

**T.C.
ISTANBUL COMMERCE UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES INSTITUTE
DEPARTMENT OF BUSINESS ADMINISTRATION
PROGRAMME**

**MEDIATOR ROLE OF ARTIFICIAL INTELLIGENCE IN THE
IMPACT OF CORPORATE STRATEGIES AND COMPETITIVE
STRATEGIES ON COMPANY PERFORMANCES**

Ph.D. Dissertation

Esra ERGÜN

Istanbul, 2023

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Advisor: Prof. Dr. AHU TUĞBA KARABULUT

Istanbul, 2023

ETHICS STATEMENT

The thesis that I have prepared is an original work, and it is supported by YÖK and Istanbul Commerce University. It has been prepared in accordance with the Graduate Regulations. In addition, while conducting this study, scientific ethics. I fully abide by the rules; I cite all the sources I have used and no source. I declare that there is no detailed quotation that I have made. All matters contained in this thesis are my opinion and do not reflect the official opinion of Istanbul Commerce University.

Esra Ergün

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ABSTRACT

This study examines the mediating role of artificial intelligence (AI) in the impact of corporate strategies and competitive strategies on company performance. The study has developed a framework that hypothesizes the mediating effect of AI on firm performances in the relationship between corporate and competitive strategies; and measured the effectiveness of artificial intelligence. The focus of this research is the finance and telecommunications sectors, as these are the most common and first areas to use digital technologies and are more mature to make empirical research interesting. Data was collected from 569 employees in these industries. Frequency distribution analyses, explanatory and confirmatory factor analyses, reliability analysis, correlation analysis and structural equation modeling were applied to the data. According to the findings of the research, corporate and competitive strategies have significant effects on artificial intelligence and company performance. It has been determined that artificial intelligence has a significant effect on company performance. In addition, the partial mediating effect of artificial intelligence was found in the effect of corporate and competitive strategies on company performance.

Keywords: Corporate Strategies, Competitive Strategies, Company Performance, Artificial Intelligence.

ÖZET

Bu çalışma, kurumsal ve rekabet stratejilerinin şirket performansı üzerindeki etkisinde yapay zekanın aracılık rolünü incelemektedir. Çalışma, kurumsal ve rekabetçi stratejiler arasındaki ilişkide yapay zekanın firma performansları üzerindeki aracılık etkisini varsayan bir çerçeve geliştirmiştir; ve yapay zekanın etkinliğini ölçmektedir. Dijital teknolojilerin kullanıldığı en yaygın alan olmaları nedeniyle bu araştırmanın odak noktası olarak finans ve telekomünikasyon sektörleri seçilmiştir. Bu sektörlerdeki 569 çalışandan veri toplanmıştır. Verilere frekans dağılım analizleri, açıklayıcı ve doğrulayıcı faktör analizleri, güvenilirlik analizi, korelasyon analizi ve yapısal eşitlik modellemesi uygulanmıştır. Araştırmanın bulgularına göre kurumsal ve rekabet stratejilerinin yapay zeka ve şirket performansları üzerinde önemli etkileri bulunmaktadır. Yapay zekanın şirket performansı üzerinde önemli bir etkisinin olduğu tespit edilmiştir. Ayrıca kurumsal ve rekabet stratejilerinin şirket performansı üzerindeki etkisinde yapay zekanın kısmi aracılık etkisi bulunmuştur.

Anahtar Kelimeler: Kurumsal ve Rekabetçi Stratejiler, Firma performansı, Yapay Zeka.

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Abbreviations

AI	Artificial Intelligence
ANN	Artificial Neural Networks
ACE	Agent-Based Computational Economics
BI	Business Intelligence
BSC	Boston Science Consulting
BS	Base Station
CFA	Confirmatory Factor Analysis
CVT	Computer Vision Technology
CSP	Communication Service Provider
CAICT	China Academy of Information and Communications Technology
CEO	Chief of Executive Officer
DOI	Diffusion of Innovation Theory
DL	Deep Learning
EDI	Electronic Data Interchange
EIS	Executive Information Systems
HGEF	High-Growth Entrepreneurial Firm
IS	Information Systems
IT	Information Technology
IOT	Internet of Things
KPI	Key Performance Indicator
KB	Knowledge Base
KMO	Kaiser-Mayer-Olkin
ML	Machine Learning
NLP	Natural Language Processing
PEOU	Perceived Ease of Use
PIM	Profit Impact of Marketing Strategy
QoE	Quality of Experience
R&D	Research and Development
RPA	Robotic Process Automation
RBV	Resource Based Value

ROA	Return on Assets
ROS	Return on Sales
ROE	Return on Equity
ROI	Return on Investment
STROIS	Strategic Orientation of Information Systems
STROBE	Strategic Orientation of Business Enterprise
SAM	Strategic Alignment Model
TFP	Total Factor Productivity
TRA	Theory of Reasoned Action
TOE	Technology Organization Environment
TAM	Technology Acceptance Model
TQM	Total Quality Management
TOPB	Theory of Planned Behavior
TUSIAD	Turkish Industry and Business Association
TMOBB	Association of Chambers of Turkish Engineers and Architects
TUBISAD	Turkish Information Industrialist's Association
UTAUT	Unified Theory of Acceptance on Use of Technology
VOA	Value of Organizational Assets
WFMO	Workforce Management Organization

INTRODUCTION

Business enterprises are highly integrated with each other through the Internet and mobile channels. The economic structure has been forced to do business quickly by Information Technologies. The Digital Age which started with the Internet and mobile technologies and the great transformation in the way of doing a new business with new technologies push the companies to act with their end customers and pure ecosystems while creating proactivity in corporate and personal life. The industry has shifted to the digital age because of the restructuring of business processes. The increasing amount of information has resulted in the business environment analyzing big data as quickly as possible. Modern businesses operate in a very competitive and fast-changing environment where customer preferences are so demanding, and technology is guiding and transforming scenarios. Business models and processes are being disrupted by the spread of new digital technologies.

Many global companies' executive managers stated the speed of technology and how the world is changing accordingly. Unilever's CEO Paul Polman highlighted "The speed of innovation has never been faster." Microsoft's co-founder Bill Gates, mentioned "Innovation is moving at a scarily fast pace." Executive Chairman of Alphabet Eric Schmidt indicated "We're going to see a new age, the age of intelligence." (Brynjolfsson et al., 2017). Microsoft's CEO Satya Nadella indicates that AI is the "ultimate breakthrough" in technology and Google describes its focus as "AI first" (Buchanan, 2019). Such statements are particularly popular with tech leaders and venture capitalists. Besides, these statements mirror the continued advancement of digital technologies in many fields, starting from fundamental technology advances such as the further doubling of basic computing power to successful investments in key complementary innovations for example cloud technologies, and new service-based business models. On top of that, the greater resource of optimism is the recent wave of advances in artificial intelligence (AI), specifically machine learning. They can also change the economic environment and create new opportunities for cost decrease and corporate business value creation.

The field of artificial intelligence has had ups and downs in recent years. Today governments are competing to create cutting-edge AI facilities and research with AI as a lever for greater economic power and influence. There are reasons for rapid growth.

Expansive advances in computing power have resulted in lower data storage costs. The data availability has increased and created more possibilities in the field of artificial intelligence.

All this indicates that the rules of business have changed. That's why it's important to know that digital transformation is about strategy, not technology. While it requires upgrading of the IT architecture, the more important thing is to upgrade strategic thinking.

Most of the AI-related work is technical, covering its engineering related side. There is little academic research investigating the potential effects of AI integration in the business environment and processes. Although, many related informative studies are being conducted by enterprise companies and private research organizations. While the use of artificial intelligence technologies continues to expand in business life, the support of AI technologies in corporate or organizational strategic planning is slower. This is mainly evident when comparing the field of strategy with other fields such as technology or engineering, medicine or other traditional management disciplines like finance or accounting. Spangler (1991) mentioned some of the reasons. First, even if the use of AI necessitates a sufficient comprehension of a task and a problem-solver, the process of formulating an enterprise strategy is yet comparatively unexplored. Therefore, strategic dilemmas are still described as being complex, unstructured, hazy, ambiguous, and exceedingly challenging to express. He continues, however, that the creation of a strategy is frequently viewed as an art, a highly creative process that is resistant to computer infiltration. In addition to being a difficult endeavor, developing a strategy involves interacting with other people and negotiating with them as part of the corporate decision-making process. The ultimate strategy might also be the result of compromises between numerous possibilities, be constrained by a variety of external variables, and conflict with other interested parties within the company. Additionally, it may take years before the outcomes of a strategy's implementation are known. Researchers are advancing AI applications and technologies up the business ladder despite these issues.

This study examines the mediating role of artificial intelligence in the perspective of corporative and competitive strategies effects on firm performance. The study has

developed a framework that hypothesizes the mediating effect of artificial intelligence in the impact of competitive and corporate strategies and firm performance and has measured effectiveness of artificial intelligence.

To ensure sufficient internal validity and to decrease the strategy measurement complexity, the research has been scoped down on some aspects. It is known that artificial intelligence usage and practices might be different in each industry. That's why the focus of this research is only on the financial and telecommunications sectors, to control the challenges caused by differences in sectors. The reason for choosing the financial and telecommunications services sector is because these are the most common and first fields to use digital technologies, resulting in more matured to make empirical research interesting.

This thesis is organized in 8 chapters which cover the following topics:

Chapter 1 presents an overview of the strategy and strategical management requirement concepts. It introduces the technology and strategy relationship by searching the literature to indicate how technology revolution and globalism are linked to each other based on strategical management principles.

Chapter 2 and Chapter 3 present an overview of the corporate and competitive strategies literature to mention the concepts that are analyzed in the thesis. The literature review provides an overview of growth, stability, and contraction strategies in the concept of corporate strategies. And provides overview of cost leadership, differentiation, and focus strategies under the head of competitive strategies. The chapter also indicates value chain and business model, innovations, and critical success factors due to their criticality in the field.

Chapter 4 focuses on company performance, and reviews financial and innovative performance concepts. Furthermore, this chapter reviews the literature from the eye of strategies and company performance relationships and the literature about technology and company performance relationships.

Chapter 5 presents the artificial intelligence definitions and history, mentioning the types of technologies and properties in the concept and the drivers of the digital technologies for the strategy. This chapter classifies the usage areas and the importance of the artificial intelligence technologies in finance and telecommunication sectors to have a better understanding of how artificial technologies have impact on these fields, by characterizing the past, current, and next future of the finance and telecom industries. Furthermore, the chapter provides a background and gives an overview about the digital and artificial intelligence approach in Turkey business environment.

Chapter 6 presents the variables of thesis concepts based on the impacts between corporate and competitive strategies, company performance and artificial intelligence measurement aspects. Besides, this chapter gives an overview of the literature of the common frameworks to make empirical analysis to measure strategy, performance, and technology from related aspects.

Chapter 7 researches and explains the mediator role of artificial intelligence in the impact of corporate and competitive strategies on company financial and innovative performances. This chapter presents the research importance, thesis model and variables, hypothesis, research limitations, measurement items and the data samples and channels collected from the industry. Afterwards, the chapter provides the technical analysis results including descriptive statistics, frequency distribution statistics, normality tests, exploratory factor analysis and KMO-Barlett tests, confirmatory factor analysis and reliability tests, correlation analysis, and then mediation and structural equation analysis.

In the final section, all analysis results are explained and concluded based on the research target and hypothesis provided, including the recommendations and insight for further research.

This research hopes that designing and conducting such a thesis could be a valuable addition not only to the Turkish business environment, but also to the relevant global research database.

1 STRATEGY CONCEPTS

1.1 STRATEGY

It is said that strategy has military roots, mostly pointing about 500 BC as mentioned by Chinese military strategist Sun Tzu (1988). He describes in his book "The Art of War" why strategy is required. Sun Tzu says, "their victories in battle are not flukes because they position themselves where they will surely win, prevailing over those who have already lost." (Pierce, 2002: 24).

It then found its way into the corporate world as companies entered strong competition and sought to identify their possible position (Zuhdi, 2012:19). There are many different types of strategies used in literature.

Chandler (1962) writes about strategy as "the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out the goals." (Pierce, 2002:24)

Andrews (1971) defines corporate strategy as the "pattern of decisions in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals, the range of business the company is to pursue, the kind of economic and human organization it is or intends to be, and the nature of the economic and noneconomic contribution it intends to make to its shareholders, employees, customers, and communities." (Pierce, 2002:24)

Later, Hofer & Schendel (1978) and Quinn (1980) used the strategy word as a fully integrated plan of target, action, and policy (Giguere, 2004:5).

