative Performance	f(Process innovative performance)= α_0+ ,392 (Technological capability) + ,172 (Top management capability) +,223 (Commitment to change) + ε_1
	f(Product innovative performance)= α_0+ ,295 (Technological capability) + ,280 (Top management capability) + ε_1
	f(Marketing innovative performance)= α_0+ ,324 (Technological capability) + ,361 (Commitment to change) + ε_1
	f(Strategic innovative performance)= α_0+ ,411 (Technological capability) + ,250 (Top management capability) + ε_1
	f(Behavioral innovative performance)= α_0+ ,314 (Technological capability) + ,165 (Top management capability) + ,256 (Commitment to learning) + ,191 (Commitment to change) + ε_1

In Table 27, functional displays of the results of multiple regression analyses because not all variables were appeared in the hypotheses. In this way, direct linear effects of technology orientation dimensions effects on the dimensions of both business and innovative performance can be seen as a summary.

4.6.3. Post-hoc analysis

Although proposed at the beginning of the dissertation, it was revealed that learning is not belonged to the multidimensional construct of technology orientation. Moreover, in line with the literature, unlearning displayed a two-dimensional construct. As a result, half of the proposed hypotheses became invalid.

The remaining hypotheses were tested so far. Eventhough reaching to such valuable results, it was considered to run some more post-hoc analysis. By this way, even going beyond the scope of the research, it was planning to achieve outputs that are more precious for both academicians and practitioners. In this regard, at first, overall performance scores were calculated. Three multiple regression analyses were run:

(1) the effects of technology orientation dimensions on overall innovative performance,

(2) the effects of technology orientation dimension on overall business performance, and

(3) the effects of technology orientation dimensions and overall innovative performance on overall business performance.

Table 28 presented the effects of technology orientation dimensions on overall innovative performance where in Figure 12, a schematic display for this relation was provided.

F-value indicated that the model is significant as a whole (F=75,962 ρ= ,000). R^2 value showed that independent variables as a whole explains % 68,6 of overall innovative performance change. Tolerance and VIF values also implied that there was no multicollinearity problem in the model.

Table 28. The Effects of TO on Overall Innovative Performance

Independent Variables	B	t	p	Collinearity	
				Tolerance	VIF
Constant		3,531	,001		
Technological Capability	,401	5,925	,000	,492	2,031
Top Management Capability	,224	3,078	,003	,426	2,347
Commitment to Learning	,096	1,337	,183	,441	2,270
Commitment to Change	,234	3,155	,002	,410	2,437
R^2 = ,686		**F**= 75,962 p= ,000			

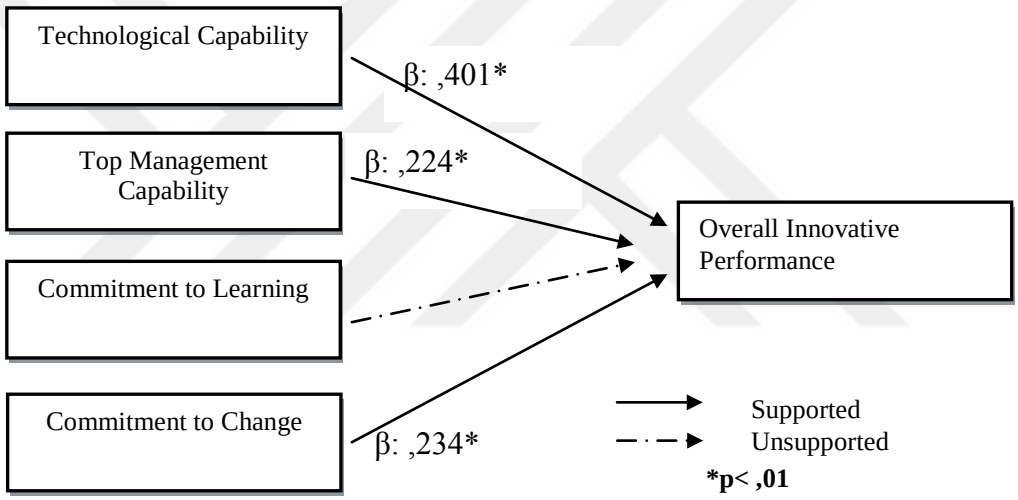

Figure 12. The Effects of TO on Overall Innovative Performance

Findings indicated that commitment to learning had no significant effects on overall innovative performance where on the other hand, technological capability, management capability and commitment to change lead to a change on overall innovative performance. Technological capability (β: ,401; p<,01), management capability (β: ,224; p<,05) and commitment to change (β: ,234; p<,01) had positive effects on overall innovative performance. One unit increase in technological capability increased ,401 units of overall innovative performance, one unit increase in management capability increased ,224 units of overall innovative performance and one unit increase in commitment to change increased ,234 units of overall innovative performance.

Table 29 represented the effects of technology orientation dimensions on overall business performance where Figure 13 presented a schematic display for this relation.

F-value indicated that the model is significant as a whole (F=21,650 ρ= ,000). R^2 value implied that independent variables as a whole explains % 38,4 of overall business performance change. Tolerance and VIF values also showed that there was no multicollinearity problem in the model.

Table 29. The Effects of TO on Overall Business Performance

Independent Variables	**β**	**t**	**p**	**Collinearity**	
				Tolerance	VIF
Constant		7,511	,001		
Technological Capability	,134	1,411	,160	,492	2,031
Top Management Capability	,370	3,625	,000	,426	2,347
Commitment to Learning	-,006	-,058	,954	,441	2,270
Commitment to Change	,198	1,903	,059	,410	2,437
R^2 = ,384		**F**= 21,650 p= ,000			

Findings indicated that technological capability and commitment to learning had no significant effects on overall business performance where management capability and commitment to change leads to a change on overall business performance. Management capability (β: ,370; p<,01) and commitment to change (β: ,198; p<,10) had positive effects on overall business performance. One unit increase in management capability increased ,370 units of overall business performance and one unit increase in commitment to change increased ,198 units of overall business performance.

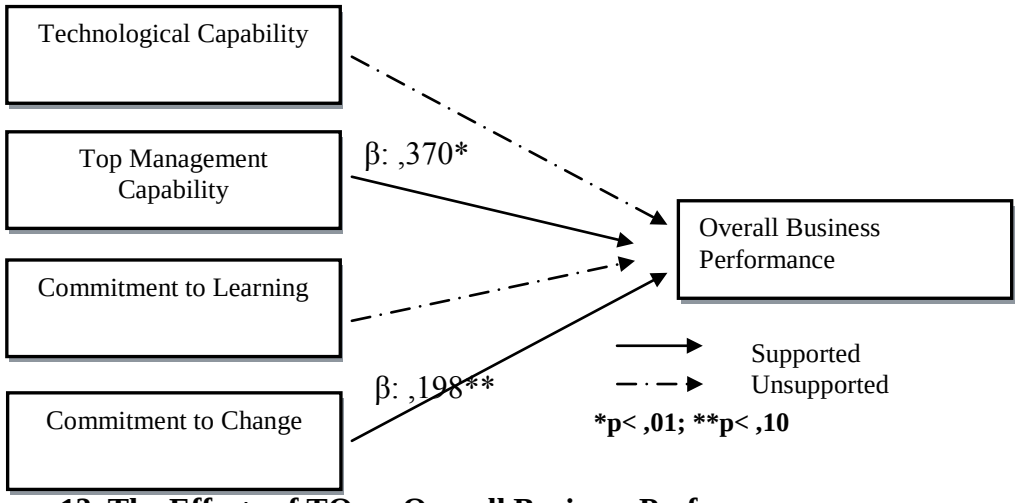

Figure 13. The Effects of TO on Overall Business Performance

The effects of overall innovative performance on overall business performance was also tested. The model was significant (F= 143,422 ρ = ,000) with a R^2 value of ,502. The result indicated that innovative performance had an effect on business performance (β: ,709; p<,01).

Table 30. The Effects of TO and Innovative Performance on Business Performance

Independent Variables	**B**	**t**	**p**	**Collinearity**	
				Tolerance	VIF
Constant		6,328	,000		
Technological Capability	-,137	-,1,468	,144	,393	2,544
Top Management Capability	,218	2,356	,020	,399	2,507
Commitment to Learning	-,070	-,794	,429	,435	2,299
Commitment to Change	,040	,419	,676	,383	2,611
Innovative Performance	,675	6,462	,000	,314	3,186
R^2 = ,527		**F**= 30,751 p= ,000			

Table 30 represented the effects of technology orientation dimensions and overall innovative performance on overall business performance where Figure 14 presented a schematic display for this relation.

F-value indicated that the model is significant as a whole (F=30,751 ρ= ,000). R^2 value implied that independent variables as a whole explains % 52,7 of overall business performance change. Tolerance and VIF values also denoted that there was no multicollinearity problem in the model.

Findings indicated that technological capability, commitment to learning and commitment to change had no significant effects on overall business performance where management capability and overall innovative performance leads to a change on overall business performance. Management capability (β: ,218; p<,05) and overall innovative performance (β: ,675; p<,01) have positive effects on overall business performance. One unit increase in management capability increases ,218 units of overall business performance and one unit increase in overall innovative performance increases ,675 units of overall business performance.

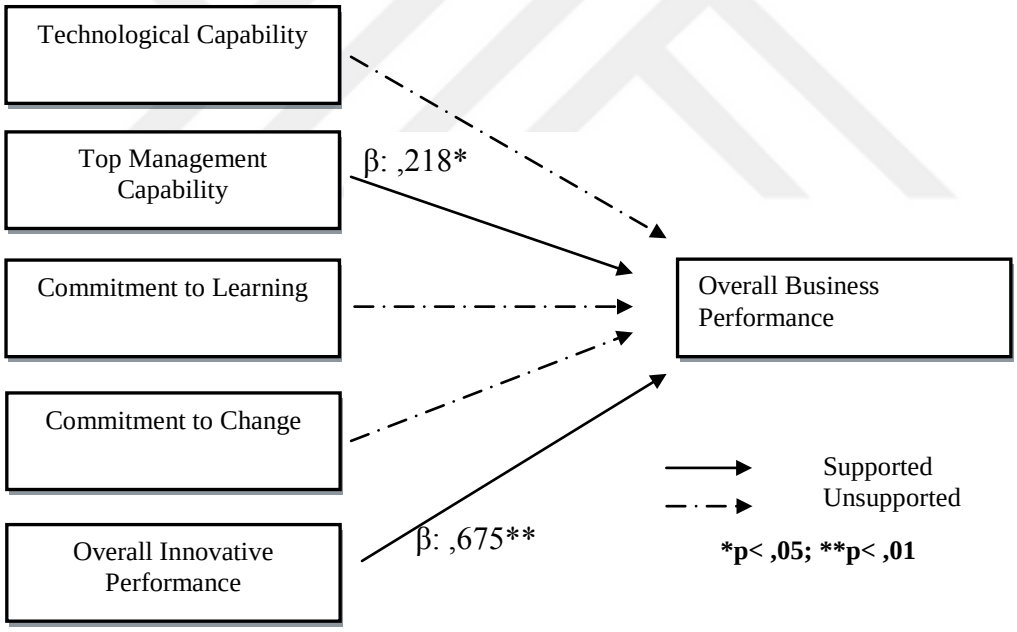

Figure 14. The Effects of TO and Innovative Performance on Business Performance

As to the post-hoc multiple regression analysis, Table 31 was displayed in order to provide a summary of relation as functional format.

Table 31. Functional Displays of Post-hoc Multiple Regression Analysis

Equations
f(Overall innovative performance)= α_0+ ,401 (Technological capability) + ,224 (Top management capability) + ,234 (Commitment to change) + ε_1
f(Overall business performance)= α_0+ ,370 (Top management capability) + ,198 (Commitment to change) + ε_1
f(Overall business performance)= α_0+ ,218 (Top management capability) +,675 (Overall innovative performance) + ε_1

EFA, CFA and multiple regression analyses so far provided many important insights into the concept and relations. In regression analysis, the effects of TO dimensions on the dimensions of two different performance criteria were examined. Not all TO dimensions significantly affect the all performance criteria, however; all variables were found significantly correlated to each other. The reason behind may have been the indirect effects of some variables on other variables. In addition, some variables' effects may have been weakening by including with some other variables. These results may also thought to be a predictor of "mediating" effect as mentioned in the study of Baron and Kenny (1986). They argued that when there is a mediating effect, previously detected effect on one another most likely to diminish or totally gone. Thus, separately utilized several multiple regression analyses were insufficient to test the model as a whole. In this regard, as a second step, an additional test was considered as necessary.

Ordinary regression analysis only provides direct effects where only one dependent variable was chosen. Structural models, on the other hand, go beyond direct relations and allow researchers to understand causal processes underlying several relationships. Moreover, it is also useful for representing the interrelationships of variables between constructs (Hair et al., 2010, p.634). Therefore, going one step behind, a structural model with a path diagram to see whole picture in which indirect relations, simultaneous relations and effects were identified was preferred.

In hypothesis testing part, the variable commitment to learning when included with other variables was seen to have little impact or even no impact on dependent variables. Then when examining technology orientation dimensions' effect on overall innovative performance commitment to learning detected to have no effect. Similarly, overall innovative performance was found to have effect on overall business performance. However, when technology orientation dimensions were included to the regression analysis, the effect of innovative performance on business performance was disappeared. In addition, the effect of technological capabilities on business performance was disappeared when innovative performance included to the model. Regarding to the facts, a structural model with mediating effects was considered in order to explore whole relations including direct and indirect relations. EQS 6.1 program was used to utilize the analysis. In Figure 14, the constructed model was presented.

Equation and statistics were found to be significant at ,05 level. Fit indices also provided satisfactory results [$\chi^2_{(1)}$=9,490 p: 0,00; NFI=,98; NNFI=,77; CFI=,99; IFI=,99; GFI=,98; RMSEA=,24].

The regression equations were formed as follows at p: 0,05 significance level in Table 32.

Table 32. Structural Analysis Equations

Equation
f(Technological capability) = α_0 + ,705 (Commitment to learning) + ε_1
f(Top management capability) = α_0 + ,410 (Technological capability) + ,524 (Commitment to learning) + ε_1
f(Commitment to change) = α_0 + ,372 (Technological capability) + ,618 (Commitment to learning) + ε_1
f(Overall innovation performance) = α_0 + ,323 (Technological capability) + ,177 (Top management capability) + ,179 (Commitment to change) + ε_1
f(Overall business performance) = α_0 + ,156 (Top management capability) + ,616 (Overall innovation performance) + ε_1

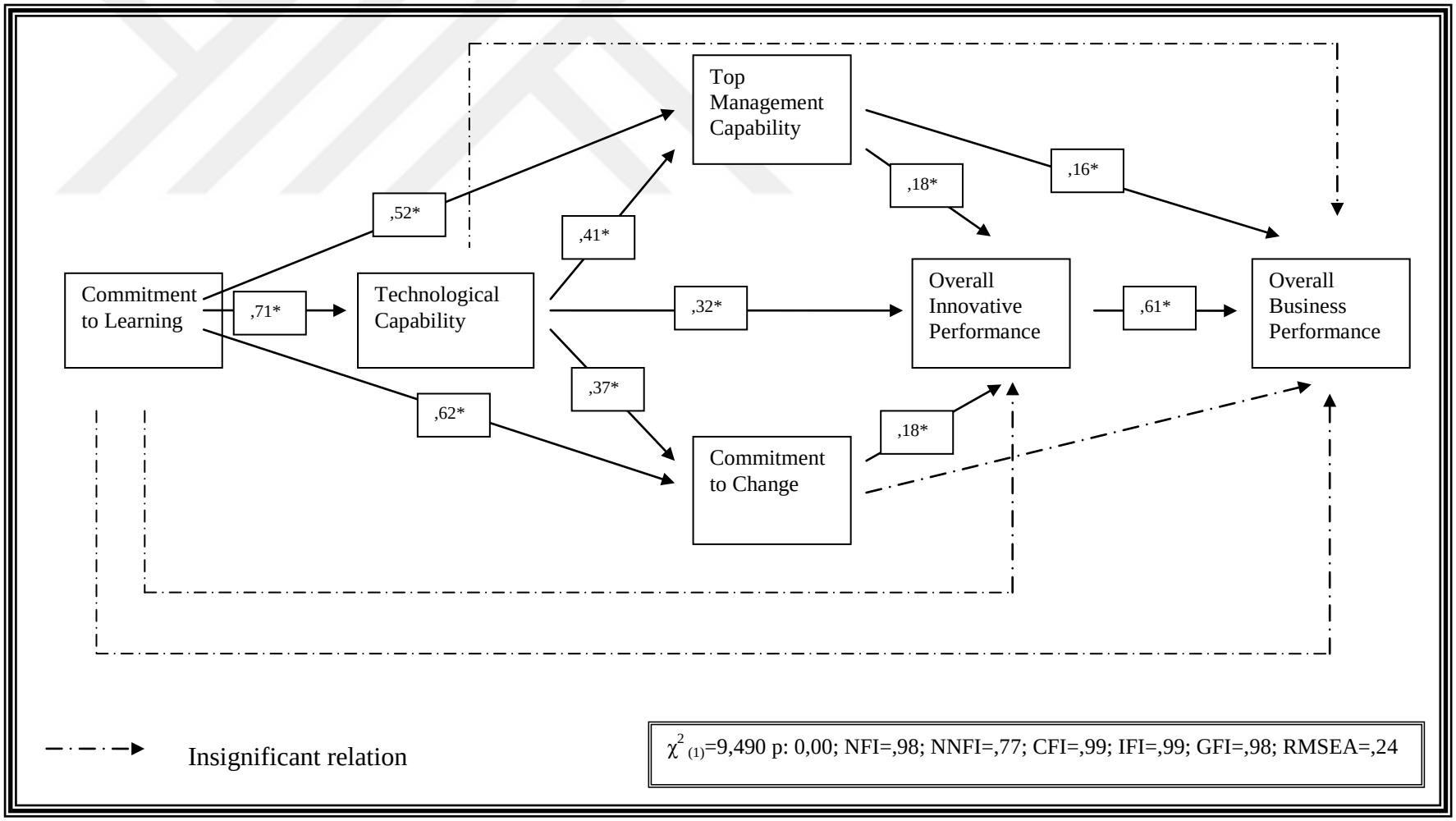

Figure 15. Path Diagram of the Structural Model

Path diagram as displayed in Figure 15 provided several important insights for both researchers and practitioners. In this diagram, the direct and indirect effects of four dimensions of technology orientation on overall innovative performance and overall business performance can be detected. In addition to those relations, the relation between overall innovative performance and overall business performance can also be seen. The coefficient values put on the arrows also indicate the direct effect size of one variable on another.

Findings indicate that the most powerful dimension of technology orientation is commitment to learning. Commitment to learning affects all other dimensions directly. One unit change in commitment to learning leaded to a 0,71 change in technological capability, 0,52 change in top management capability and 0,62 change in commitment to change. It can be interpreted from the picture that the common variance on commitment to learning decreases this dimensions' effect on performance criteria in multiple regression analyses or totally disappears. Findings also indicate that commitment to learning has direct effect on neither overall innovative performance nor overall business performance. Technological capability has also direct effect on both top management capability and commitment to change. One unit change in technological capability leaded a 0,37 change in commitment to change and a 0,41 change in top management capability. Technological capability has a direct effect on overall innovative performance, where one unit change in technological capability leaded a 0,32 change in overall innovative performance. In addition, there is only an indirect effect on overall business performance through top management capability and overall innovative performance. As similar to technological capability, commitment to change has also direct effect on overall innovative performance, where one unit change in variable commitment to change leaded a 0,18 change in overall innovative performance and only indirect effect on overall business performance through overall innovative performance. Top management capability, on the other hand, is the only technology orientation dimension that has direct effects on both overall innovative performance and overall business performance. One unit change in top management capability leaded a 0,18 change in overall innovative performance and a 0,16 change in overall business performance. When it comes to the relation between two performance criteria, the strong direct effect of overall innovative performance on overall business

performance is remarkable. One unit change in overall innovative performance leaded a 0,61 change in overall business performance. As a summary in considering technology orientation dimensions and overall performance criteria, commitment to learning has no direct but indirect effects on both overall innovative performance and overall business performance. Commitment to change and technological capability have no direct effects but indirect effects on overall business performance where those dimensions have direct effects on overall innovative performance. Top management capability has direct effects on both overall innovative performance and overall business performance.

In sum, just being committed to learning does not lead to an increase in overall innovative performance or in overall business performance. Being committed to learning leads to accelerate commitment to change, technological capability and top management capability by which a harmonized effect of multidimensional construct of technology orientation leads to an increase in overall innovative performance. One other important implication revealed from the structural model analysis is the importance of top management capability and overall innovative performance on overall business performance. Overall innovative performance especially had a great impact on overall business performance. Therefore, paying attention to innovative ways of doing things throughout an organization will return as increased business performance.

5. DISCUSSION AND CONCLUSION

There are no universally accepted optimal set of strategic choices for all businesses. Environmental factors to some points are one of the determinants of strategic choices. As to the fast-changing nature of emerging economies, highly heterogeneous environment in terms of demand uncertainty, technology turbulence and competition intensity are required for country specific researches and recipes for survival.