Miles and Snow (1978) mentioned the business strategy as the way companies adapt to the environment in which they compete. Each company has three problems to solve:

- 1) entrepreneur (selection of product-marketplace),
- 2) engineering (selection of technology for production and distribution),

3) administration with two aspects: (leading aspect: determination of domains for future innovation and lagging aspect: realization of structure and process) (Pierce, 2002:25).

Miles and Snow (1978) described four types of strategy: prospector, defender, analyzer, and reactor, where prospector and defender are assumed to be at either end of a continuum. As they mentioned prospector firm's "prime capability is that of finding and exploiting new product and market opportunities." (Kalagnanam, 1997:19).

Prospector firms grow by developing new products and markets. They are always scanning the conditions and the environments for new opportunities and grow rapidly since such opportunities do not come in a continuous manner, these firms grow rapidly, and prospectors establish flexible organizations, focusing on effectiveness instead of efficiency more and defining organizational performance in terms of outcomes and results as Miles and Snow (1978) mention. They say that a defender firm's success "depends on its ability to maintain aggressively its prominence within the chosen market segment". And Kalagnanam (1997) summarizes that the key is efficiency which means high quality or low price for customers. Despite the prospector firm, the defender firm experiences incremental growth. Defender firms are based on a centralized, functional structure to control and manage their activities and focus more on efficiency than effectiveness (Kalagnanam, 1997:19).

An analyzer firm executes consolidation of the prospector and defender strategies. This brings to attempt minimizing risk in parallel to maximize the opportunity for profits. At the end, as Miles and Snow (1978) mentioned the reactor firm is an "unstable organization type because it lacks a set of consistent response mechanisms that it can put into effect when faced with a changing environment" (Kalagnanam, 1997:21).

Rumelt (1979) states consistency in policies and objectives. He highlights the "primary function of strategy is to provide a consistent set of objectives and policies that restructures an ambiguous reality into a set of organizationally solvable problems" (Pierce, 2002:25).

Schendel and Hofer (1979) expand Chandler's (1962) definition by listing six main activities that make up the strategic management process:

- 1) target formation,
- 2) environmental analysis,
- 3) strategy formulation,
- 4) evaluation,
- 5) implementation, and
- 6) strategic control (Pierce, 2002:25).

George Steiner (1979) introduced the term strategy to business literature in his book *Strategic Planning*; It speaks of entering in response to an opponent's current or anticipated actions. Steiner also says in his work that there is no consensus on what strategy means in the business world (Eraslan, 2014:23).

In his book "The Concept of Corporate Strategy," Andrews (1980), defined strategy as the relationship between what a corporation can do (based on its strengths and limitations) within the concept of what it could do (in the presence of environmental opportunities and dangers) (Zuhdi, 2012:20).

Further information on Andrews (1980) strategy explanation was provided by Michael Porter (1980). He explained strategy as the creation of a unique and valuable location, including a different set of actions (Zuhdi, 2012:20). His book *Competitive Strategy - Techniques for Analyzing Industries and Competitors* points out those actions of companies are highly controlled and constrained. Sustainability of the companies depends on creating the best match between resources and environment of the organization (Porter, 1980:194). Michael Porter (1980) defines three generic business strategies: cost leadership strategy, differentiation strategy and focus strategy. Also, literature adds additionally that combining low-cost and differentiation strategies creates an option for managers as mentioned by Hitt, Ireland, Hoskisson, Rowe & Sheppard (2002) (Giguere, 2004:6). Porter's view is that every company in a competitive industry

executes a competitive strategy. The strategy formulation process in a company takes two forms:

- Formulation of a clear strategy based on the planning process; and
- Implicit strategy formulation developed because of organization's functional activities (Porter, 1980:194).

According to Parthasarthy (2007), strategy is a series of decisions and actions taken by managers to achieve superior company performance compared to their competitors. And Beard and Dess (1981) defines that business-level strategies are important in explaining differences in firm profitability and long-term performance (Teeratansirikool et al., 2012:169).

Many strategies, including competitive strategy, diversification strategy, various types of strategic orientation, strategic decision-making, and strategic planning criteria, have been outlined by Venkatraman and Grant (1986). Five general ways in which the strategy can be followed are defined as follows: plan, initiative, pattern, location and perspective (Aydoğan & Şensözlü, 2015:59). Barry (1986), another researcher working in the field of management science, defines strategic management as the analysis of the process that shows the targets that an organization would like to reach in the future and how to reach this goal (Eraslan, 2014:24).

Hax and Majluf (1991) mention that Strategy can also be portrayed as a multidimensional approach that affects all sensitive activities of an organization. The most important indicator of this is that the strategy provides and directs all transactions (functions) to act in integrity, for the same direction and purpose. As a matter of fact, considering the studies on the concept of strategy, it has come to the fore that there are some sensitive dimensions in order to present a holistic expression to this concept. Strategy with these various dimensions; It is a unifying and integrating model that ensures the consistency of decisions and ensures that the organizational targets of the company and accordingly the long-term goals, action plans and resource allocation priorities of this organization are decided. At the same time, it ensures the selection of jobs that the organization is in or can be found in and tries to extract long-term sustainable advantages in each business

unit. It tries to achieve this by considering the opportunities and threats in the external environment of the organization, and the strong and open-to-development aspects in the internal environment. On the other hand, it deals with all hierarchical levels of the organization (corporate, business, and functional); It is detailed as an institutional route that will ensure the fulfillment of economic and non-economic obligations towards stakeholders (Eraslan, 2014:24).

An influential researcher, Mintzberg (1992), extended the concept of strategy by suggesting that real strategies include a combination of intended and emergent strategies. Additionally, Hambrick & Fredrickson (2001) states that strategy is “an integrated, overarching concept of how the business will achieve its objectives” (Giguere, 2004:5).

Sandberg (1992) states that the development of a strategy in an organization depends on the hierarchical level at which it is applied: corporate / institutional, enterprise, commercial or functional. For example, Ibrahim and Ellis (1990) mention corporate strategy can be distinguished from business strategy. On the other hand, corporate strategy includes defining “the firm’s mission and the business in which it should be in”. On the other hand, the aim of business strategy is to leverage core competencies and achieve competitive advancement in specific, individual product markets (Giguere, 2004:6).

According to Bernard Boar (1994), strategy entails specifying the desired future condition of the company, specific goals to be met, the strategic actions to be taken, and methods for enabling or supporting commitment and change management. Boar (1994) also adds strategy consisting in identifying the desired future, specific goals to be achieved, and the strategic actions required to realize that future. Simply, Pierce (2002) summarizes formulation of business strategy enables the company to achieve its targets and goals (Pierce, 2002:17).

In another study, Mintzberg, and Quin (1996) expressed strategy as a plan that brings together the goals, policies and actions of the organization in a consistent way. Strategy includes organizations using their resources and capabilities in the most effective way, considering environmental changes. When we summarize all these different recipes,

Andrews (1971) tells the strategy is; sets the goals and objectives of the organization; shows how and by which means these goals and objectives will be achieved; analyzes the situation and environment of the organization; It determines who will use what tools and how to achieve goals in the organization (Eraslan, 2014:24).

Strategic management, according to Bryson (1998), is a management style that discloses what an organization does, why it exists, and the objectives it hopes to accomplish in the future (Eraslan, 2014:23).

A small or medium-sized corporation typically defeats a huge company. The business environment has largely become "dynamic" as a result of information technology advancements, greater competitiveness, and other factors. It is no longer effective to expand capacity over an extended period of time and produce significant volumes of goods from it. Companies now have to be flexible in their operations and can produce value-added goods even in small quantities thanks to ongoing technological advancements. Flexibility is now a more important choice for businesses to attain economies of scale than mass manufacturing facilities (Porter, 1980:196-197).

Technology revolution and globalization are new forces in the competitive environment where entrepreneurs should compete. Ireland and Hitt (1997) mention this new environment creates new, important economic opportunities for entrepreneurs to seek growth. In this new environment, to achieve high growth, companies must “increase their financial performance by choosing an appropriate strategy and implementing it effectively”. In addition, they force the entrepreneur to constantly answer the following questions to review and improve its strategy: “Has my firm selected the right strategy? Can we implement our strategy effectively and efficiently?”. The target of a competitive strategy is to achieve sustainable competitive advantage. A competitive strategy requires the entrepreneurial firm to “choose a different set of activities than those chosen by its competitors to deliver unique value to the market as mentioned by the same writers. Giguere (2004) also agrees on selection and implementation of competitive strategy is vital as it directly affects the enterprise performance to support Zahra (1996) and Ireland & Hitt (1997) studies (Giguere, 2004:31).

1.2 STRATEGIC MANAGEMENT

This section describes strategic management understanding and its importance in general. Strategic management is a dynamic process of adapting the companies' internal resources with external conditions to achieve a set of defined targets. The environment brings technological, economical, and socio-political- forces which the company has less direct control as Schendel and Hofer (1979) mentioned (Woo et al., 1998:515).

Strategic management focused first on planning, then on positions, and now on learning (Pierce, 2002:29). Long-term goals are strategic choices the firm should consider formulating its strategic plan. Peter Drucker says "strategic management is not a box of tricks or bundle of techniques. It is analytical thinking and commitment of resources to action. But quantification alone is not planned. Some of the most important issues in strategic management cannot be quantified at all." (Pierce, 2002:32).

Kiggundu (1996) states strategic management is expected to be externally oriented, considering all external factors that affect a firm's future. In addition, since it will affect the future of the company, it is better to be forward-looking and performance based (Zuhdi, 2012:20). Then Scribner (2000) adds that strategic management is the process for developing and executing plans to achieve a long-term target that considers internal and external variables (Zuhdi, 2012:20).

A company is considered to have a production function transforming inputs into outputs to maximize profits as mentioned by Pepall (2008). Porter (2008) states the firm should decide on a strategic position that allows it to maximize profits, considering trade-offs with other positions. Trade-offs occur when activities are conflicting, as well as when internal coordination and control are constrained (Zuhdi, 2012:21).

The "Theory of the Growth of the Firm" by Penrose (1959), which makes the claim that the caliber of a company's resources affects its distinctiveness, is one of the earliest significant studies of strategy research. Chandler (1962) asserted in a groundbreaking study that "structure follows strategy." By selecting 50 of the top North American corporations, it examined strategy (in the form of diversification) and structure (in the sense of corporate organization). According to Chandler (1962), if a company changes

its strategies without changing its organizational structure, inefficiency will occur. Years of investigation into the connection between diversification and performance yield were sparked by Chandler's work. However, Grant (2002) questions whether diversification improves business performance. Chandler was published 40 years ago. concludes that the issue cannot be resolved simply and consistently (Dederichs, 2010:8-9).

In the 1980s, businesses began to be more affected by the change; Economic thinking has advanced to a central position in strategic management as disciplines are studied in theoretical motivation for empirical work. The major contribution to the economy of this decade was the Competitive Strategy by Porter (1980). While strategic management in all businesses operating in the private sector, public sector and the third sector (non-profit voluntary sector) is defined as a management technique that shows the field of activity of an enterprise, its reason for existence and the goals it wants to achieve in the future as mentioned by Bryson (1995). This can also be defined as the determination of the medium and long-term goals of an enterprise, namely the strategic intent, and the analysis of the process showing how to reach this goal as declared by Barry (1986) previously. According to Jauch and Glueck (1989), strategic management provides clear goals and directions, allows businesses to anticipate changing situations, advances research so that the process can assist managers, and systematizes business decisions, assists managers in investigating a company's core problems. and helps the company communicate, coordinate individual projects, allocate resources, and develop short-term planning such as budgets (Aydoğan & Şensözlü, 2015:60).

According to Nag et al (2007), the general definition is as follows: “The field of strategic management deals with the major intended and emergent initiatives taken by general managers, on behalf of owners involving utilization of resources, to enhance the performance of firms in their external environments” (Zuhdi, 2012:20). The selection of the product portfolio and the appropriate competitive strategy for each product are the company's main decisions. These choices will subsequently be translated into specific asset configurations by means of technology, distribution logistics, and the company's negotiating position with its employees and potential suppliers. Different asset configurations will develop as a result of changing strategies at various stages of a product's life cycle and in various competitive contexts. According to numerous authors,

including Dess and Devis (1984), Miller and Friesen (1977), Porter (1980), and White (1986), numerous integrated decisions must be made with regard to facility investments, inventory levels, liquidity reserves, pricing, loan terms, organizational structure, advertising efforts, and research and development activities (Woo et al., 1998:515-526).

The works of Andrews (1971) and Learned (1965) extend Chandler's findings. They mentioned strategy is constructed of two related but separate aspects: formulating (meaning deciding what to do) and executing (meaning realizing strategy). With this framework, Mintzberg (1990) indicates the execution of strategy was understood to consist of a series of sub activities that were primarily administrative. While there is increasing criticism of such a strict distinction between formulation and application by different writers such as Jarzabkowski (2005), Pye & Pettigrew (2006), and Baden-Fuller (2006), this framework has been very influential and is precursor to many research projects in strategic management field to manage such as Hoskisson et al. (1999), Moller-Stewens & Lechner (2001) (Dederichs, 2010:9).

1.3 STRATEGY AND TECHNOLOGY

In this section, strategy and technology relationships and linkages are defined as the main umbrella of this research. Competitiveness and leveraging technology beginning in the 1960's, observers such as H. Igor Ansoff, John Andrews, Richard Ford and others realized that information technology can be an important part of business operations, and that it "should be no less part of an organization's functional activities than manufacturing or sales." Ford (1968) argued that technology strategy and strategic management are integral in the practice of effective organizations (Addicott, 2000:11). The use of information technology has become an important component of managerial response. Automation and managerial decision making were recognized as major waves of the future in the 1950's by academics such as Eric Trist at England's Tavistock Institute, Nobel Laureate Herbert Simon at Carnegie-Mellon, and Paul Lawrence and Jay Lorsch at Harvard (Addicott, 2000:12).

Past research has ignored the dynamic character of the interaction between strategy and technology, e.g. Itami and Numagami (1992), Porter (1985), Andersen and Tushman (2005). The product portfolio of an organization affects the type of technology it wishes

to maintain or enhance. Consequently, this impacts the future technological foundation upon which the organization's future strategy is founded, i.e., the technology-based strategy (Parker, 2000:56).

According to Porter (1983,1985), the allocation of technology resources is crucial for achieving a lasting competitive advantage and enhancing an organization's financial performance (Parker 2000:55). The value chain understanding gained in studies such as Competitive Advantage and Competitive Strategy by Michael Porter (1980) has increased management theorists' awareness of incoming logistics, outward logistics, and the role of technology in driving a company's chosen strategic path (Addicott, 2000:11). As Galliers (1993), Lederer (1989), and Mendelow (1989) note, some organizations have understood the centrality of their information resources to their operations. By authors such as Adler (1989) and Zahra and Covin (1993), the literature emphasizes the need for strategy and technology to be in sync (Parker, 2000:55). In the second perspective, Porter (1983) explains that strategy leads to the development of technology so that the business may remain competitive. According to Itami and Numagami (1992), Zahra and Covin (1993), technology development can give a company with not only a variety of competitive weapons, but also a technological base that can be applied to other industries (Parker, 2000:56).

Chandler (1962) argued that an organization's diversification strategy is propelled by its acquired resources from previous operations. In addition, Prahalad and Hamel (1990) asserted that the main sources of competitive advantage are achieved by merging enterprise-wide technology and production skills inside core competences, as opposed to developing unexpected goods. In this instance, technology can be extended, and the current strategy improves the technology of the future (Parker, 2000:56).

The third perspective examines the influence of present technology on future strategy. Rosenberg (1976) observed that the internal logic of technology functions as a focusing instrument that typically determines the course of new product development. He says that technology enables businesses to comprehend which strategy to adopt (Parker, 2000:56).

McFarlan, McKenney, & Pyburn (1983) classify firms in a strategic impact grid according to the strategic impacts of current and future Information systems applications. Firms in the factory quadrant need IS resources to support backbone applications such as payroll and accounting, even though their day-to-day operations do not depend on the smooth functioning of ISs. Therefore, future IS applications need not be crucial to strategic success. For companies in the support quadrant, the trouble-free operation of automated systems is vital to their day-to-day operations, and therefore future IS implementations tend to focus on repair, maintenance, continuous process and update programs. A firm in the turnaround quadrant is in the process of reinvigorating its business with a new IS, so future IS implementations are critical to the firm's strategic success. Finally, both current and future IS practices are vital to firms' survival and competitive position in the strategic quadrant (Zhang, 1998:16).

Porter and Miller (1985) generalized the three effects generated by IT: changing industry structure and competition rules, creating competitive advantages by providing companies with new ways to outperform their competitors, and often creating an entirely new business from a company's current operations (Ong, 2013:74). Porter & Miller (1985) provide compelling examples of how information technology affects the nature of competition. They argue that IT affects competition in three main ways:

- 1) Changing industry structure.
- 2) Creating new competitive advantages and
- 3) Helping new businesses emerge (Galal, 1997:13).

Venkatraman (1985) says, "efficient introduction and adoption of new technologies underlying management systems requires corresponding changes in other functions of business. This calls for integrating the management information systems plan with the plans of the other functional areas as well as the overall organizational plan" (Pierce, 2002:9-10).

Michael Vitale (1986) suggested the critical importance of aligning enterprise strategy with cross-organizational systems strategy but saw diffusion of new technologies as a threat not only to the security of information about pricing, customers, and materials but

also to the company. It is a significant threat to the organizational hierarchy (Addicott, 2000:46).

Keen (1986) stated that EDI (Electronic Data Interchange) and telecommunications enable firms to compete more effectively in a timely manner, provide continuous inputs to strategy and can act as a corrective mechanism (Addicott, 2000:46). "Performance improvement" is one of the reasons companies decide to implement an interorganizational system; it's the same reason companies engage in formal discussions about strategy and business models (Addicott, 2000:46).

According to Miller (1988), research documenting the relationship between strategy and technology has developed more slowly, and little attempt has been made to integrate prior work (Parker, 2000:55).

Itami and Numagami (1992) underline that technology plays a more active role in cognitively directing strategy and contend that, at times, it serves as the process's primary driving force. This is the foundation for the knowledge that drives the plan. For instance, when a business has a strong commitment to a certain technology, it initiates ideation activities prior to formulating its strategy. Second, it guides the process of idea generation towards a unified strategic direction and concentration. Third, technology helps the adoption of a strategy. As numerous authors, including Burgelman and Rosenbloom (1989), Jaikumar and Bohn (1986), and Habermeir (1990), have noted, technology drives strategic cognition in this scenario (Parker, 2000:56).

Luftman, Lewis, and Oldach (1993) suggest that business and IT must be strategically aligned for effective and efficient IT use. IT can assist, support, and promote business goals and objectives when business and IT strategies are aligned. Coordination between a company's business and IT strategies is crucial to its performance. (Pierce, 2002:8). According to Bharadwaj et al. (1999), IT influences the intangible worth of businesses. Mitra (2005) suggested that IT can help businesses expand (Ong, 2013:74).

These topics can be viewed as the comprehension of the effects of information technologies on enterprise value (Ong, 2013:74). As Huie (2014) explains, the strategic

and operational significance of information technology capabilities in modern organizations has grown. Since its creation, it has altered how businesses function (Huie, 2014:28). With the increasing complexity of globalization, there has been a tremendous increase in interest in and discussion about how to leverage information technology to achieve competitive business advantages (Wen et al. 2008:148). Preston, Chen, and Leidner (2008), citing Byrd and Turner (2001) and Sambamurthy, Bharadwaj, and Grover (2003), asserted that information technology (IT) has emerged as one of the most influential determinants of competition in recent decades. According to Bogdana, Felicia, and Delia (2009), the sharing of information across firms has increased investments in information technology. According to Hocevar & Jakli (2010), IT expenditures continue to rise as firms invest billions of dollars in the quest for suitable information solutions. Most IT management practitioners and scholars assume that investing in new technology is beneficial (Huie, 2014:28-29).

Information technology (IT) has become vital to business support, sustainability, and growth in many enterprises (De Haes, 2007:19). Tallon (2009) summarizes the effects of IT on firm performance as "IT support for firm assets" mentioned by Rivard (2006) and "enhancing operational effectiveness" mentioned by Tallon (2000) and indicates the influences of firm value as "IT support for business strategy" mentioned by Rivard (2006) and "firm's strategic positioning" mentioned by Tallon (2000) (Ong, 2013:74).

IT has the capability not just to support current company strategies, but also to design new ones (Venkatraman & Henderson, 1993). With this approach, IT becomes not only a survival and prosperity element, but also an opportunity to differentiate and acquire competitive advantage. Additionally, information technology is a tool for enhancing productivity. Utilizing information technology to develop value-added products and services has become a global corporate skill (De Haes, 2007:29).

1.4 INTELLIGENT STRATEGIC DECISION – MAKING PROCESS

According to Kettemborough, "strategic planning reflects the concern of top management with the future directions, profitability, product line, and position in the community of the firm" (Rosso, 2004:4). The summarization strategy encompasses clearly outlined activities that are communicated as a plan for proactive actions that result

in results that create differences and uniqueness against the competition (Kurien, 2013:31). These guides, which make strategic differentiation in the value of a process, product, or service from the steps we call strategic planning and the decisions made to get there, are the function of strategic decision-making (Kurien, 2013:31). Firms can gain strategic advantage through competencies in marketing, manufacturing, and innovation as mentioned by Droge, Vickery & Markland (1994). Given this, competencies related to decision making and the exploration of options become critical, and there are evolving patterns in hierarchical decision making. Rivkin & Siggelkow (2007) investigated three levels of firms: low search, medium search, and high probability search. If firms continually explore new possibilities, there is a higher propensity for firm innovation. However, there is also a tendency for resource competition within the firm if firms continually explore new possibilities (Snedegar, 2009:28).

Weill and Ross (2004) recognized the top-performing organizations are able to successfully support their strategy by implementing effective IT governance, which they define as determining decision making rights to encourage desired behavior when it comes to use of IT (Kurien, 2013:3-4). Business decisions can be classified according to their impact on the organization and the management level of the decision maker. Operational decisions affect the overall operations of day-to-day business transactions and are made at the supervisory level. Strategical decisions, made by middle managers, guide the allocation of resources and mid-level goals of the organization. Senior or senior managers make strategic decisions. Strategic decision-making is concerned with mission-critical issues that affect the organization's direction, competitive standing, and long-term success of the organization (Rosso, 2004:10-11). The decision to use decision support tools can affect a firms' ability to compete in a global, changing market (Rosso, 2004:4).

Bell et al. (1988) mentions decision science has divided decision theories and methodologies into three different categories. These categories are normative, descriptive, and prescriptive. Winterfeldt (1989) defines normative principles about postulating how people should ideally behave. Brown (1989) defines descriptive science characterizes the world as it is, independent of any decision-aiding procedure. Prescriptive decision science tries to help the decision maker to define the process people

must take to make decisions. In other words, Thomas (1995) summarizes that the normative approach says, “What should happen?”; the descriptive approach reveals “What actually happens?”; and the prescriptive approach suggests “What can help?” (Thomas, 1995:12-13).

While bridging the gap between these three decision sciences, decision engineering concepts of Keller (1989) were used to create models that would allow the decision maker(s) to formulate their ideas and evaluate and test their decisions for consistency. An intelligent decision support system decomposes the complexity of a difficult decision into a set of relatively simple component judgments. It allows imprecise input from one or a group of decision makers and aggregates them into probabilistic rankings of alternatives that the decision makers can use to interactively analyze and modify their decisions until an appropriate decision is reached (Thomas, 1995:13).

With the rapid advancement of information technology, decision makers have access to an increasing number of tools. Decision support systems are the most prevalent systems (Wen et al., 2008:149). Decision Support Systems provide incentives and tools to increase the understanding, insights, and analytic abilities of the decision as mentioned by Keen & Scott Morton (1978). The knowledge and increased capabilities increase the decision-making efficiency of decision makers. The decision-making activity involves determining what should be done in a particular decision-making situation and ensuring that the chosen criteria are relevant as mentioned by Keen & Scott Morton (1978) (Parikh, 1998:1). An intelligent decision support system can show the decision maker/s how alternatives can fit into decision space. The developed merit function will give an idea about the overall strength and attractiveness of the alternatives. The decision model will identify weaknesses as well as strengths in the new product development associated with the development value, cost or investment risk and potential success factors and sub-factors (Thomas, 1995:154).

Apart from computational models, many academics in strategic planning have examined the cognitive perspective on strategic decision making. Schwenk, for instance, examines cognitive models in the early stages of strategic planning, notably in terms of default reasoning (strategic assumptions) and schematic structures (cognitive maps), and argues

that they are a crucial component of environmental evaluation and interpretation. Included in the schema are the prevailing assumptions, such as a subjective view of causal links and judgments based on these perceived relationships (Spangler, 1991).