Turkey is becoming increasingly integrated to the world economy. As many emerging economies, Turkey has struggled to adopt all institutions to the fast changing environment. By the accelerated effect of globalization, many foreign firms have entered into the local competitions; local firms have faced with many advanced and high standard technologies. In such a highly competitive context, in order to survive, firms have tried to update their technological infrastructures by joint ventures to get advantage from know-how, have made investments to R&Ds or have purchased/transferred advanced technologies directly. Regardless of chosen way of survival, the importance of technological power has been accepted.

The effects of technology orientation on firm performance have important implications especially for emerging markets. Turkey as an emerging economy, needs to pay strong attention to technology and rather than transferring, internally updating technology by heavily investing on technology-based capabilities and R&D activities is expected to provide more sustainable position. In this regard, intensive current studies conducted in emerging economies such as China, Portugal and Turkey make sense. Technology orientation studies in Turkey are understudied, considering only three empirical studies had been conducted up to date.

Strategic orientations are defined as creating firm behaviors parallel with firm strategy to influence employee norms, beliefs and values in order to provide sustainable competitive advantage in the long run (Zhou, Yim & Tse, 2005). Some firms may be successful in pursuing more than one strategic orientation. However, eventhough being aware of the accelerated positive combined effects of strategic orientations, many firms need to make choices between strategic orientations and

select one over others. This selection is mostly a consequence partly because of limited and scarce resources of a firm and resource allocation problems where partly because of the difficulties of seeding more than one (sub)cultural value systems throughout the firms. Referring to one of the research questions -third one- of this dissertation, and considering the importance of technology and technological advances in competitiveness, especially in emerging economies, “technology orientation” as a sole orientation was in the focus of this dissertation. In this regard, a study that focusing on technology orientation in the manufacturing firms that operating in Izmir, Turkey is expected to contribute to the practitioners as well as researchers. Thus, this dissertation was also expected to fill this mentioned gap in Turkey-specific case.

Technology orientation studies strongly keen on technology-push and product-oriented management approach. Technology-push approach assumes that technological superiority is favorable in the eyes of customers; therefore, those firms heavily invest on R&D activities as well direct their resources to improve their technical aspects. Firms that embrace product-oriented management focus on firm supplies rather than customer needs and wants. In this manner, current empirical studies mostly handle technology orientation as a driver of new product innovation. Therefore, although strategic orientations are discussed at firm level, technology orientation is associated with functional level, namely production and/or R&D department strategies. This dissertation opposes this statement and proposes that technology orientation is not only related with final outputs of product innovation processes but also is about using, advancing and/or transferring technologies that will be used in those processes. Those technology-based applications are more likely to lead a firm to increase its speed in production and provide cost advantages. In addition, beyond production processes, managerial efficiencies are also expected to be improved via technological advances, which give accurate and timely information on decision-making. Moreover, technology orientation is not only composed of “creating new technologies” but also noticing a promising or accepted technology and, imitating and/or adopting it into the firm processes and/or production functions in order to be competitive.

There has been a gap in the current literature. Technology orientation was discussed in strategic marketing management literature, but it was only associated with manufacturing or R&D departments of firms. That is why technology orientation was discussed at functional level. However, as a culture-based strategic orientation, this dissertation proposed that technology orientation is needed to be discussed at firm level. Moreover, in opposed to single dimensional construct as mentioned in literature, it was proposed to have a multidimensional construct for the first time. The main objective of this dissertation was to constitute the multidimensional construct of technology orientation. Referring to strategy-performance relation once again; strategy is about setting goals where performance is about in what extent to achieve them. Therefore, one of the additional aims was come to mind naturally: to investigate the effects of technology orientation dimensions on innovative performance and business performance. One other aim was to state multidimensional constructs of both performance criteria.

The broad scope of this dissertation based on a comprehensive literature review accompanied with a comprehensive filed study and statistical analyses. Therefore, this dissertation started with strategic orientation literature and by using deductive reasoning, technology orientation literature was discussed in details in the introduction and conceptual framework parts of the dissertation. In this regard, well-known and reputable databases were searched, and all empirical studies consisting of technology orientation were tabulated and investigated (see Table1a to 1t). Moreover, which relations were in request in those studies was checked and in Table 2 literature on technology orientation-performance relation was also displayed as a summary. After that comprehensive literature study, research questions of this dissertation were raised. One of the research questions was about why technology orientation was not examined alone in the current literature. When all technology orientation definitions considered, the other question was: is technology orientation really a single dimensional construct as discussed in all empirical studies. What if it is more appropriate to consider it in a multidimensional construct? Since conceptual studies mentioned firm-level characteristics of technology orientation, third question was why empirical studies handled the concept at functional level. Moreover, as a firm level strategic orientation, how technology orientation effects firm performance was in the consideration.

Technology orientation was proposed as a multidimensional construct where top management capability, technological capability, learning and unlearning were supposed to be the dimensions. Strategy studies mainly address the question of why some firms perform better than the others do in the same industry. In the research field, there are just few approaches to explain those performance differences of firms. This dissertation was constructed on resource-based view (RBV) and learning theory where technology orientation itself and two dimensions –top management capability and technological capability- were associated with RBV and, the other two -learning and unlearning- were associated with learning theory. Business performance was constructed in a four-dimensional construct in which marketing performance, market performance, financial performance and manufacturing performance dimensions were included. Innovative performance was considered as a five-dimensional construct where innovative process, innovative product performance, innovative marketing performance, innovative marketing performance, innovative strategic performance and innovative behavioral performance dimensions were included.

After a comprehensive literature review, a two-step field study was conducted in order to collect data. A pilot study was conducted to obtain an applicable, reliable and valid measuring instrument for the hypotheses testing in the second step. Survey method was preferred to collect primary data. Perception based and likert-type questions were included to the questionnaire. Some of the scales were adapted from current literature, where some major revisions and changes done to some scales (see Table 4 for detailed information on questionnaire development). For the pilot study, voluntarily participated 58 Yaşar University graduate students who were working for a manufacturing firm located in Izmir were included. Factor analyses results indicated that technology orientation was composed of four dimensions; however, those dimensional construct were occurred somehow different than it was originally proposed. As to the findings, supposed “learning” dimension items were totally excluded where “unlearning” dimension items were divided into two separate dimensions. Therefore, some revisions on scales and questionnaire were needed to be done to continue with final field study. In Figure 2, all items which took place in final field study were displayed with their respective dimensions.

In the final field study, 147 manufacturing firms operating in Izmir area was participated to the study voluntarily. All scales were confirmed as valid and reliable. Exploratory factor analysis results indicated that technology orientation is composed of four dimensions namely top management capability, technological capability, commitment to learning and commitment to change. Business performance is composed of expected four dimensions namely marketing performance, market performance, financial performance and manufacturing performance. Likewise, innovative performance is also composed of expected five dimensions which are innovative process performance, innovative product performance, innovative marketing performance, innovative strategic performance and innovative behavioral performance. After exploratory factor analyses, confirmatory factor analyses were executed in order to test how well the variables represent the theory. As to the results, observed variables were significantly loaded to regarding factors and fit indices were in acceptable ranges for technology orientation, business performance and innovative performance. Therefore, as response to first two research questions, as opposed to current empirical discussions, multidimensional construct of technology orientation was supported. In addition, single dimensional technology orientation was because dealt with R&D and/or manufacturing units of a firm, technology orientation was considered to be analyzed at functional level. In this dissertation, by the proposed multidimensional construct of technology orientation, analyses can be realized at firm level.

After factor analyses, multiple regression analyses were executed in order to test the hypotheses. Thus, the effects of technology orientation dimensions on several performance criteria were examined. Supported, unsupported and invalid hypotheses were presented in Table 26. Some of the set hypotheses were automatically became invalid to analyze because of the change in technology orientation construct in the proposed model. Recalling to the pilot study analyses results, supposed learning dimension was totally excluded from the structure where unlearning dimension was divided into two dimensions, which are “commitment to learning” and “commitment to change” dimensions. Turkey, as an emerging economy, mostly keens on transferring rather than developing technologies. Therefore, it is not surprising that, rather than learning/ knowledge creation, unlearning become more prominent.

Additionally, considering the "openness to change" characteristics of technology orientation, unlearning seems more well suited in the construct instead of learning. Eventhough, learning and unlearning can vary across regional or country based-cultural characteristics, in order to keep up with the fast-changing technology and new products, being committed to unlearn a may provide competitive advantage. Firms who change their technological background and way of doing things faster than others do, most likely to be the pioneer firms or first imitators.

There were only three unsupported hypotheses. The effects of technological capability on both marketing performance and financial performance were found unsupported along with the effects of top management capability on marketing innovative performance. One possible reason to all unsupported hypotheses can be sampling size. If analyses are run with enlarged data, then some or all of them may become "supported". Another reason can be the combination of variables that put together in the analysis. In other words, indirect effects may be the reason to those unsupported hypotheses. In the current literature some empirical studies (e.g. Tsai, 2004; Wang, Lo, Zhang & Xue, 2006) indicated the direct positive effects of technological capability on productivity growth and business performance among high tech/electronic firms in Taiwan/China. However, most studies supported the direct relation between technological capability and innovative performance (e.g. Garcia-Muina & Navas-Lopez, 2007; Hao & Yu, 2011; Huang, 2011) where the existence of an indirect relation between technological capability and business performance in line with this dissertation. In those mentioned studies, researchers indicated that technological capability leads to increased innovative performance which in turn (indirectly) has a significant effect on organizational performance. Concerning the relation between top management capability and firm performance, there are only limited studies conducted where no study investigated the top management and marketing innovative performance in specific. Thompson and Heron (2005) indicated that top management capability leads to high performance work organizations which in turn increase business performance. Zehir, Müceldilli, Zehir and Ertosun (2012) investigated the role of leadership management and performance relation in their study. In that study, they argued that management leadership is associated with overall innovative performance, quality performance and operational performance. As to Harmancioglu, Grinstein and Goldman (2010)

top management mostly deal with strategic decisions; therefore, because of lack of bureaucracy, in small firms role of top management is expected to be higher in operational level. Considering the questionnaire items, which are related to marketing innovative performance, they are related to tactical roles mostly. Therefore, in addition to the mentioned possibilities related to being unsupported above, this specific reason should also be taken into consideration regarding to this "not supported" hypothesis.