It should not be forgotten that the success of companies in a knowledge-based economy depends significantly on the successful acquisition and use of knowledge (Huie, 2014:18). There is a rising awareness and confidence that intelligently processed and accessible data is a useful resource for good business decisions in today's world of rapid change. On this premise, business managers are now aware that this massive volume of data is meaningless unless it is properly examined, as a resource that business professionals must compete with or utilize is concealed inside it. Relevant, relevant, and meaningful knowledge must be derived from this data to improve organizational decision making (Huie, 2014:19). According to Shankar and Gupta (2005), firms must focus on a knowledge management strategy to remain competitive in global marketplaces. Numerous businesses struggle to convert data into information for strategic decision-making. Another issue for many organizational managers is incorporating the knowledge of their staff into day-to-day operations (Huie, 2014:20). Like Chou and Lin (2006), Kridan and Goulding (2006) stated that it is a significant aspect in the organization's performance since it is a crucial component of a business strategy that can provide an organization with possibilities to address new market issues (Huie, 2014:21).

The distribution of data to decision makers requires technology (i.e., a BI system), and gaining insights from data requires analytical techniques, which can range from simple charts to more advanced statistical analyses (Richards, 2019:189). The intelligence of the support system is crucial in providing advanced decision support where the system adapts to the user, the task, and the context. Artificial intelligence techniques (AI) can provide this type of intelligence to learn and adapt responses to changing support needs as indicated by Goul (1992), Radermacher (1994), Rao (1994), Remus & Kottemann (1986), Teng (1988), Turban & Watkins (1986) (Parikh, 1998:22). According to Maria, intelligently selected intelligence enables managers to answer complex issues in real time, maximize profitability, make suitable judgments based on relevant information, and assess the impact of their decisions in a timely manner (2008). This is crucial as the time available for managers to make business decisions has been drastically reduced.

Under the strain of competition, managers must make quick, educated judgments based on incoming data. According to Hocevar and Jakli (2010), the capacity to turn obscure data into meaningful information in real time can provide a corporation with a major competitive edge (Huie, 2014:35).

Researchers are beginning to employ distributed models based on artificial intelligence to support strategic decision making. Syed and Tse discuss the SRI-developed distributed system Integrated Consulting System (ICs). ICs integrate quantitative and qualitative technology, enterprises, and customers, as well as market adjustment processes, in order to assist business decision makers with competitive analysis and strategic planning (Spangler, 1991:152).

According to Makridakis (2017), the special significance of Artificial intelligence technologies stems from their capacity to develop, deepen, and substitute for virtually any work performed by people. Regarding the capabilities of AI systems from a mixed academic and business perspective, it can be argued that AI has a diverse understanding of its application fields. The acquisition of knowledge and its representation as an output are crucial aspects of AI development. In recent years, artificial intelligence technologies have entered fields such as economics and finance; "decision support systems" is an example of artificial intelligence system integration in these fields. These systems, according to Haton (2006), are interactive computerized systems that aim to improve the decision-making process in complex scenarios where the decision-maker must make a quick and decisive choice, such as analyzing risks or managing resources (Doğan, 2018:9). Decision Support Systems provide analytical tools for "ad hoc" and "what-if" analyses to decision makers (Rosso, 2004:15).

The significance of artificial intelligence rests in its capacity to both unearth secret knowledge in enormous volumes of data and create rapid and trustworthy answers. Hil'ovská & Koncz (2012) note that studies provide evidence that AI approaches are suited for several economic applications because of their capacity to process, learn, adapt, and create expert-level nonlinear relationships (Doğan, 2018:9). AI brings the power of reasoning and inference that allow DSSs to go beyond data management and model management. An AI-based system can be built on the facts and heuristics of an expert

and techniques for reasoning about them, and methods of reasoning about unstructured decisions (Parikh, 1998:22).



2 CORPORATE STRATEGIES

This chapter defines the corporate strategies to link how the companies' responses to the competitions and market challenges.

Corporate strategy is the decision model that identifies and sets forth a company's goals and objectives, generates basic policies and plans to achieve these goals, and defines the range of business and economic type that the company will pursue, the human organization that the company is or plans to become, and the nature of the economic and non-economic contribution it plans to make to its shareholders, employees, customers, and communities (Kurien, 2013:12).

According to the research of Picken & Dess (1997), Ireland & Hitt (1997), and others, businesses achieve high levels of performance when they select and implement the optimal strategy (Giguere, 2004:32). The ground-breaking book "Corporate Strategy" by Ansoff (1965) presented a rationalist and planning-oriented perspective on strategy, as well as codified stages of strategy creation. He introduced systematic planning to coordinate and manage the strategies of the various divisions of multidivisional corporations. It was understood that high management was the driving factor behind this planning procedure. Ackoff (1970) and Steiner (1979) conclude that planning is a systematic and rational procedure (Dederichs, 2010:9).

Businesses must be competitive in terms of speed, pricing, and customer relations in order to compete on the global market and avoid falling behind in the race. As indicated by Kngr (2007), it is a priority to integrate fundamental abilities with the appropriate use of developing technologies or external resources. The most important prerequisites for developing a competitive advantage with resources and talents are scarcity and compatibility. If assets and abilities can be relocated or replicated, they can be duplicated (Grant et al., 2014:130-131). Businesses can thrive if they can successfully and swiftly adjust to changes and advances. Businesses must adjust their internal structures to external changes in order to constantly provide the most effective response to the harsh consequences of competition. To ensure the organization's success, all business functions must align with these objectives. These objectives should be framed in a manner that allows for constant adaptation to advancements and competition (Çubukçu, 2018:143).

A firm's responses to both external competitive advantage and internal power can be influenced by its growth, stability, and even strategy (Lu, 2006:529).

2.1 GROWTH STRATEGY

The growth strategy, according to Glueck (1976), is when a corporation aims for a considerably higher standard than in the past; the desired goal is a forced increase in market share or sales. Stearns (1991) noted that a company can undertake a growth plan by developing internally or merging with external enterprises, based on the following three methods:

- 1) Increasing the number of sale points to gain new customers.
- 2) Enhance existing items or develop new, similar products to retain and attract existing customers.
- 3) The merger acquisition of a competitor or a forward/retrospective company (Lu, 2006:530).

In Alfred Chandler, *Strategy and Structure* book (1962), Chandler suggests that organizations change their growth strategies to use resources more profitably in the face of changing technology, income, and population (Kalinowski, 1987:22). Chandler was also open about the developmental sequence of strategy and structure. He suggested that initial growth was driven by simple volume expansion, then geographic expansion, vertical integration, and finally product diversification (Kalinowski, 1987:22). Choosing exploration also provides opportunities for the firm. Partnerships with new partners can expand the firm's knowledge base and provide access to new information. From time to time, the firm needs to acquire new and external knowledge for growth and renewal (Liu, 2009:70-71). There is also evidence that investors emphasize long-term growth potential such as those arising from R&D. Therefore, the long-term benefits to be derived from an alliance with a new partner will improve the possibility of future cash flows and will be considered in the valuation of the alliance (Liu, 2009:74).

Diversification and the formation of alliances continue to be the most prevalent growth strategies for businesses; however, firms continue to expand in a number of ways.

However, the effectiveness of such growth methods is likely to be contingent on the occurrence of unforeseen circumstances during execution (Liu, 2009:1).

Wiseman (1988) expands on Porter's three competitive strategies by adding innovation, growth, and alliance strategies (or strategic moves in Wiseman's terms). Innovation moves take advantage of introducing a product or process change and those results in a fundamental transformation that impacts the entire industry. It provides the advantage of growth moves, increased volume, geographical expansion, product diversification, or backward/forward integration. Alliance moves take advantage by making marketing agreements and creating joint ventures between organizations (Zhang, 1998:14-15).

To compete with foreign products and integrate with raw material suppliers, agents, and sales locations, Alliance Strategy joins blocks of comparable enterprises, resulting in vertical and horizontal integration in target markets (Al-Sukkar, 2013:3).

Venture growth models have received much attention in literature and are useful for understanding the relationship between strategy and growth. These models integrate strategic management theories, industrial organization concepts, and entrepreneurship models by bringing together the variables of strategy, industry, and entrepreneurship (Giguere, 2004:21).

To suit the needs of the target markets, the diversification strategy entails providing varied product lines. This includes supplying diverse items, presenting a new collection of products to new markets, and depending on independent raw material and production input suppliers (Al-Sukkar, 2013:3).

The policy and strategic direction perspective is influenced by economic theory and represents the majority of strategy research conducted in the 1970s and beyond that investigates the performance of firms pursuing various strategic orientations. As was mentioned previously, the relationship between strategy and performance has become so pervasive that performance has become a common dependent variable in strategy research, as demonstrated by Barney (2002), Grant (2002), and Johnson (2002). Diversifying a company's operations is the usual strategic direction considered in this

strategy perspective. However, many other strategic variables, such as the effectiveness of merger and acquisition strategies, have been researched over time (Dederichs, 2010:22).

As indicated by Amit & Livnat (1988) and Rumelt (1982), related diversification firms can leverage synergies between product units by consolidating their business activities in manufacturing, marketing, raw material purchasing, and research & development (R&D), thereby achieving both scale and scope (Liu, 2009:4).

According to Hitt, Hoskisson, and Kim (1997), geographic diversification is the expansion into other geographical places or markets that cross regional and national borders. By utilizing its proprietary assets, particularly intangibles, in global marketplaces, a company can achieve above-average profits by Buckley (1988), and the exploitation of these assets is bolstered by market imperfections, as noted by Delios & Beamish (1999) (Liu, 2009:6). Morck and Yeung (1991) discovered that the degree of geographic diversity's influence was proportionate to R&D and advertising investment, supporting the internalization theory that the value of multinationalism is derived from intangible assets. Their findings are congruent with that of Mishra and Gobeli (1998), who discovered that R&D spending and multinationalism had favorable effects on market valuation. Due to their function as financial intermediates, Errunza (1981) and Senbet (1984) have demonstrated theoretically and empirically that multinational corporations suffer a positive value effect relative to exclusively local firms (Liu, 2009:6).

The literature in the field of strategy with respect to international trade reflects a growing awareness of the global integration of markets. Unlike the international business world, the conceptualization of local business no longer captures market realities, especially in industrialized countries. Traditional markets of domestic firms have been invaded by foreign competition. High-tech firms find themselves drawn into international competition not only because of the potential that is promised by foreign markets, but also because barriers and barriers between national markets are breaking down or are being overcome by firms through innovative forms of organization. Competition for the

commercialization of high technologies has become increasingly global (Shan, 1990:133).

Different owner-managers seek different growth levels as told by Ginn & Sexton (1990) and Gundry & Welsch (2001). In addition, different entrepreneurs will use different growth strategies, although they may seek the same level of growth. Davidsson (1989) surveyed 400 Swedish entrepreneurs and identified the characteristics of high-growth entrepreneurs. Generally, expected outcomes other than money have been found to motivate high-growth entrepreneurs. In addition, job growth and sales growth are highly desirable goals for high-growth entrepreneurs. They also often consider the firm's external conditions when making strategic decisions. In addition, Gundry & Welsch (2001) found "strategic intentions emphasizing market growth and technological change" (Giguere, 2004:16).

Much of the relevant literature on growth seeks to discover the various aspects that enable a company to achieve its objectives and eventually establish an effective marketing plan (Pieshko & Soulden, 2002:259). While scholarly perspectives on growth strategies vary, the vast majority of growth strategy research references Ansoff's product-market growth matrix. According to his presentation, a business may select one or more competitive strategies, such as intensive or diversified growth. He thinks that the safest growth plan is to adopt a market penetration or saturation strategy, in which a company gains more usage from existing consumers while also attracting new customers from the competitors. Adopting a market development strategy for the firm's present products/services to expand into new channels, geographies, or customer categories would be a little riskier move. The next degree of risk is a growth plan in which the company creates wholly new items, different versions of existing products, or different quality levels of existing products to sell in their existing markets. Diversification, in which new items are generated for new markets inside a specific product market, is advised as the strategy with the highest risk. Following Ansoff, Bradley asserts that a business has numerous alternatives for enhancing its marketing performance. First, it may modify existing items or create new ones. It can also create new markets. Thirdly, the company can choose a combination of new items for new markets. Similarly, Kotler categorizes different growth prospects available to a company as intensive, integrative, or diverse. These

approaches enable systematic identification and efficient pursuit of strategic growth opportunities (Pieshko & Soulden, 2002:260).

According to Ireland and Hitt (1997), a high-growth entrepreneurial firm (HGEF) "takes risks, is inventive, and initiates aggressive competitive actions." This entrepreneurial mindset enables the company to identify "attractive product-market prospects while seeking superior financial performance," as stated by Zahra & Covin (1995), Ireland & Hitt (1997), and others (Giguere, 2004:17). As MacMillan (1993) noted, HGEFs are "more likely to adopt new, advanced technology than slow-growing ones." Entrepreneurs may pursue a high-growth strategy for a variety of reasons, including being a global enterprise, entering new markets, or commercializing innovative goods. Compared to larger companies, flexibility is one of the primary advantages of growth for entrepreneurial organizations (Giguere, 2004:17-18).

In the context of enterprises with rapid expansion, the strategy is unstable. For instance, Maidique & Haye (1984) analyzed a sample of 250 high-tech companies and found that growth strategies are characterized by "alternating periods of consolidation and continuity, with sharp trends that can lead to dramatic changes in the firm's strategies, structure, controls, and power distribution, followed by a period of consolidation" (Giguere, 2004:31-32).

Baum, Locke & Smith (2001) tested the same integrated model. They tested multiple components for each variable and used venture growth as a measure of enterprise performance. The results show that three key variables contribute significantly to the growth of the startup: competitive strategies, general motivations, and the entrepreneur's specific competencies. In terms of competitive strategies, differentiation only by innovation or quality/service was found to be an effective strategic option for higher growth (Giguere, 2004:27).

One implication of the high growth rate is that firms must develop their functional capabilities, including procurement, production, marketing, sales, and logistics, to meet market demand for their products. In such cases, the strategic focus is on the speed to market rather than the innovation or innovation the product provides. In order to meet

the need for speed, companies should create strategies that can produce precise and fast results (Liu, 2009:92-93).

2.2 STABILITY STRATEGY

When pursuing a stability strategy, a corporation maintains its current market share in order to capitalize on future prospects. A stabilization strategy focuses on preserving the market share of a corporation. This strategy's primary objective is to strengthen the organization from within (Lu, 2006:530).

This is a passive strategy, as opposed to an active one. In strategic planning, a corporation must consider the need for growth, respond to external opportunities, and select the most suitable growth strategy and timetable (Lu, 2006:529-530).

There is no clear linking between stability strategy, technology improvements and usage and the firm performance in the literature. That is why the stability strategy is not considered in this work.

2.3 CONTRACTION STRATEGY

When a corporation employs a contraction strategy, it attempts to reduce external / internal flaws by downsizing, withdrawing finances, and budget cuts, among other measures (Lu, 2006:529). The objective of an extraction strategy is to resolve existing issues, improve management efficiency, lay off employees, and drain funds from certain company divisions. This strategy may also be deemed passive (Lu, 2006:529).

There is no clear linking between contraction strategy, technology improvements and usage and the firm performance in the literature. That is why the contraction strategy is not considered in this work.

3 BUSINESS STRATEGIES (COMPETITIVE STRATEGIES)

This chapter defines and analyses the competitive strategies focusing on cost leadership and differentiation strategies to create the baseline of the research.

Some industries face particularly fierce competition among firm players in the competitive market. Depending on the goods or services to be offered, the sectors' reach can be local, global, or both (Baroto & Bin Abdullah, 2011:1362). By providing unique goods and services that support the company's operations, strategy aids businesses in adapting to difficult circumstances. There are strategies that allow businesses to maximize performance given their surroundings (Snedegar, 2009:35). The worth, scarcity, and replicability of a company's resources and competencies determine its potential for competitive advantage. To fulfill their full potential and make the best use of their assets and talents, businesses must be efficiently organized. In order to maximize the competitive potential of its resources and competencies, it should be a well-organized company (Barney et al., 2012:99). According to Porter (1992), there are three requirements for competitive advantage to remain strong. The first is where its supremacy comes from. The number of outstanding resources the company possesses is the second characteristic. Continuous innovation and improvement are the third and most significant resource (Çubukçu, 2018:145).

The strategic management literature, including Bettis & Weeks (1987), Chen et al. (1991), MacMillan et al. (1985), Smith, Grimm, Chen, & Gannon, advocates a fine-grained and dynamic view of strategy that focuses on competitive activities and competitor responses (1989). This viewpoint adheres to Porter's (1980) definition of strategy as making competitive maneuvers to acquire an edge over the competition (Sandra, 2010:18).

Strategies to enhance performance, maximize sales, and reduce costs were put out by Utterback and Abernathy in 1975. These three strategies place a focus on the effectiveness of the products and services, marketing initiatives to boost sales and market share, and a decrease in direct manufacturing costs (Hudson, 2001:22).

The classification of generic competitive strategies was first made by Porter, McGee and Thomas, and it was also tested by Galbraith, Schendel and Miller with experimental research as mentioned by Yamin et al.(1999). According to Porter (2003), every firm must have a competitive strategy to compete with its defined or undefined rivals, and the firm must surpass its competitors in order to gain a foothold in the market and survive in the long run. With globalization, competition in technology, in the market, in the semi-finished production market, in the sale of goods and services, in short, in the whole market, has increased very seriously. Therefore, companies should analyze and determine their current strategies well in order to provide sustainable competitive advantage as indicated by Yamin et al.(1999) (Songul, 2016:12).

Porter notes that the methods businesses employ to compete in a given sector might differ in a wide range of ways, and he suggests a set of "strategic dimensions" that should represent any variations in the methods businesses might use to pursue their strategic alternatives within each industry. As Porter (1980) noted, these dimensions include, among other things, competitive strategies like brand recognition, channel choice, technology leadership, cost positioning, service, and leverage. These competitive strategies give us a way to describe how rivals in a given market are positioning themselves. A strategic group is made up of businesses within an industry that have the same or a comparable strategy (i.e., emphasize similar forms of rivalry) (Dess and Davis, 1980:470).

Scholars and practitioners paid close attention to Porter's 1980 book *Competitive Strategy*. Porter states at the outset that "the main feature of a firm's environment is the industry or industries in which it competes," and that "connecting a company to its environment is the foundation of crafting competitive strategy" (Dess and Davis, 1980:8). According to Porter's (2008) paradigm, businesses obtain a competitive edge by identifying the industry structure, placing themselves in accordance with this structure, and constructively altering the industry structure (Zuhdi, 2012:23).

The five competing forces that fuel industrial competitiveness are what determine which industry should be classified appropriately (Dess and Davis, 1980:8).

- the threat of new entrants,
- the bargaining power of buyers,
- the threat of substitute goods or services,
- the bargaining strength of providers,
- the competitive rivalry among currently operating businesses.

According to an examination of these five forces, an industry can be categorized as belonging to one of five general industry environments: (1) fragmented, (2) emerging, (3) mature, (4) declining, or (5) global (Dess and Davis, 1980:8).

The five forces shown in Figure 1 show industry attractiveness - the extent to which the industry return on investment (ROI) rates are better than other industries. If the combined effect of the five forces is strong, the industry is too competitive to deliver high rates of return. Every industry participant can influence the industry structure by changing the nature of certain forces (Ernest, 1998:29).

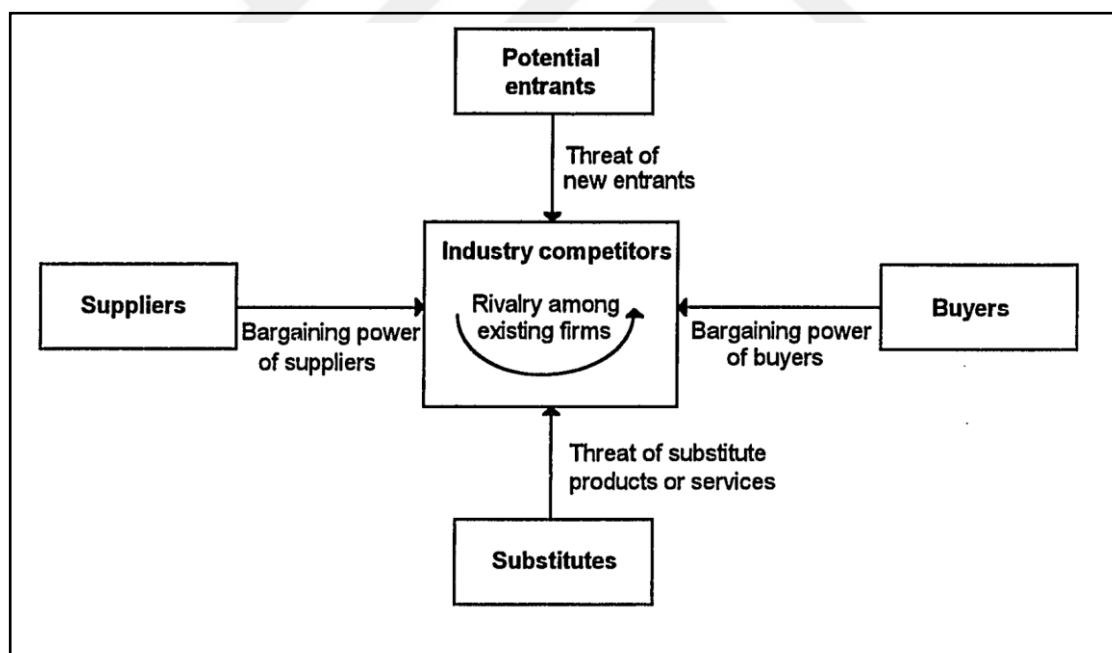


Figure 1. The Industry Forces Model by Porter (1985)

Source: (Ernest, 1998:29)

The value chain, shown in Figure 2, was introduced by Porter as the essential tool for analyzing a firm's operations in terms of competitive advantage. It consists of nine value activities and the margin that together represents the total value for the buyer. Each of the valuable activities takes place by purchased inputs, human resources, and technology

to perform its function, as well as using and producing knowledge. Some valued activities can also create financial assets and liabilities as depicted by Porter (1985) (Ernest, 1998:30).

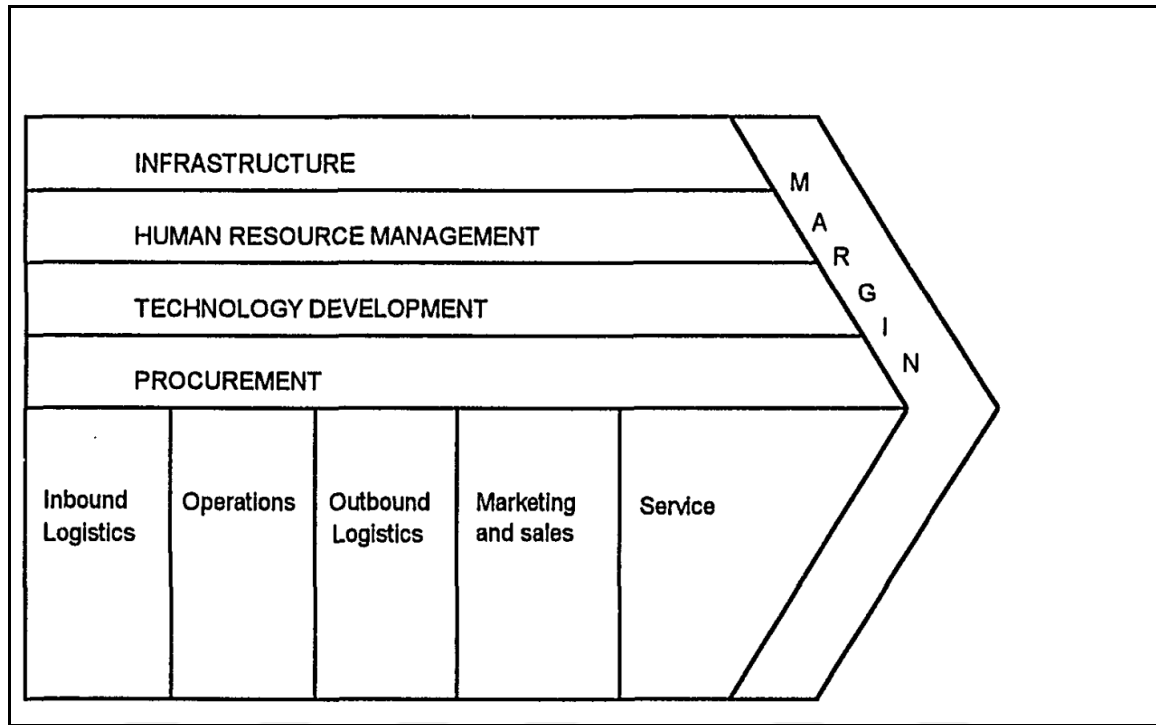


Figure 2. The Value Chain by Porter (1985)

Source: (Ernest, 1998:30)

The industry forces model is used at the business planning level. Strengths of forces are determined by the technical and economic factors underlying the industry, such as switching costs, brand identity, government policy, economies of scale, price sensitivity of buyers, and concentration of suppliers. These factors typically change slowly over time, and the changes are what business strategy should address (Ernest, 1998:69).