Supplementary to Table 26, supported significant relations can also be seen in Table 27 in a functional display format. When considering the literature on the relation between technology orientation and performance, this dissertation also supports the earlier findings in a general sense. Studies such as Gatignon & Xuereb (1997), Salavou (2005), Jeong, Pae & Zhou (2006), Bulut (2007), Spanjol, Qualls & Rosa (2011), Hortinha, Lages & Lages (2011), Sainino, Ritala & Hurmelinna-Laukkanen (2012) and Yang, Wang, Zhu & Wu (2012) indicated single dimensional construct of technology orientation directly affects the innovative performance in a positive way. Those studies except Sainino, Ritala & Hurmelinna-Laukkanen (2012) used innovative performance as similar to new product performance. Studies such as Jeong, Pae & Zhou (2006), Bulut (2007), Gao, Zhou & Yim (2007), Akman, Ozkan & Eriş (2008), Hakala & Kohtamaki (2010) indicated single dimensional construct of technology orientation directly affects the business performance in a positive way. In most of those studies, profitability, firm performance, company performance kind of names were used instead of business performance and the limited performance indicators of those studies can be seen in Table 2 in details. In addition, there are some studies that two or more different sets of relations were presented. For example, in Table 1b, the study of Zhou, Yim & Tse (2005) implicitly implied an indirect relation between technology orientation and firm performance. In that study, technology orientation affects technology-based orientation where an increase in technology based orientations lead to an increase in firm performance. However, because those relations are the results of linear multiple regression analysis and such a relation may disappear if all those three variables are included to one equation. One of the reasons to decide on continuing with some post-hoc analysis in this dissertation was to eliminate such a thread.

As to the hypotheses testing results, not all technology orientation dimensions were found to be effective on set performance criteria where they were all correlated with each other. In light of those results, an existence of Baron & Kenny's (1986) mediating effect was considered. Therefore, taking one-step ahead of the scope of the research, as post hoc analysis, a structural model analysis was considered. A structural analysis was considered appropriate in order to achieve a whole picture in which beyond direct relations, indirect relations, simultaneous relations and effects can be detected. In this regard, at first, overall performance scores were calculated for business performance and innovative performance. Three additional multiple regression analyses were run:

(1) the effects of technology orientation dimensions on overall innovative performance,

(2) the effects of technology orientation dimension on overall business performance, and

(3) the effects of technology orientation dimensions and overall innovative performance on overall business performance.

The results of those three multiple regression analyses were presented in Table 31. As to those linear analyses results, overall innovative performance was found to be a function of three of technology orientation dimensions, namely; technological capability, top management capability and commitment to change. Overall business performance was found to be a function of top management capability and commitment to change dimensions of technology orientation. However, when overall innovative performance variable was included to the equation, the effect of commitment to change was disappeared where top management capability and overall innovative performance were found effective on overall business performance. Then, not effective or the least effective variables in multiple regression analyses were considered to have a stronger effect in a broad scope and added variables diminished their sole effects. Considering the data on hand, technology orientation dimensions and performance variables were sequences in an order manually. Based on that sequence, in the following step, direct and indirect relations were supported by fit indices as can be seen in Figure 14. In addition, those direct relations were also displayed in equation formats as in Table 32. Therefore, as response to the fourth research question, changes in technology

orientation leads to changes in performance dimensions. However, not all dimensions of technology orientation have direct or linear relations; indirect relations are also needed to be taken into consideration.

In conclusion, factor analyses results support the four-dimensional construct of technology orientation. Results indicated that technology orientation consists of top management capability, technological capability, commitment to learning and commitment to change. Therefore, technology orientation as a culture-based firm level strategic orientation is characterized by top management capability that leads the strategic direction, strong technological capability and being committed to learn and committed to change when necessary in order to be/stay competitive. In short, technology orientation is a way to sustainable competitiveness granted by organization wide shared strong beliefs on top management and technological capabilities as well as being dedicated to continuous learning, questioning all new information and change old routines if necessary.

Results also indicated business and innovative performances both constitute a multidimensional construct. Business performance was consisted of financial, market, marketing and manufacturing performances where innovative performance was consisted of product, process, marketing, behavioral and strategic innovative performances.

As to the path diagram, where proposed dimensions effects on overall business and innovative performances were investigated in a model, indicated that the most powerful dimension of technology orientation is commitment to learning. Commitment to learning affects all other dimensions. Although individual effects of dimensions on business performance were investigated, the strong indirect effects of dimensions of technology orientation on business performance through innovative performance were undeniable. Therefore, participated firms' declarations in this dissertation demonstrated that manufacturing firms might increase their business performances by paying attention to increasing their innovative performances. In order to increase innovative performance, they need to have a clearly directed mission, vision and leadership skills; need to invest on strong R&D resources, practical and theoretical know-how, methods, physical devices/equipment and highly

skilled human resources; need to be dedicated to learning, evaluate every bit of new information and shed the old way of doing things/procedures if the new ones are more suitable or the new ones are required to stay competitive.

Technology orientation has strong direct effects on innovative performance. Being committed to learning is likely to excel a firm's current capabilities and make them more efficient as well as to accelerate continuous learning. This process may be formulated as a chain reaction:

(1) technological capability of a firm is likely to increase via commitment to learning,

(2) a combined effect of technological capability and commitment to learning leads to a higher level of top management capability as well as a firm's commitment to change behavior,

(3) while commitment to learning indirectly effects, top management capability, technological capability and commitment to change positively effect overall innovative performance,

(4) in the end, while combining with top management capability, overall innovative performance leads to an increase in overall business performance.

Therefore, although paying attention to all dimensions of technology orientation is important to improve innovative performance, managers need to put most of their efforts to "commitment to learning" considering prioritization and, scarce sources and time. Being committed to learning is utmost important because it stimulates all other technology orientation dimensions.

This dissertation had a number of limitations as in every social sciences research, although it provided valuable insights for future research as well as contributed to current literature. One of the limitations was the reliance on subjective data based on self-reporting in measuring the variables. Survey method itself, as a data collection technique; also have limitations that can affect the quality of the findings. The survey depended on participants' perceptions, thus the participants' perceptions were investigated which means that the findings would not reflect the facts. However, the results of validity and reliability tests brought sufficient confidence in these measures. Second limitation was about sampling. The sampling

frame in the beginning was manufacturing firms operating in Izmir Ataturk Organized Industrial Zone. However, planned participation was not provided. In order to increase number of observed data, a somehow snowballing technique was preferred. In this way, satisfactory numbers of participant firm were reached but when it comes to generalization, a cautious interpretation would be necessary.

This dissertation contributes to the current literature in several ways. For the first time, in this dissertation, technology orientation is a sole focus of a research where technology orientation was discussed at firm level instead of functional level as in the current empirical works. The gap of associating technology orientation on functional level as a reflection of technology-push approach was argued in detail. This dissertation is the first research that proposed and supported a multidimensional construct of technology orientation. Therefore, considering the four newly revealed dimensions -top management capability, technological capability, commitment to learning and commitment to change-, definition of technology orientation was extended to firm level. In other words, beyond pointing out the shortcoming regarding to associating technology orientation with R&D investments and production processes, technology orientation was redefined at firm level. Consequently, as well as being well aware of the higher impact of combined effects of several strategic orientations on firm performance, the sole effect of technology orientation under the circumstances of resource scarcity and allocation problems in an emerging economy was examined for the first time. One of the proposed dimensions of technology orientation, unlearning, was operationalized at firm level as opposed to team level operationalization of current literature. This newly operationlized two-dimensional firm level unlearning scale is expected to be used in future studies. Five-dimensional innovativeness attitude scale was converted into innovative performance scale at firm level. By this way, for the first time a multidimensional innovativeness scale, which is reflecting OECD innovativeness definition, was provided to current literature. Therefore, innovative performance can be investigated in a detail way in future studies. Proposed four-dimensional business performance construct was supported where those performance indicators of current literature were deepened and enriched. Beyond investigating direct effects of dimensions of technology orientation on several performance criteria, by providing a complete picture of networks of all variables, direct and indirect effects among

variables as well as mediating effects were also displayed. Another important contribution of this dissertation was revealing the dominance of “unlearning” instead of “learning” regarding to technology orientation tendency of participant firms. Therefore, a cultural-based reflection of being a technology importing country, the vitality and significance of unlearning was revealed for the first time.

It is expected that this dissertation can stimulate more research on technology orientation. Future studies may try to test the validity and reliability of newly proposed technology orientation scale among other populations. Moreover, a Turkey-based extended study may provide a wide range map of the tendency of technology orientation in Turkey. In addition, those studies may deepen the results on what differences may occur depending on sectoral-based practices. In this regard, future studies may conduct an expanded field study in several organized industrial zones in different regions and can examine the differences between them. Moreover, as an additional analysis method, cannonical correlation may be applied in order to provide deeper simultaneous relations among the dimensions of technology orientation and several selected performance criteria. On the other hand, the reasons behind why supposed “learning” dimension was excluded from the factor structure and why unlearning became dominant in technology orientation can also be new research questions to future studies. Therefore, learning and unlearning can be discussed in detail among dominant social culture. Moreover, cross-cultural studies, especially a comparison with technology developing countries, may reveal if different social cultures reveal different consequences regarding unlearning dimensions of technology orientation.

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Appendix-A: Questionnaire Form Used in Pilot Study

Stratejik İnovasyon Yönetimi ve İşletme Performansı

Değerli Katılımcı,
İmalat sanayinde faaliyet göstermekte olan işletmelerin yürütmekte oldukları stratejik inovasyon yönetiminin işletme performansı üzerindeki etkilerini araştırmayı hedeflemekte olduğumuz bu çalışma tamamen bilimsel hedeflere yönelik hazırlanmıştır.
Bu çalışmaya katılımınız gönüllüdür. Çalışmamızı başarıyla sonuçlandırabilmemiz için bu ankete ayıracağınız kısa bir zaman dilimi hepimiz için büyük önem arz etmektedir.
Kimlik bilgilerinizin kesinlikle talep edilmediği bu çalışmada, sunduğunuz tüm bilginin gizli ve güvenli bir şekilde, bireysel değil toplu olarak ele alınacağını ve ayrıca hiçbir şart ve koşulda kimliğinizin açıklanmayacağını taahhüt ederiz.
Araştırma bulgularından elde edilecek genel sonuç raporunu isterseniz lütfen duygu.seckin@yasar.edu.tr e-mail adresine bu istediğinizi belirtiniz.
Yardım ve katkılarınız için çok teşekkür ederiz!
Araş. Gör. Duygu SEÇKİN HALAÇ, duygu.seckin@yasar.edu.tr, Yaşar Üniversitesi, İİBF, İşletme Bölümü

Cinsiyet	☐Bay ☐Bayan
Meslek hayatınızdaki tecrübeniz	……yıl
Mevcut firmadaki çalışma süreniz:	……yıl (1 yıldan az ise …….ay)
Çalışmakta olduğunuz pozisyon:	☐ Mavi yakalı personel ☐ Beyaz yakalı personel ☐ Orta Kademe Yöneticisi ☐Üst Kademe Yöneticisi ☐ İşletmenin Sahibi / Ortağı
Ar -Ge departmanı ile birebir çalışıyor musunuz?	☐Evet ☐Hayır
Ürün geliştirme süreçlerinde birebir görev alıyor musunuz?	☐Evet ☐Hayır
Firmanızda çalışan personel sayısı:	…….(yaklaşık bir rakam verebilirsiniz)
Firmanız kaç senedir faaliyet göstermektedir?	……..……