Value chain shows how a firm partially or fully integrates its operations, while vertical integration of value chain involves expanding backwards towards sources of supply, or to the supply chain or end user. By retrospectively integrating, a firm can enhance technological capabilities and position for future products or industries. Backward vertical integration can create differentiation by keeping activities in-house. It reduces dependency on suppliers. Forward integration provides better access to end users and markets. Forward integration is what drives firms to create shared value for consumers.

In essence, organizational effectiveness is the basis of organizational strategic differentiation, if not necessarily strategic differentiation. The overall cost leadership strategy requires a firm to monitor and adjust its value chain with the appropriate supporting structures and systems as clearly defined by Porter (2005) (Snedegar, 2009:37-38).

Porter creates three potentially successful generic strategies for structuring a defensible position in a given industry and outperforming competitors. (Dess and Davis, 1984:469). Cost leadership Strategy, Differentiation, and Focus, described in Figure 3 (Baroto & Bin Abdullah, 2011).

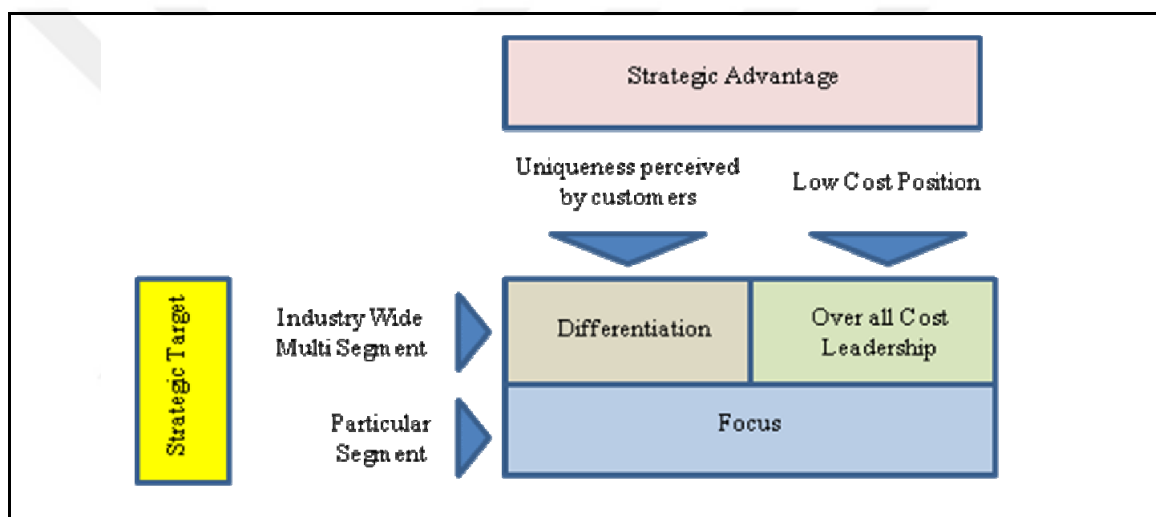


Figure 3. Porter's Three Generic Strategies

Source: (Baroto & Bin Abdullah, 2011:1363)

First, total cost leadership stresses low costs in comparison to competitors without sacrificing quality, service, or other factors (Dess and Davis, 1984:469). The company is committed to maintaining an acceptable quality standard and being the lowest-cost producer in its industry. This includes selecting and targeting profitable customers, utilizing economical purchasing, selecting local raw materials that meet the required specifications, if any, adhering to a labor-saving policy and increasing productivity, presenting typical products in a particular collection, and employing technology in all areas, production steps that reduce and control overall and promotion costs (Al-Sukkar et al., 2013:3). A low-cost approach emphasizes the necessity for exposure to the lowest costs in an industry; Commodore's business machines are an example of this strategy. This strategy necessitates "aggressive construction of efficient-scale facilities, vigorous

pursuit of cost reductions from experience, tight cost and overhead control, avoidance of marginal customer accounts, and cost minimization in areas such as R&D, service, sales force, and so on," according to Porter (1980) (Govindarajan, 1988:830).

The second technique, differentiation, necessitates the creation of a product or service that is recognized as unique within the sector, allowing the company to charge above-average costs (Dess and Davis, 1984:469). To distinguish the company's products from those of its competitors and tailor them to the needs of its target markets' clients. This includes having an accurate grasp of the customer's demands, investing in research and studies, addressing the customer's needs, and producing items of higher quality (Al-Sukkar et al., 2013:3). In a differentiation strategy, a company attempts to be distinctive in its industry in ways that are highly valued by consumers; Mercedes employs this strategy in its automobiles. Using this method, a business "Chooses one or more traits that many customers in an industry deem essential and positions itself distinctively to suit those needs. Its originality is rewarded with a high price " (Govindarajan, 1988:830).

Third is a strategy that focuses on a certain consumer group, geographic area, or product line segment (Dess and Davis, 1984:469). It is a specialized branch of knowledge to manufacture products for a certain market sector. This comprises selecting the market sector in which the company can obtain a competitive edge, control expenses, and boost the efficiency of its marketing activities (Al-Sukkar et al., 2013:3).

These three generic strategies represent three broad sorts of strategic groups; hence, strategy choice may be viewed as "the option of which strategic group to compete in," as described by Porter (1980). Firms that lean toward particular strategies should outperform those who are "stuck in the middle," as stated by Porter. Porter says that enterprises in the second tier that fail to create a strategy in at least one of these three categories "almost certainly" experience low profitability (Dess and Davis, 1984:469).

The cost leadership approach represents organizations' efforts to gain a competitive advantage by achieving the lowest industry costs. Porter (1980) mentions pursuing a cost leadership strategy place a premium on stringent cost management and overall effectiveness. The objective of a corporation pursuing a cost leadership strategy is to

deliver its product at the lowest possible price. According to Porter (1985), cost leadership is achieved by doing key value chain operations at a lower price than competitors. The cost leadership approach, according to Bingxin Li and Juan Li (2008), likewise aims to provide clients with a standard, straightforward, high-volume product at the most competitive price (Baroto & Bin Abdullah, 2011:1364).

In turn, a differentiation strategy entails creating value for customers by offering higher quality, innovative products, brand image, and excellent services. This will ensure product differentiation, hence making the product more competitive compared to others (Baroto & Bin Abdullah, 2011:1364).

The generic of differentiation strategy entails establishing a market position that is viewed as unique across the sector and is long-lasting as said by Porter (1980). Besides according to Frambach (2003), such differentiation may be based on design or brand image, distribution. Particularly differentiating organizations establish client value by offering premium-priced, high-quality products backed by excellent service (Baroto & Bin Abdullah, 2011:1364).

Porter (1985) creates a value chain architecture that categorizes a company's transformation system into core and support value activities. Primary activities include the manufacturing and distribution of the product or service and after-sales support, as well as input and output logistics, operations, marketing, sales, and service. Support activities assist primary activities and each other by offering input, managing human resources, developing technology, and performing basic administrative tasks. Any one of these valued activities (main or support) can create a competitive advantage if it can be executed more efficiently or at a lower cost than rivals. As vital to the sources of competitive advantage as the activities themselves, according to Porter, are the interactions or links between value activities. In addition, the firm can obtain a competitive edge through interactions with its suppliers and consumers along its value chain (Zhang, 1998:12).

Ultimately, a firm's capacity to handle the five forces of competition of Porter (1979) is the key to achieving a lasting competitive advantage. A cost plan may necessitate the

development of new technologies, the identification of lower-cost raw material suppliers, or the reduction of operating expenses. However, these strategies are not always sufficient to eliminate competition and preserve a competitive edge (Snedegar, 2009:35-36).

According to Porter, the objective of generic strategies is to gain a competitive advantage and determine the type of strategy to employ in order to attain this advantage. Porter (1985) underlined that cost leadership and differentiation strategies are two types of business strategies that can be chosen, whereas focusing is more appropriate for organizations that focus on skills and a restricted market sector (Songul, 2016:16). Porter's conception of the two methods suggests that cost leadership and differentiation are viewed as opposite extremes of a continuum (Regner, 2007:22). Porter (1985) strongly opposes the pursuit of both cost-leadership and differentiation strategies at the same time because each strategy requires different resources, strengths, and organizational arrangements due to their "fundamentally different approach to creating and sustaining a competitive advantage." Porter's reasoning and the associated empirical findings (e.g., Aulakh, Kotabe, and Teegen (2000)). Dess and Davis (1984) indicate that companies must adopt a single pure strategy or risk being mired in the middle and must retain their commitment to success (Bingxin Li & Juan Li, 2008:2).

Nonetheless, other studies contend that cost leadership and differentiation are not mutually incompatible, but rather consistent techniques to dealing with external factors, e.g. Hill (1988) and Murray (1995) (Bingxin Li & Juan Li, 2008:2). According to researchers, there are no "pure" methods; both cost-effectiveness and differentiation must be considered. Hall (1980), Miller & Dess (1993), Reddy (1980), Kim & Lim (1988), Miller & Friesen (1986), Jones & Butler (1988), and Reitsperger et al. (1993) support this "two-dimensional" conception the most (Regner, 2007:24). Beal and Ardekani (2000), Philips, Chang, and Buzzell (1983), Spanos, Zaralis, and Lioukas (2004), among others, provide empirical support for the notion that a combination of methods can lead to success, at least under certain conditions (Bingxin Li & Juan Li, 2008:2).

Evidence demonstrates that Porter's conceptualization is oversimplified. Hall (1980), in a survey of 64 companies in eight main industries, found that many of the most profitable

enterprises obtained either the lowest cost or the most divergent position in their field, a finding that supports Porter's position. However, Hall also noted that a fraction of the most successful companies follows both a differentiation strategy and a low-cost approach, indicating that the two are not necessarily incompatible. White (1986) found comparable results in his research of 69 business units. White (1986) observed that 19 of 69 units had a competitive advantage based on a combination of both low cost and differentiation. In addition, its findings indicate that business units with the highest ROI are those that successfully combine low cost with distinction (Hill, 1988:402).

Miller (1988) says that Caterpillar initially attempted to become the world's highest-quality maker of earth-moving equipment by focusing entirely on durability and precision, disregarding efficiency and economy. Single strength (or plan) also runs the danger of decreasing adaptability and flexibility. Combination strategies boost a firm's adaptability to changes such as technical advancements and industry shifts by enhancing its flexibility (Regner, 2007:34).

Other researchers contend that product and system innovations have the potential to reduce costs and increase differentiation via quality improvement efforts, process innovations, product innovations, and system innovations e.g., Wright et al (1991), Helms et al (1997), Grant (2005), Wright et al (1991), and Wright et al (1991). Oskarsson and Sjoberg (1994) give empirical evidence in support of this argument. A case study of Motorola and the mobile phone business found three cost-effective and efficient technologies. Thus, Oskarsson and Sjoberg (1994) reached the conclusion that differentiation and cost leadership are not always incompatible strategies (Regner, 2007:30).

Until the late 1980s, when the economic environment was reasonably stable and flexibility and responsiveness were not as important, Porter's suggestion to use a single strategy appeared reasonable. However, in today's world, where the business environment has become very complicated and unpredictable, companies are compelled to be flexible and adaptive in order to meet the ever-changing environmental needs, which is made feasible by combining differentiation and low-cost strategy (Porter, 1980:198).

3.1 COST LEADERSHIP STRATEGY

Typically, achieving cost leadership requires aggressively constructing efficient scale facilities and applying experience, strict cost and overhead management, avoiding marginal client accounts, and a combination of R&D, service, sales force, advertising, etc (Regner, 2007:14-15). Companies can gain competitive advantage on an economy scale by using cheaper raw material, mass production and distribution, and effective systems to reduce human resources cost and minimize costs (Kurt & Zehir, 2016:100).