1 kesinlikle katılmıyorum 2 katılmıyorum 3 kararsızım 4 katılıyorum 5 kesinlikle katılıyorum

Firmamız;	**1**	**2**	**3**	**4**	**5**
TI1-Mevcut teknolojisinin geliştirilmesine yönelik yatırımlar yapar.	☐	☐	☐	☐	☐
TI2-Kullanmakta olduğu teknolojisinin bir bölümünü firma bünyesinde oluşturur.	☐	☐	☐	☐	☐
TI3-Kullanmakta olduğu teknolojik altyapıyı büyük ölçüde diğer firmalardan temin eder.	☐	☐	☐	☐	☐
TI4-Teknoloji temelli yenilik yapılmasına önem verir.	☐	☐	☐	☐	☐
TI5-Sektörümüzdeki teknolojik gelişmelere öncülük eder.	☐	☐	☐	☐	☐
TI6-Problemlerin çözümünde geleneksel yöntemlerden ziyade orijinal/yeni yöntemleri tercih eder.	☐	☐	☐	☐	☐
TI7-Ar-Ge faaliyetleri sonucunda ortaya çıkartılan yeniliklere önem verir.	☐	☐	☐	☐	☐
TI8-Yeni ürünlerini kendi geliştirdiği yöntemlerle üretmeyi tercih eder.	☐	☐	☐	☐	☐

Firmamız;	**1**	**2**	**3**	**4**	**5**
TC1-Ar-Ge faaliyetlerine yeterli yatırımı yapmaktadır.	☐	☐	☐	☐	☐
TC2-Farklı alanlarda güçlü teknolojik becerilere sahiptir.	☐	☐	☐	☐	☐
TC3-Teknik becerilerin geliştirilmesinde iş üzerinde "yaparak öğrenme"ye önem vermektedir.	☐	☐	☐	☐	☐
TC4-Çalışanların teknik becerilerini eğitimlerle sürekli geliştirmektedir.	☐	☐	☐	☐	☐
TC5-Yüksek yetenekli uzmanları çekecek ve motive edecek niteliktedir.	☐	☐	☐	☐	☐

TC6-Gelecek teknolojik trendleri doğru tahminleme yeteneğine sahiptir.	☐	☐	☐	☐	☐
TC7-Yeni teknolojilerle problemleri çözmede yeteneklidir.	☐	☐	☐	☐	☐
TC8-Sektöründe teknoloji standardlarını belirleyenlerden biridir.	☐	☐	☐	☐	☐
TC9- Sektöründe teknoloji standardlarını sürekli yükseltenlerden biridir.	☐	☐	☐	☐	☐
TC10-Teknolojik yenilikçilikte öncü firmalardandır.	☐	☐	☐	☐	☐
TC11-Sektöründe teknolojiye yönelik stratejilerinde rekabetçi ve güçlü konumdadır.	☐	☐	☐	☐	☐
TC12-Dışarıdaki teknolojik kaynakları bünyemize entegre etme yeteneğine sahiptir.	☐	☐	☐	☐	☐
TC13-Güncel teknolojik değişim ve gelişmeleri yakından takip etmektedir.	☐	☐	☐	☐	☐

Firmamız üst düzey yöneticileri;	**1**	**2**	**3**	**4**	**5**
MC1-İşinin ehli liderlerdir.	☐	☐	☐	☐	☐
MC2- Firmamızın vizyonunu paylaşırlar.	☐	☐	☐	☐	☐
MC3-Stratejik planlama konusunda başarılıdır.	☐	☐	☐	☐	☐
MC4-Değişen dış çevre koşullarının farkındadır.	☐	☐	☐	☐	☐
MC5-Sektörde gerekli olan teknik yeterliliğe sahiptir.	☐	☐	☐	☐	☐
MC6-Firma çalışanlarıyla iyi iletişim halindedir.	☐	☐	☐	☐	☐
MC7-Müşteriler ve tedarikçilerle iyi iletişim halindedir.	☐	☐	☐	☐	☐
MC8-Firmamızın temel işleyişiyle ilgili tam bilgiye sahiptir.	☐	☐	☐	☐	☐
MC9-Çalışanlardan düzenli geri bildirim alırlar.	☐	☐	☐	☐	☐

Firmamız;	**1**	**2**	**3**	**4**	**5**
LC1-Zorlukları ve fırsatları anlama yeteneğine sahiptir.	☐	☐	☐	☐	☐
LC2-Yakaladığı/gördüğü fırsatları gerçekleştirmek üzere yeni fikirler üretme yeteneğine sahiptir.	☐	☐	☐	☐	☐
LC3-Üretilen yeni fikirler arasından en uygulanabilir ve gerçekçi olanına karar verme yeteneğine sahiptir.	☐	☐	☐	☐	☐
LC4-Karar verdiği fikirleri uygulama yeteneğine sahiptir.	☐	☐	☐	☐	☐
LC5-Farklı birimlerce edinilmiş bilgi, deneyim ve uygulamaları diğer birimlerle de paylaşır.	☐	☐	☐	☐	☐
LC6-Geçmiş tecrübelerden, gelecek faaliyetler için yararlanma yeteneğine sahiptir.	☐	☐	☐	☐	☐
LC7-Geçmiş deneyimlerin önemine inanmaktadır.	☐	☐	☐	☐	☐
LC8-Dış çevreden aldığı gerekli bilgiyi tanımlama, edinme ve kullanma yeteneğine sahiptir.	☐	☐	☐	☐	☐
LC9-Edindiği bilgi ve deneyimleri kurumsal hafızaya (dokümantasyon vb) aktarama yeteneğine sahiptir.	☐	☐	☐	☐	☐
LC10-Edindiği bilgi ve deneyimleri sınıflandırma ve gerektikçe tekrar kullanma yeteneğine sahiptir.	☐	☐	☐	☐	☐
LC11-Performans hedeflerini belirlemede önceki tecrübeleri kullanma yeteneğine sahiptir.	☐	☐	☐	☐	☐

	1	**2**	**3**	**4**	**5**
Firmamızda;					
ULC1-Yeni bilgi akışına önem veririz.	☐	☐	☐	☐	☐
ULC2-Yeni bilgiler ışığında eskilerini sorgularız.	☐	☐	☐	☐	☐
ULC3-Yeni bilgiler ışığında rutinlerimizi ve prosedürlerimizi sorgularız.	☐	☐	☐	☐	☐
ULC4-Uygulanma potansiyeli yüksek yeni bilgiyi firma içinde paylaşırız.	☐	☐	☐	☐	☐
ULC5-Edinilen yeni bilgilerin etkinliğine inanılırsa eski bilgilerin kullanımından bilinçli olarak vazgeçeriz.	☐	☐	☐	☐	☐
Firmamızda <u>edinilen yeni bilgiler</u> ışığında gerekli ise;					
ULC6-Mevcut iş yapış şekillerini yeniden düzenleriz.	☐	☐	☐	☐	☐
ULC7-Mevcut prosedürleri ve rutinleri yeniden düzenleriz.	☐	☐	☐	☐	☐

ULC8-Mevcut teknik altyapı unsurlarını (montaj hattı, depolama vb) yeniden düzenleriz.	☐	☐	☐	☐	☐
ULC9-Mevcut iş görme yöntemlerini iyiye taşıyacak araçları yeniden düzenleriz.	☐	☐	☐	☐	☐
ULC10-Daha etkin olduğu düşünülen iş yapış şekillerini derhal uygulamaya koyarız.	☐	☐	☐	☐	☐
Edinilen bilgiler ışığında çalışanlarımız;					
ULC11-Değişime karşı olumlu düşüncelere sahiptir.	☐	☐	☐	☐	☐
ULC12-Değişeme karşı direnç göstermez.	☐	☐	☐	☐	☐
ULC13-Değişime hızla uyum sağlar.	☐	☐	☐	☐	☐
ULC14-Değişim fikirlerini uygulamaktan çekinmez.	☐	☐	☐	☐	☐
ULC15-Değişim sonucu oluşan rutin ve prosedürleri hızla benimser.	☐	☐	☐	☐	☐
ULC16-Terk ettiğimiz iş görme yöntemlerinden ötürü pişmanlık duymaz.	☐	☐	☐	☐	☐

Son 3 yılı dikkate aldığınızda, aşağıdaki her bir başarı kriterini firmanızın rakiplerine göre değerlendiriniz.

1 ortalamanın çok altı 2 ortalamanın altı 3 ortalama 4 ortalamanın üstü 5 ortalamanın çok üstü

	1	2	3	4	5
Pazarda sunulan yeni ürünlerin beklenen;					
MGP1-satış hedefi	☐	☐	☐	☐	☐
MGP2- karlılık hedefi	☐	☐	☐	☐	☐
MGP3- yatırım getirisi	☐	☐	☐	☐	☐
MGP4- pazar payı büyümesi	☐	☐	☐	☐	☐
MP1-müşteri memnuniyeti	☐	☐	☐	☐	☐
MP2-toplam satışlar	☐	☐	☐	☐	☐
MP3-pazar payı büyüklüğü	☐	☐	☐	☐	☐
FP1-Ciro karlılığı (Kar/Toplam Satışlar)	☐	☐	☐	☐	☐
FP2-Aktif Karlılığı (Kar/Toplam Satışlar)	☐	☐	☐	☐	☐
FP3-Firmanın genel karlılık durumu	☐	☐	☐	☐	☐
FP4-Yatırım dışı nakit akışı	☐	☐	☐	☐	☐

	1	2	3	4	5
ManP1-İmalat kalitesi	☐	☐	☐	☐	☐
ManP2-İmalat maliyeti	☐	☐	☐	☐	☐
ManP3-İmalat esnekliği	☐	☐	☐	☐	☐
ManP4-İmalat hızı	☐	☐	☐	☐	☐
ManP5-Teslimat hızı	☐	☐	☐	☐	☐

Son 3 yılı dikkate aldığınızda, aşağıdaki her bir başarı kriterini firmanızın rakiplerine göre değerlendiriniz.

1 ortalamanın çok altı 2 ortalamanın altı 3 ortalama 4 ortalamanın üstü 5 ortalamanın çok üstü

	1	2	3	4	5
(Pazara sunulan) yeni süreç, ürün ve hizmetlerin;					
IP1-Sunumunda öncü olması	☐	☐	☐	☐	☐
IP2-Müşteriler için' ilk' oluşu	☐	☐	☐	☐	☐
IP3-Sayısı	☐	☐	☐	☐	☐
IP4-Başarı oranı	☐	☐	☐	☐	☐
IP5- Ana üretim ve hizmet süreçlerinde kullanılan makine ve teçhizatların teknolojik özellikleri	☐	☐	☐	☐	☐
IP6- Üretiminde kullanılan yeni makine ve teçhizata yapılan yatırımların yıllık cirodaki oranı	☐	☐	☐	☐	☐
IP7- Üretim yöntemlerine yapılan yatırımların yıllık cirodaki oranı	☐	☐	☐	☐	☐
IP8-Üretim hattı ve süreçlerin yeniliği	☐	☐	☐	☐	☐
IP9-İşletim süreçlerinin sürekli yenilenmesi	☐	☐	☐	☐	☐
IP10-Üretim yöntemlerini değiştirebilme hızı	☐	☐	☐	☐	☐
IP11-Yeni yönetim yaklaşımlarının geliştirilmesi	☐	☐	☐	☐	☐
IP12-Problemlerin çözümünde yeni yöntemlerin kullanılması	☐	☐	☐	☐	☐

Yeni ürün/hizmetlerin					
IP13-Eski ürün ve hizmetlerden ayrışması	☐	☐	☐	☐	☐
IP14- Farklılığı	☐	☐	☐	☐	☐
IP15-Pazara sunum hızı	☐	☐	☐	☐	☐
IP16-Pazarlama taktiklerinin niteliği	☐	☐	☐	☐	☐
IP17-Reklam ve promosyon şekilleri	☐	☐	☐	☐	☐
IP18-Pazara sunumunda en yeni teknolojilerin kullanılması	☐	☐	☐	☐	☐
IP19-Teknolojik yeniliklerin iş süreçlerine ve üretime adapte edilme hızı	☐	☐	☐	☐	☐
IP20-Ar-Ge ve ürün geliştirme kaynaklarının yeterliliği	☐	☐	☐	☐	☐
IP21-Yöneticilerin büyüme fırsatlarını yakalayabilmek için aldıkları riskler	☐	☐	☐	☐	☐
IP22-Yöneticilerin problem çözümünde yeni yöntemleri araştırması	☐	☐	☐	☐	☐
IP23-Yeni iş yapış şekillerinin süreçlere adapte edilme hızı	☐	☐	☐	☐	☐
IP24-Yöneticilerin, çalışanların yeni iş yapış şekillerini deneme isteklerine desteği	☐	☐	☐	☐	☐
IP25-Yöneticilerin yenilikçi fikirlere açık olması	☐	☐	☐	☐	☐
IP26-Diğer firmaların iş yapış süreçlerinin iç süreçlere adapte edilmesi	☐	☐	☐	☐	☐
IP27-İşleri alışılmışın dışında yapmak isteyen çalışanlara karşı toleranslı tutum	☐	☐	☐	☐	☐
IP28-İş görme şekillerinde yeni yöntemlerin kullanılma isteği	☐	☐	☐	☐	☐
IP29-Çalışanların alışılmışın dışında yeni iş yapış şekilleri denemesi	☐	☐	☐	☐	☐

Katkı ve yardımlarınız için çok teşekkür ederiz!

Appendix-B: Questionnaire Form Used in Final Study

Stratejik İnovasyon Yönetimi ve İşletme Performansı

Değerli Katılımcı,

İmalat sanayinde faaliyet göstermekte olan işletmelerin yürütmekte oldukları stratejik inovasyon yönetiminin işletme performansı üzerindeki etkilerini araştırmayı hedeflemekte olduğumuz mevcut çalışma tamamen bilimsel hedeflere yönelik hazırlanmıştır.
Mevcut çalışmaya katılımınız gönüllüdür. Çalışmamızı başarıyla sonuçlandırabilmemiz için ankete ayıracağınız kısa bir zaman dilimi hepimiz için büyük önem arz etmektedir.
Kimlik bilgilerinizin kesinlikle talep edilmediği mevcut çalışmada, sunduğunuz tüm bilginin gizli ve güvenli bir şekilde, bireysel değil toplu olarak ele alınacağını ve ayrıca hiçbir şart ve koşulda kimliğinizin açıklanmayacağını taahhüt ederiz.
Araştırma bulgularından elde edilecek genel sonuç raporu istenildiği taktirde duygu.seckin@yasar.edu.tr e-mail adresine bu talebinizi lütfen belirtiniz.
Yardım ve katkılarınız için çok teşekkür ederiz!
Araş. Gör. Duygu SEÇKİN HALAÇ, duygu.seckin@yasar.edu.tr, Yaşar Üniversitesi, İİBF, İşletme Bölümü

Cinsiyet	☐Kadın ☐Erkek
Meslek hayatınızdaki tecrübeniz	……yıl
Mevcut firmadaki çalışma süreniz:	……yıl (1 yıldan az ise …….ay)
Çalışmakta olduğunuz pozisyon:	☐ Mavi yakalı personel ☐ Beyaz yakalı personel ☐ Orta Kademe Yöneticisi ☐Üst Kademe Yöneticisi ☐ İşletmenin Sahibi / Ortağı
Ar -Ge departmanı ile birebir çalışıyor musunuz?	☐Evet ☐Hayır
Ürün geliştirme süreçlerinde birebir görev alıyor musunuz?	☐Evet ☐Hayır
Firmanızda çalışan personel sayısı:	…….(yaklaşık bir rakam verebilirsiniz)
Firmanız kaç senedir faaliyet göstermektedir?	……..……

1 kesinlikle katılmıyorum 2 katılmıyorum 3 kararsızım 4 katılıyorum 5 kesinlikle katılıyorum

	1	2	3	4	5
Firmamız;					
TI1-Mevcut teknolojisinin geliştirilmesine yönelik yatırımlar yapar.	☐	☐	☐	☐	☐
TI2-Kullanmakta olduğu teknolojisinin bir bölümünü firma bünyesinde oluşturur.	☐	☐	☐	☐	☐
TI3- Teknoloji temelli yenilik yapılmasına önem verir.	☐	☐	☐	☐	☐
TI4- Sektörümüzdeki teknolojik gelişmelere öncülük eder.	☐	☐	☐	☐	☐
TI5- Problemlerin çözümünde geleneksel yöntemlerden ziyade orijinal/yeni yöntemleri tercih eder.	☐	☐	☐	☐	☐
TI6- Ar-Ge faaliyetleri sonucunda ortaya çıkartılan yeniliklere önem verir.	☐	☐	☐	☐	☐
TI7- Yeni ürünlerini kendi geliştirdiği yöntemlerle üretmeyi tercih eder.	☐	☐	☐	☐	☐

	1	2	3	4	5
Firmamız;					
TC1-Ar-Ge faaliyetlerine yeterli yatırımı yapmaktadır.	☐	☐	☐	☐	☐
TC2-Farklı alanlarda güçlü teknolojik becerilere sahiptir.	☐	☐	☐	☐	☐
TC3- Çalışanların teknik becerilerini eğitimlerle sürekli geliştirmektedir.	☐	☐	☐	☐	☐
TC4- Yüksek yetenekli uzmanları çekecek ve motive edecek niteliktedir.	☐	☐	☐	☐	☐
TC5- Gelecek teknolojik trendleri doğru tahminleme yeteneğine sahiptir.	☐	☐	☐	☐	☐

TC6- Yeni teknolojileri kullanarak problemleri çözme yeteneğine sahiptir.	☐	☐	☐	☐	☐
TC7- Sektöründe teknoloji standardlarını belirleyenlerden biridir.	☐	☐	☐	☐	☐
TC8- Sektöründe teknoloji standardlarını sürekli yükseltenlerden biridir.	☐	☐	☐	☐	☐
TC9- Teknolojik yenilikçilikte öncü firmalardan biridir.	☐	☐	☐	☐	☐
TC10- Sektöründe teknolojiye yönelik stratejilerinde rekabetçi ve güçlü konuma sahiptir.	☐	☐	☐	☐	☐
TC11- Dışarıdaki teknolojik kaynakları firma bünyesine entegre etme yeteneğine sahiptir.	☐	☐	☐	☐	☐
TC12- Güncel teknolojik değişim ve gelişmeleri yakından takip etmektedir.	☐	☐	☐	☐	☐

1 kesinlikle katılmıyorum 2 katılmıyorum 3 kararsızım 4 katılıyorum 5 kesinlikle katılıyorum

	1	**2**	**3**	**4**	**5**
Firmamız üst düzey yöneticileri;					
MC1-İşinin ehli liderlerdir.	☐	☐	☐	☐	☐
MC2- Firmamızın vizyonunu paylaşırlar.	☐	☐	☐	☐	☐
MC3-Stratejik planlama konusunda başarılıdır.	☐	☐	☐	☐	☐
MC4-Değişen dış çevre koşullarının farkındadır.	☐	☐	☐	☐	☐
MC5-Sektörde gerekli olan teknik yeterliliğe sahiptir.	☐	☐	☐	☐	☐
MC6-Firma çalışanlarıyla iyi iletişim halindedir.	☐	☐	☐	☐	☐
MC7-Müşteriler ve tedarikçilerle iyi iletişim halindedir.	☐	☐	☐	☐	☐
MC8-Firmamızın temel işleyişiyle ilgili tam bilgiye sahiptir.	☐	☐	☐	☐	☐

	1	**2**	**3**	**4**	**5**
Firmamızda;					
ULC1-Yeni bilgilerin firma içinde akışını sağlarız.	☐	☐	☐	☐	☐
ULC2-Yeni bilgiler ışığında eskilerini sorgularız.	☐	☐	☐	☐	☐
ULC3-Yeni bilgiler ışığında rutinlerimizi ve prosedürlerimizi sorgularız.	☐	☐	☐	☐	☐
ULC4-Uygulanma potansiyeli yüksek yeni bilgiyi firma içinde paylaşırız.	☐	☐	☐	☐	☐
Firmamızda edinilen yeni bilgiler ışığında gerekli ise;					
ULC6-Mevcut iş yapış şekillerini yeniden düzenleriz.	☐	☐	☐	☐	☐
ULC7-Mevcut prosedürleri ve rutinleri yeniden düzenleriz.	☐	☐	☐	☐	☐
ULC8-Mevcut teknik altyapı unsurlarını (montaj hattı, depolama vb) yeniden düzenleriz.	☐	☐	☐	☐	☐
ULC9-Mevcut iş görme yöntemlerini iyiye taşıyacak araçları yeniden düzenleriz.	☐	☐	☐	☐	☐
ULC10-Daha etkin olduğu düşünülen iş yapış şekillerini derhal uygulamaya koyarız.	☐	☐	☐	☐	☐
Edinilen bilgiler ışığında çalışanlarımız;					
ULC11-Değişime karşı olumlu düşüncelere sahiptir.	☐	☐	☐	☐	☐
ULC12-Değişeme karşı direnç göstermez.	☐	☐	☐	☐	☐
ULC13-Değişime hızla uyum sağlar.	☐	☐	☐	☐	☐
ULC14-Değişim fikirlerini uygulamaktan çekinmez.	☐	☐	☐	☐	☐
ULC15-Değişim sonucu oluşan rutin ve prosedürleri hızla benimser.	☐	☐	☐	☐	☐
ULC16-Terk ettiğimiz iş görme yöntemlerinden ötürü pişmanlık duymaz.	☐	☐	☐	☐	☐