There are many ways to achieve a cost leadership strategy, and businesses depend on the structure of the sector in which they operate, the size of competition, raw materials, etc. Strategies to be implemented differ depending on the ease of access to alternative sources at low cost, the size of the enterprise, its production portfolio, and its current and potential customer portfolio. Among these strategies, utilizing economies of scale is one of the prominent options according to Kunc (2010). Duman (2014) tells while businesses that adopt the cost leadership strategy in the sector carry out their efforts to reduce their costs, it is necessary not to reduce the prices and quality of goods and services, but to reduce the waste in costs as much as possible (Peker et al., 2014:14).

The basic idea behind this strategy is explained by Kotha (1995) in this way: A business that creates more value by lowering its costs than its competitors can increase its market share and profit by passing some of this excess value to consumers in the form of lower prices. Leaving all the excess value created in the enterprise will not lead to competitive advantage, although it will increase the profit margin of the enterprise (Karadal, 2005:31).

Aiming to establish an overall cost leadership position, the strategy's unifying theme is low-cost relative to competitors (Regner, 2007:15). A low-cost position protects the company from aggressive purchasers because aggressive purchasers can only use force to drive costs down to the level of the next most efficient competition. Low cost provides protection against dominant suppliers by allowing for greater adaptability to input cost rises (Regner, 2007:15). Achieving a low total cost position frequently necessitates a high relative market share, as economies of scale and cost advantages tend to protect a company against dominant customers and suppliers and present substantial obstacles to

entry. In other words, cost advantages can produce value for a company by mitigating the following five threats: entry, competition, replacements, suppliers, and purchasers (Regner, 2007:15).

Kaya (2013) writes a cost-leadership strategy that involves targeting the most typical customer in a broad target market, offering a product that caters to a need rather than a luxury. Because costs can generally be reduced by standardizing a product more (Kaya, 2013:110). Dinçer (2013) adds the business determines strategies for producing and distributing its goods or services by realizing its costs at the lowest level compared to its competitors. The main theme that determines the strategy is that the enterprise is at the lowest level in total costs. Cost leadership requires establishment of facilities with economy scale, obtaining strong cost reductions due to experience, tight cost and overhead control (Dinçer, 2013:200). To an enterprise to compete in an industry with low cost, the market must be flexible, especially against the prices of products, and the enterprise must benefit from economies of scale and experience curves as mentioned by Kaya (Kaya, 2013:111). As in all strategies, to implement the cost leadership strategy, enterprises should adopt or build an organizational structure, management controls and compensation policies that strengthen this strategy (Barney et al., 2012: 141). Ülgen and Mirze (2013) writes cost leadership as a business management strategy seeks to reduce costs without affecting or compromising quality. Otherwise, cost reduction may also reduce quality and customers' expectations may not be met, thus reducing the value created for them. Competitive strategies are those that create value for both customers and businesses, not those that reduce value. The first thing that could be done reducing costs in practice; It is to reduce input prices by bargaining with suppliers, to reduce energy, communication, management and office expenses and side payments of employees (Çubukçu, 2018:147).

Businesses should consider low-cost sources to follow this strategy. When analyzing the cost situation of a business, it is necessary to divide the business activities into groups and analyze the factors that affect the costs of each activity group. Economy of scale, economy of experience, capacity utilization, access to production factors, technological superiorities independent of scale, policy choices, links between business activities,

vertical integration and establishment location can be counted as low-cost sources (Engin, 2005:31).

When a corporation seeks to acquire a competitive advantage through a low-cost dominance approach, Johnson (2008) outlines three options:

- to achieve a larger market share than other enterprises — economies of scale provide the cost advantage.
- to concentrate on components of the value chain that are valued by customers and to identify company functions that can be carried out more effectively in this manner.
- to capitalize on customers' price sensitivity and achieve a cost advantage that is tough for competitors to replicate (Duicia & Duica, 2014:34).

If a company has low prices and is therefore a cost leader, it can provide lower selling prices than rivals while retaining the same price level. Alternatively, if the struggle for competitiveness in the sector intensifies and companies begin to compete over the selling price, the industry leader – the company with the lowest cost per product – will be able to compete with its rivals more effectively. Competitors in the industry will have the opportunity to gain and defend their market shares more effectively. To take advantage of costs, the total production costs for the entire value chain must be lower than the sum of the production costs for each competitive firm's value chain. This can be accomplished in two ways (Duicia & Duica, 2014: 34).

- It is required to perform work better than competitors, to conduct value chain activities more efficiently, and to manage the elements that impact the level of value chain expenses.
- Until operations are integrated, or particularly expensive chain activities are discontinued, the company's value chain should be rectified (Duicia & Duica, 2014:34).

Porter (1980) suggested that the status of cost leadership gives three significant benefits to companies employing this strategy:

The first advantage is that cost leadership enables a company to make greater profits than its rivals (Hudson, 2001:29). Businesses with cost leadership have a competitive advantage over their rivals since their low costs will provide returns even if they lose profits (Zehir, 2016:15). When a company becomes a cost leader, for instance, it acquires a competitive advantage by acquiring a cost structure that enables it to sell its products at prices below its competitors' expenses while being profitable (Hudson, 2001:29).

A second advantage mentioned by Porter (1980) for corporations implementing this strategy is that a cost leadership position within an industry serves as a defense against competitors attempting to compete on price with a low-cost position by attacking the cost leader (Hudson, 2001:30). Businesses in a position of cost leadership are better able to negotiate with their suppliers (Zehir, 2016:15). This defensible position includes both buyers and suppliers, as a position of cost leadership diminishes influence. Both customers and suppliers attempt to exert influence over a cost-leading company (Hudson, 2001:30-31).

The new market entry barrier produced by a cost leadership company is the third advantage (Hudson, 2001:31). Companies with a low-cost approach are resilient against five competing pressures (Zehir, 2016:15). The low-cost firm is shielded from possible new entrants because its cost position prevents new enterprises from generating adequate profits and attaining significant market share (Hudson, 2001:31).

Initially, organizations may incur losses while implementing a cost leadership plan. However, once leadership is attained, further investments are required to retain it as said by Porter (2003) (Songul, 2016:15).

As Nayar (1993) also demonstrated, a low-cost position shields businesses from competitive forces. It allows businesses to protect themselves against competition from rivals, powerful customers, and suppliers. Advantageously, a cost leadership approach improves market share by decreasing expenses through economies of scale. However, Porter (1980) argues that an overemphasis on cost reduction can lead to an inability to respond to changes in the economic environment, technology, and customer or market demands; thus, the cost advantage has some hazards. A company's choice of strategy is

impacted by the market structure and economic environment. It has been stated, for instance, that the cost-leadership strategy is more suitable for stable and predictable environments, whereas distinctiveness and focus are more suitable for dynamic and uncertain markets (Hançerlioğulları et al., 2016:40).

It is not correct to suggest that there can only be one cost leader in a market. There may be more than one cost leader in the same industry. In this respect, cost leadership should be supported by the lowest price strategy. Unless this is done, the possibilities of gaining new consumers and reaching competitive advantage will not be evaluated as added by Partridge et al (1994) (Engin, 2005:31).

3.2 DIFFERENTIATION STRATEGY

The overall differentiation approach entails establishing an industry-unique market position that is sustainable over the long term. According to Porter (1980), this differentiation could be based on design or brand image, technology, characteristics, customer service, distribution, etc (Frambach et al., 2003:381). Then, Porter (1985) noted that differentiation strategies might include aspects such as brand name, technology, customer service, and sales network, and that the optimal strategy for a company is to differentiate itself in multiple dimensions (Kurt & Zehir, 2016:101). The fundamental premise of differentiation strategy is to channel client selections into products and services by doing things differently from each rival (Kurt & Zehir, 2011: 81).

Porter (1980) suggests that strong marketing capabilities, product engineering, creative talent, a strong aptitude in basic research, a corporate reputation for quality or technological leadership, a combination of unique skills long-established in the industry or acquired from other businesses, and strong collaboration across channels are typically required to implement differentiation (Regner, 2007:18).

According to Porter (1988), the differentiation strategy increases profitability by fostering brand loyalty and price sensitivity. According to Dess and Davis (1984), differentiation strategy is characterized by brand positioning, advancements in marketing strategies, control of distribution channels, and advertising campaigns. Additionally, brand loyalty, brand awareness, originality, innovation, strong marketing abilities, robust

technology, and quality are essential for the implementation of the differentiation strategy (Karabođa, 2015:38).

According to Porter (1985), the source of differentiation can be product differentiation, unique delivery systems, marketing, or comparable reasons. Other researchers, including Powell (1995), Daniel and Reisperder (1994), Phillips, Chang, and Buzzell (1983), and Miller and Friesen (1986), have enlarged the differentiation source to include product quality. Furthermore, according to these experts, the Total Quality Management paradigm's principles, which emphasize continual quality improvement and greater customer satisfaction, are possible pathways for differentiation and competitive advantage. This claim is supported by empirical study conducted by Powell (1995) (Hudson, 2001:32).

A company that employs a differentiation strategy attempts to convince customers that its products or services are superior to those of its competitors in terms of image and reputation, reliability, design characteristics, and quality, as described by Dean and Evans (1994) and Sashi and Stern (2002). These are reinforced by Miller's (1986) assertion that a company develops this perception by inserting genuine qualitative differences into its products and services, implementing advertising and marketing campaigns, and charging premium prices (Baroto & Bin Abdullah, 2011:1365).

According to Slater & Olson (2001), the performance of the differentiation strategy depends on how well the company can balance product benefits and product prices for the client in relation to rival alternatives (Frambach et al., 2003:381). In another formulation by Walker & Ruekert (1987), differentiating enterprises build consumer value by providing premium-priced, high-quality products backed by excellent service (Frambach et al., 2003:381). Consequently, this strategy necessitates an in-depth comprehension of both client requirements and the positioning of competitors. And Frambach (2003) concludes that a company's emphasis on distinction will have a favorable impact on both its customer and competitive orientation (Frambach et al., 2003:381).

In the differentiation strategy, the objective is to distinguish oneself from competitors by providing products and services that are distinct from theirs. Differentiation, according to Barney and Hesterley (2006), reflects the innovation and initiative of groups and individuals within an organization (Karaboğa, 2015:38).

Differentiation can be defined as making the goods and services produced by the companies unique from all their competitors in terms of design or brand name, technology customer service. Again, with new products, the customer's differentiated brand perception, and good service, it gives the company a chance to put extra prices. It should develop new products with advantages such as single or different products in order for customers to benefit more. The differentiation strategy and innovation activities are linked as concluded by Santos-Vijande et al. (2012), too (Zehir, 2016:15).

Differentiation is the process of adding value to a product or service that will be seen as unique by the buyer. There are five kinds of differentiation and cost reduction strategies for implementing the differentiation strategy. These include a focus on quality, process improvements, product innovations, and system innovations, as well as assistance for privileged talent (Eren, 2013: 280). In addition to the high price that can be accepted by the customer, the differentiation strategy also ensures the loyalty of the customer to the business or its products, and thus, loyal customers can be created as mentioned by Ülgen and Mirze (2013). And Karaoğlu (2010) said that it is a differentiation strategy to produce goods and services and to sell these products at high prices and earn an income above the market average (Çubukçu, 2018:147)

Baum, Locke & Smith (2001) showed that the strategy of differentiation through innovation or quality/service is associated with high growth in a positive way (Giguere, 2004:35). Although differentiation encompasses a variety of components, including as quality assurance, specially created products, and the embodiment of identity and lifestyle, greater quality is arguably the most commonly associated feature. Then, better quality is commonly used as a distinction factor in exams and investigations (Regner, 2007:27). Some of the direct costs associated with increasing distinctiveness include high-quality inputs, more marketing expenses, improved after-sales services, and better-trained workers (Regner, 2007:27). Chaganti, Chaganti & Mahajan (1989) studied 192

Canadian small manufacturing firms and found that two strategies were highly successful: the broad product coverage strategy (as opposed to niche strategy) and the quality image drive strategy. Specifically, Chaganti, Chaganti & Mahajan (1989) found that broad differentiation strategy focused on quality image was most profitable under a type of promotional competition environment (Giguere, 2004:35). As Bal (2005) tells in another way that differentiation strategy is a strategy based on seeing the product or service produced as unique within the whole industry. At this point, the factors to be considered are brand image, licensed technology, special features, a strong distribution channel and other features that can make a difference within the current industry. This will transform the firm's profit margin above the industry average (Eraslan, 2014:46).