Son 3 yılı dikkate aldığınızda, aşağıdaki her bir başarı kriterini firmanızın rakiplerine göre değerlendiriniz.
1 ortalamanın çok altı 2 ortalamanın altı 3 ortalama 4 ortalamanın üstü 5 ortalamanın çok üstü

	1	**2**	**3**	**4**	**5**
MGP1- Yapılan reklam ve promosyon faaliyetlerinin satışlarımıza etkisi	☐	☐	☐	☐	☐
MGP2- Pazarlama faaliyetleri için yapılan yatırımların mevcut müşteri sayısını artırmaya etkisi	☐	☐	☐	☐	☐
MGP3- Yapılan pazarlama faaliyetlerinin karlılığa etkisi	☐	☐	☐	☐	☐

MGP4- Pazarlama ekiplerine yapılan yatırımın toplam satışlar üzerine etkisi	☐	☐	☐	☐	☐
MGP5- pazarlama faaliyetlerine yapılan yatırımın pazar payı büyümesine etkisi	☐	☐	☐	☐	☐
MP1- müşteri memnuniyetinin önemi	☐	☐	☐	☐	☐
MP2- mevcut müşterilerin toplam satışlardaki payı	☐	☐	☐	☐	☐
MP3- mevcut müşterilerin ürün alım oranlarının artışı	☐	☐	☐	☐	☐
MP4- yeni müşteri kazanma oranı	☐	☐	☐	☐	☐
FP1-Ciro karlılığı (Kar/Toplam Satışlar)	☐	☐	☐	☐	☐
FP2-Aktif Karlılığı (Kar/Toplam Varlıklar)	☐	☐	☐	☐	☐
FP3-Firmanın genel karlılık durumu	☐	☐	☐	☐	☐
FP4-Yatırım dışında kalan nakit akış hızı	☐	☐	☐	☐	☐
ManP1-İmalatın kalitesi	☐	☐	☐	☐	☐
ManP2- İmalat maliyetleri	☐	☐	☐	☐	☐
ManP3-İmalatın esnekliği (mevcut makine ya da hammaddelerle farklı ürünlerin üretilebilmesi ya da farklı üretime geçişte ek maliyetin az oluşu)	☐	☐	☐	☐	☐
ManP4-üretim hızı	☐	☐	☐	☐	☐
ManP5-Nihai ürünlerin müşteriye ulaşma hızı	☐	☐	☐	☐	☐

Son 3 yılı dikkate aldığınızda, aşağıdaki her bir başarı kriterini firmanızın rakiplerine göre değerlendiriniz.

1 ortalamanın çok altı 2 ortalamanın altı 3 ortalama 4 ortalamanın üstü 5 ortalamanın çok üstü

	1	**2**	**3**	**4**	**5**
Yeni ürünlerin;					
IP1-Sunumunda öncü olması	☐	☐	☐	☐	☐
IP2-Müşteriler için' ilk' oluşu	☐	☐	☐	☐	☐
IP3-Sayısı	☐	☐	☐	☐	☐
IP4-Başarı oranı	☐	☐	☐	☐	☐
IP5-Teknolojik özellikleri yüksek makine ve teçhizatla üretiliyor olması	☐	☐	☐	☐	☐
IP6- Üretimine yapılan yatırımların yıllık cirodaki oranı	☐	☐	☐	☐	☐
IP7- Üretim yöntemlerine yapılan yatırımların yıllık cirodaki oranı	☐	☐	☐	☐	☐
IP8- Farklılığı	☐	☐	☐	☐	☐
IP9-Üretim hattı ve süreçlerin yeniliği	☐	☐	☐	☐	☐
IP10- İşletim süreçlerinin sürekli yenilenmesi	☐	☐	☐	☐	☐
IP11-Üretim yöntemlerini değiştirebilme hızı	☐	☐	☐	☐	☐
IP12-Süreçlerin iyileştirilmesine yönelik yeni yönetim yaklaşımlarının geliştirilmesi	☐	☐	☐	☐	☐
IP13-Problemlerin çözümünde yeni yöntemlerin kullanılması	☐	☐	☐	☐	☐
IP14- Yeni iş yapış şekillerinin süreçlere adapte edilme hızı	☐	☐	☐	☐	☐
	1	**2**	**3**	**4**	**5**
IP15-Yeni ürünlerin önceki versiyonlarından belirgin şekilde farklılaşmasına yönelik tanıtımlar	☐	☐	☐	☐	☐
IP16-Yeni ürünlerin nihai müşteriye ulaşma hızı	☐	☐	☐	☐	☐
IP17-Pazarlama taktiklerinin niteliği	☐	☐	☐	☐	☐
IP18- Yeni ürünlerin reklam ve promosyon şekillerinin öncekilere göre belirgin şekilde farklılaşması	☐	☐	☐	☐	☐
IP19- Yeni ürünlerin nihai müşteriye sunumunda en yeni teknolojilerin (ürünlerin iphone barkod, karekod okuyucuya uyumlaştırma gibi) kullanılması	☐	☐	☐	☐	☐
IP20- Yeni ürünlerin paket ve ambalajlarında belirgin iyileştirmeler yapılması	☐	☐	☐	☐	☐
IP21- Satış sonrası hizmetlerde belirgin yenileme ve iyileştirmeler yapılması	☐	☐	☐	☐	☐
IP22- Ürün yelpazesinin genişletilmesi	☐	☐	☐	☐	☐
IP23-Teknolojik yeniliklerin iş süreçlerine ve üretime entegre edilmesinde karar alma hızı	☐	☐	☐	☐	☐

IP24-Ar-Ge ve ürün geliştirme kaynaklarına (İnsan kaynağı dahil) yeterli kaynak aktarılması	☐	☐	☐	☐	☐
IP25-Büyüme fırsatlarını yakalayabilmek için yönetimin yeni yatırımlar üstlenmesi	☐	☐	☐	☐	☐
IP26-Problem çözümünlerinde yeni yöntemlerin araştırılmasına verilen öneminin artması	☐	☐	☐	☐	☐
IP27- Yenilik (inovasyon) teşvik projelerine (KOSGEB, TEYDEB vb.) başvuruların desteklenmesi	☐	☐	☐	☐	☐
IP28-Çalışanların yeni iş yapış şekillerini deneme isteklerine yönetimin desteği	☐	☐	☐	☐	☐
IP29-Yönetimin yenilikçi fikirlere açık oluşu	☐	☐	☐	☐	☐
IP30-Yönetimin iş yapış süreçlerini sürekli iyileştirilmek için harcadığı çaba	☐	☐	☐	☐	☐
IP31-İşleri alışılmışın dışında yapmak isteyen çalışanlara karşı yönetimin toleranslı tutumu	☐	☐	☐	☐	☐
IP32-İş görme şekillerinde yeni yöntemlerin kullanılma isteği	☐	☐	☐	☐	☐
IP33-Çalışanların alışılmışın dışında yeni iş yapış şekilleri denemesi	☐	☐	☐	☐	☐

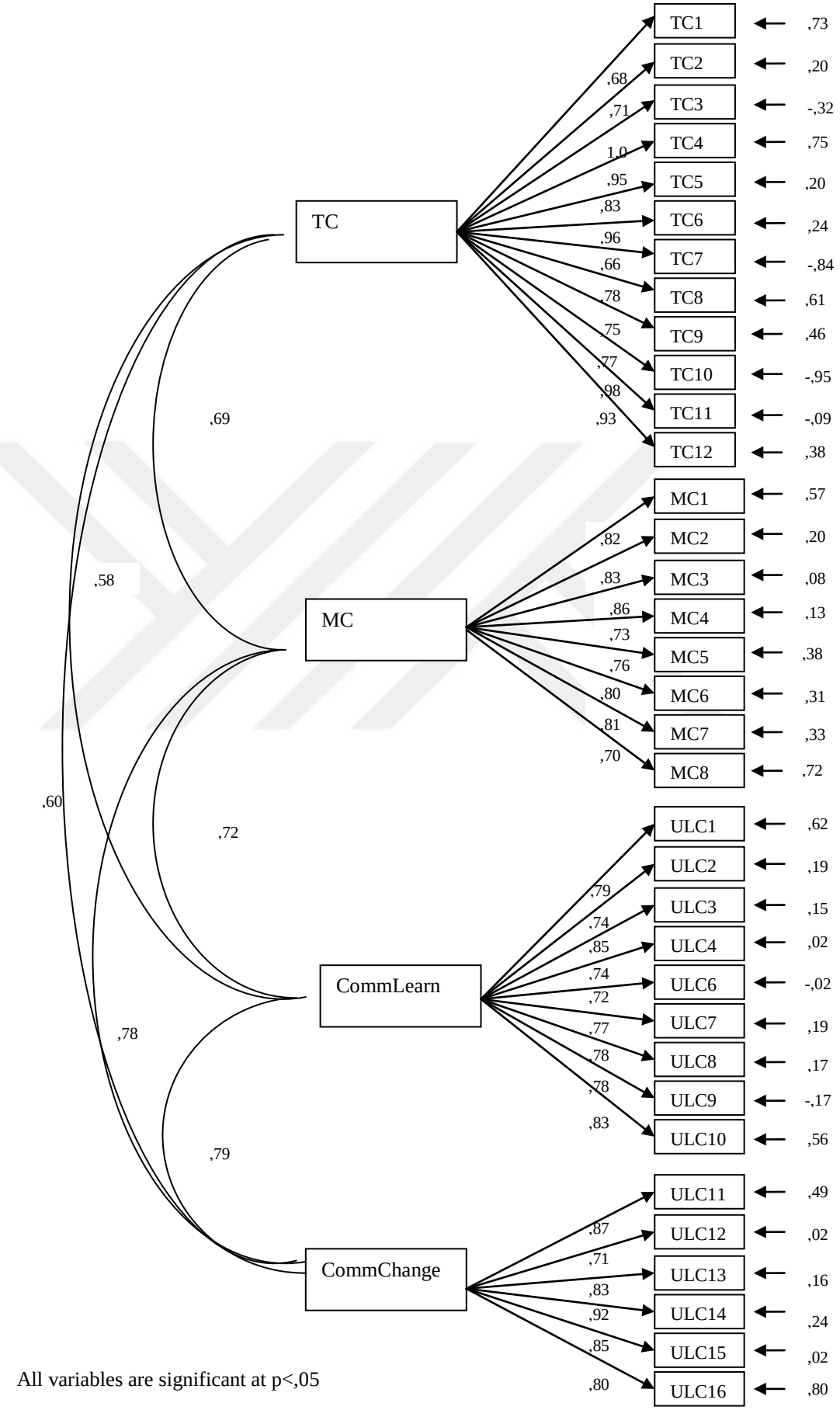
Katkı ve yardımlarınız için çok teşekkür ederiz!

Appendix-C: EFA Result Including "Learning" Items

Items	Factors						
	1	2	3	4	5	6	7
TC8	,846						
TC9	,839						
TC11	,822						
TC2	,807						
TC10	,793						
TC7	,768						
TC5	,686						
TC12	,678	,434					
TC6	,674						
LC9	,665	,414					
TC13	,648						
TC4	,618						
TC1	,612					,491	
LC10	,560	,448					-,428
LC2	,506		,400				
MC8		,847					
MC5		,773					
MC1		,764					
MC7		,750					
MC3		,726					
MC2	,430	,712					
MC4		,705					
MC6		,666	,402				
LC6		,638	,503				
LC11	,442	,621					
LC7		,608	,429		,410		
LC1		,590					,464
LC4	,469	,528					
LC8		,472					
ULC7			,741				
ULC3			,728				
ULC1			,715	,404			
ULC8			,697				
ULC2			,692				
ULC9		,406	,683				
ULC6			,592		,528		
LC5		,401	,567				
ULC10			,541			,497	
LC3		,467	,501				
ULC16				,742			
ULC13	,424			,661			
ULC11		,428		,616			
ULC14				,589			
ULC15				,581		,430	

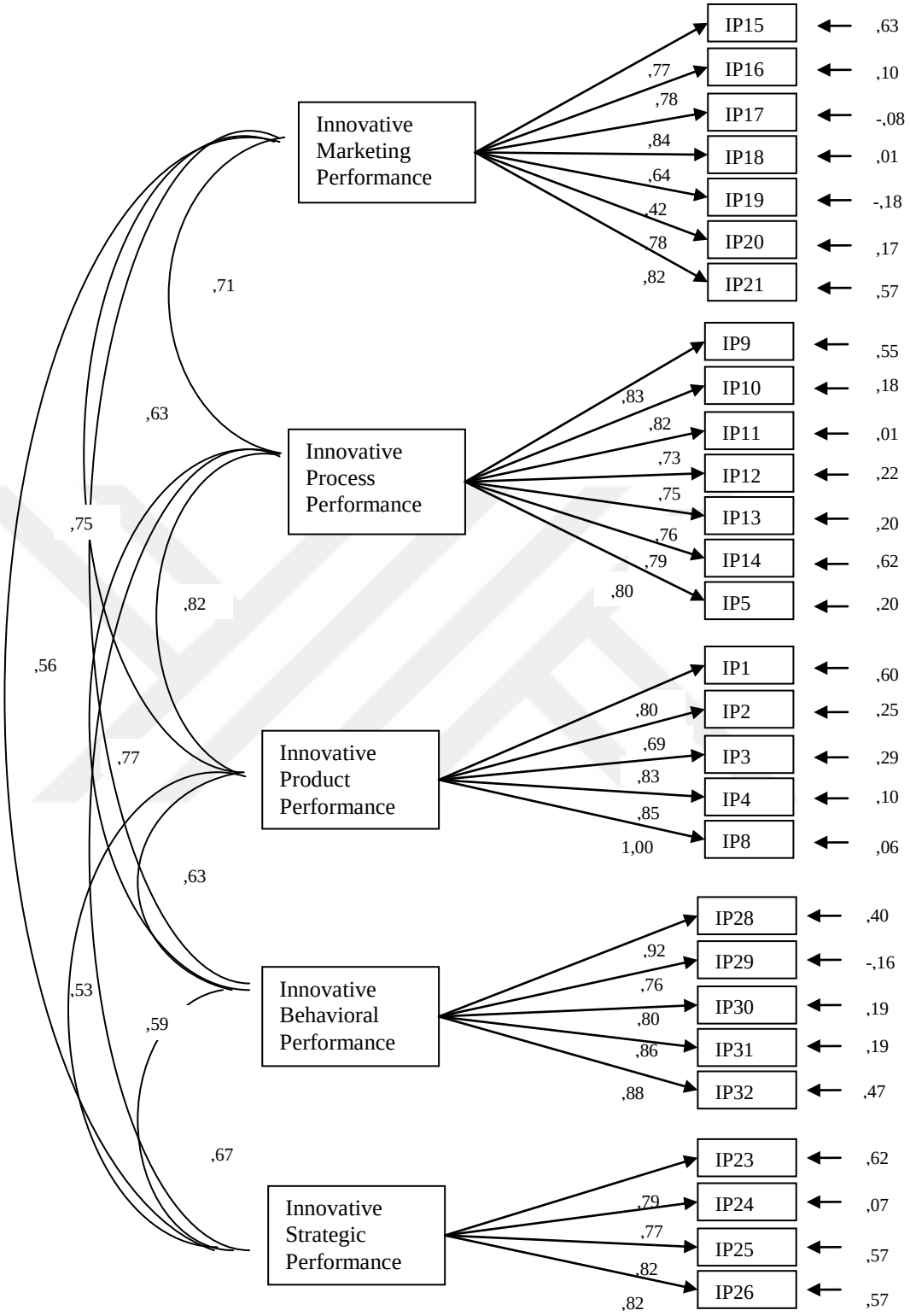
ULC12				,577			
ULC5					,729		
ULC4					,645		
TC3		,460				,492	
MC9						,444	

Appendix-D: Schematical Display of CFA for Technology Orientation



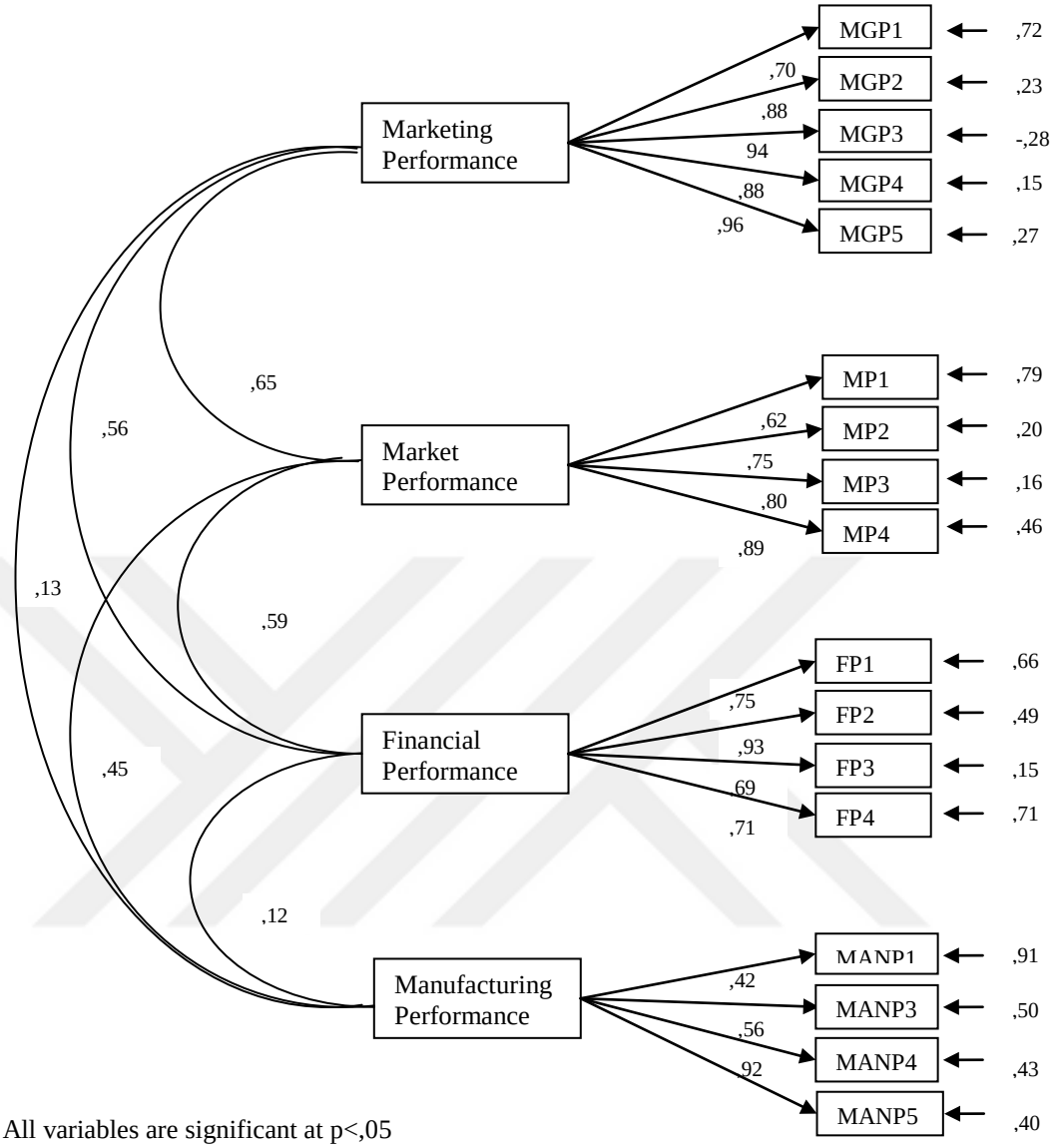
All variables are significant at p<,05

Appendix-E: Schematical Display of CFA for Innovative Performance



All variables are significant at p<,05

Appendix-F: Schematical Display of CFA for Business Performance



All variables are significant at p<,05

CURRICULUM VITAE

Duygu Seçkin Halaç graduated from Dokuz Eylül University, Business Administration Faculty, Department of Economics in English in 2004. Following the graduation, she worked at DYO Paint Factories as Finance Specialist for two years. In 2006-2007, lived in Raleigh, NC, in the US and participated several certificate programs related to Human Resources Management. After moving back to Turkey, until 2009 she worked as Compensation and Benefits Specialist at Tesco Kipa, Plc headquarter.

In 2009, she participated to Yasar University MBA program in English and from October, 2010 she has been working as a Research Assistant in Business Administration Department at Yasar University. In January 2011, she got her MBA degree and February 2011 has started her PhD courses. She specializes on strategic management, strategic marketing management, innovation and entrepreneurship.