Design, brand image, technology, features, customer service, and dealer network are a few different ways to differentiate a product. The fundamentals of difference fall into three distinct areas. First, to execute distinction, a company may concentrate on product/service characteristics, such as product characteristics, product complexity, product introduction timing, or location. Second, a company can focus on its relationship with its customers, such as through product customization, marketing to consumers, and product reputation. Lastly, difference can be achieved by concentrating on connectedness within or between organizations, including connectivity within a company's operations, affiliation with other companies, product mix, distribution channels, and service support. Ideally, the company should distinguish itself in multiple dimensions (Regner, 2007:17).

Porter (1985) lists the steps to be followed to reduce the cost in the differentiation strategy (Eraslan, 2014:45);

- (1) determine who the real buyer is,
- (2) describe the buyer's value chain and its impact on the firm's value chain,
- (3) determine the purchase criteria of the buyer,
- (4) assess the current and potential unique resources in the firm's value chain,
- (5) determine the availability and costs of potential sources of differentiation,
- (6) choose the appropriate configuration to make the differentiation that creates the most value for the activities in the value chain,

- (7) test the chosen differentiation strategy for sustainability, and
- (8) determine the activities in a way that does not affect the chosen differentiation method (Eraslan, 2014:45).

According to Hill (1988), the differentiation strategy has three effects on demand:

- 1- The firm's ability to differentiate the product.
- 2- The competitive structure of the product marketing environment
- 3- Consumers' loyalty to the rival firm (Zehir, 2016:15).

In addition to Porter (1985), Morschett et al. (2006) concluded that organizations that apply a differentiation strategy minimize the price sensitivity of consumers through fostering brand loyalty. Similar to the cost leadership plan, the differentiation strategy provides organizations with a sustained competitive advantage in this situation. R.Awade (2014) considers the differentiation strategy in three categories. These are:

- 1- Differentiation in business product and/or service qualities, namely product features, product promotion, timing of market entry of the product,
- 2- Product customization in the relations between the business and its customers, differentiation in consumer marketing understanding,
- 3- Comparing product distribution, service, and product mix among firms (Peker et al., 2014:15).

According to Slater & Olson (2001), the efficiency of a differentiation strategy depends on how well a company is able to balance product advantages and product costs in relation to rival alternatives. Following a differentiation strategy, businesses attempt to develop and promote distinct items for specific client segments. Morshett, et al. (2006) adds that while they aim at superior fulfilment of consumer expectations in one or more product features in order to increase customer satisfaction and loyalty, they are frequently utilized to charge a minimum price for products (Baroto & Bin Abdullah, 2011:1365).

Differentiating a product or service may generate fresh demand or necessitate a high price for an existing product or service. One of the criteria of the differentiation approach is product customization, which is achieved by establishing personal relationships with clients and is difficult for competitors to mimic. According to Heskett et al. (1994), this

also results in creating consumer loyalty and sustaining firm performance over time. Differentiation, due to consumer loyalty and decreased price sensitivity, shields businesses from intense competition (Hançerlioğulları et al., 2016:40).

Differentiation also has the potential to hinder a cost strategy, as costs are likely to increase with differentiation and smaller customer bases. A differentiation strategy implies that a firm is highly customer-focused; functions work together seamlessly and consistently to deliver positive customer experiences as added by Driggs (2008) (Snedegar, 2009:38).

When the firm's ability to differentiate the product is high, when consumers' loyalty to competitors' products is low, when market growth is high, when there is market structure, fragmented when the production process is new and complex, and when economies of scale (especially at the firm level) and economies of scope exist, differentiation is most compatible with achieving a low-cost position. For the plan to be successful, it is not required that all of these alternatives concurrently occur. However, some conditions must be met for the technique to be successful (Hill, 1988:409).

Hill (1988) proceeded by stating that it is also possible to identify particular industry contexts where the strategy is more likely to succeed. The significance of strong market growth and a fragmented market structure on the demand side, as well as learning effects on the cost, suggests that differentiation may be a viable strategy for achieving a low-cost position in growing industries. As marketplaces develop, differentiation becomes less important for a business to obtain a low-cost position. In mature markets, growth is often low, the structure is oligopolistic, brand loyalty is strong, and processes are well established. These variables limit the strategy's effectiveness. However, even in established markets, chances may occur for a company to obtain a low-cost position through differentiation: Changes in technology that result in new processes can reintroduce the significance of learning effects. If this occurs, the company may employ distinctiveness to promote movement along the new experience curve to a competitive advantage position (Hill, 1988:409).

It may be a low-cost technique for differentiation, but it is not the primary objective. In this regard, a value chain analysis is conducted, all types of operations that can make a difference are analyzed, and enhancements are made to create a competitive advantage over rivals. In the differentiation approach, an advantage, such as a company's brand, design, technology, customer service, or quality, is stressed. For low-cost advocates, the key to success for a business that adopts a differentiation strategy should be quality strategy implementation at the lowest overall cost, innovation, creativity, and product performance. This contrasts with the strategy implementation for businesses that adopt a cost leadership strategy, which focuses on reducing costs and increasing efficiency (Barney et al., 2012:166). Efficiency of goods and services is emphasized through standardized procedures. The key to success for proponents of distinction is offering high-quality items to select clusters of customers who are ready to pay (Olson et al., 2005:54). According to Barney et al., (2012), the organizational structure used to implement the cost leadership and product differentiation strategy is a functional or U-shaped structure used to implement a vertical integration approach (Çubukçu, 2018:147).

Companies that employ technology as their principal means of attaining a competitive advantage distinguish themselves through the usage of cutting-edge technology in their products. Gatignon and Xuereb (1997), for instance, discovered that enterprises with a strategic orientation toward the technology market produce goods that are more innovative, less similar to those of competitors, and more advantageous. According to Workman (1993), given the objective of generating new products that create new market opportunities, technology-driven differentiators are likely to engage in innovative activities without a special focus on customers or competitors (Frambach et al., 2003:381).

3.3 FOCUS STRATEGY

A focus strategy demands focusing on a specific section of an industry, a specific market niche, a specialized buyer group, or a specific geographic location by adopting one of Porter's (1980) low-cost or differentiation methods (Eraslan, 2014:46). Porter (1985) adds that the focusing strategy is the generic approach that organizations employ by concentrating on client groups with specific unique demands, i.e. "narrow target

audiences," as opposed to broad-based strategies, hence achieving sustained competitive advantage (Peker et al., 2014:15).

A focus strategy involves focusing on a specific market group of consumers and a specific product/service offer (Giguere, 2004:33).

According to Porter (1980), companies that can operate more effectively and efficiently towards a narrower strategic target than their competitors that compete on a broad base should adopt this strategy (Eraslan, 2014:46). Porter (1998) continued that in the focus strategy, unlike other competitors, instead of addressing the entire market, a smaller customer group is addressed in a smaller area of the market. Businesses that implement this strategy avoid serving the entire market by directing their activities to a certain customer group or geographic region. In order to have a focusing strategy, there are customer groups with different product and service demands in the same market, competitors choose to address the market by thinking more generally instead of focusing or specializing in a certain area, and business resources are not large enough to serve the entire market, so they only focus on certain markets with scarce resources. must have the opportunity to serve (Karaboğa, 2015:39-40). Wren (2007) adds a firm that adopts this strategy focuses on a narrow market where competition is less intense and foregoes gains or potential buyers that it is likely to derive from an entire market (Eraslan, 2014:46).

A focus strategy is chosen when a firm wants to meet the needs of a particular "buyer group, product line segment, or geographic market" (Porter 1980) and supported by Chaganti, Chaganti & Mahajan (1989), too. (Miller (1986) contributes this strategy and said this can be used to discuss business or corporate level strategy. At the enterprise level, focus strategy is defined as the "degree to which a firm covers a particular industry". At the institutional level, it is defined as "the extent to which the firm has diversified into different industries". Porter's business niche strategy is characterized by a narrow market, high knowledge and expertise, and specialized manufacturing capabilities that are often overlooked by competitors. This strategy is carried out to ensure efficient use of resources according to Teplensky & al. (1993) and rapid decision-making according to Bray, Kerr & Atkin (1978), which are two critical factors for entrepreneurial firms that Bantel (1996) supports. Competitors may reach market

segments and technology, or customer preferences may change. Empirical research has shown that most entrepreneurial firms actually use the focus strategy, but it is not strongly associated with high growth (Giguere, 2004:25-26).

Baum, Locke & Smith (2001) found that the focus strategy was negatively associated with growth and its profitability was better or equal to differentiation and cost leadership strategies. In addition, Dess & Davis (1984), Miller & Camp (1985) and Sandberg & Hofer (1987) suggest that focus strategies perform less well than differentiation strategies (Giguere, 2004:26).

The focus strategy takes two forms based on Tanwar (2013) declaration:

- 1- Gaining cost advantage by focusing on costs in the business target segment,
- 2- The business wants to gain a competitive advantage by focusing on differentiation in its target segment.

As stated previously, the focus approach is the cost leadership and differentiation strategy applied to a particular target market. Businesses that cannot endure the fierce competition in their industry owing to globalization favor this method. According to Duman et al. (2014), organizations that successfully implement a focused strategy can earn more profit than their competitors, despite the fact that they may appear to have given up a portion of their market share and sales volume (Peker et al., 2014:15).

Besides Porter (1998)'s findings, businesses that follow a cost-focusing strategy aim to penetrate the market deeply by reducing their costs in the target market compared to their competitors. Differentiation-oriented businesses, on the other hand, can benefit from the inability of their competitors to respond to the privileged requests of customers and offer high-featured products and services specific to these customers, and earn high revenues from a small segment of the market at higher prices (Karaboğa, 2015:40).

In summary, the focus strategy strives to serve a specific industry target or segment successfully, as opposed to pursuing industry-wide objectives of cost leadership and differentiation strategies (Regner, 2007:19). This analysis excludes focused cost leadership and focused differentiation. Concentrated cost leadership and focused

differentiation strategies concentrate on specific product or market segments and are suitable for niche-serving businesses with limited resources. Consequently, focused strategies are not examined in the present study (Teeratansirikool et al., 2012:170).



4 COMPANY PERFORMANCE

This section explains the company performance terms in the literature and how it is measured in different perspectives.

Since the beginning of the Industrial Revolution, company performance has been a significant area of study. The revolution began with technological advancements (Aydiner, 2016:15). Corporate performance is synonymous with competitive advantage, which outlines how organizations successfully execute business strategies that lead to cost leadership, product differentiation, and focus, as stated by Porter (1985) as the starting point (Pierce, 2002:19). Venkatraman and Ramanujan (1986) and Saraf et al. (2007) define firm performance as "organizational effectiveness in terms of its financial and operation performance" (Ong & Chen, 2013:74). Furthermore, Ravichandran et al. (2009) note that performance is "a measure of management efficacy." According to Ravichandran and Lertwongsatien (2005), organizations can generally adopt profitability and productivity to characterize the results of firm performance (Ong & Chen, 2013:74).

Measuring performance is essential for establishing, implementing, and monitoring a strategic strategy. It enables managers to assess if organizational objectives have been met and is also used to develop and compensate managers. It assists managers in determining whether the organization is progressing in the desired direction (Teeratansirikool et al., 2012:169).

As said by Eccles, performance management brings value to a corporation by focusing on how an organization creates, implements, and monitors strategic plans (1991). This strategic emphasis is maintained throughout all business management procedures (Sharma & Djiaw, 2011:117). It begins with knowing where the organization is now, where it wants to go, what goals must be created, and how resources should be allocated to achieve these goals using business intelligence tools. Once plans have been generated, the system monitors their execution, identifies exceptions, and gives context for their creation. As stated by various authors, including Lee and Kim (2001) and Zikmund (1997), the system facilitates the examination of alternatives from which decisions can be taken and closes the loop by returning to the decision of where the organization wishes to go (Sharma & Djiaw, 2011:117-118).

Corporate performance management at its best enables management to communicate and direct strategy throughout the entire business, assisting management in making and implementing decisions that support strategic goals and objectives. It enables the business to concentrate on the most important issues and data rather than all possible concerns and events. Presents the correct information to the right people at the right time and in the right context, as stated by Paladina (2007) (Sharma & Djiaw, 2011:117).

According to Venkatraman and Ramanujam (1986), measuring the performance of enterprises is necessary to observe progress in the competitive system, but there is no common view on how performance measurement will be made, which stages should be passed, which criteria should be taken as a basis and on what basis. According to Porter (1980), performing well is about achieving an above-average income for a year (Karaboğa, 2015:23).

With Murphy's (1996) words: "Strategy research... [discusses] organizational performance measurement in terms of multiple hierarchical constructs. Financial performance is the central construct of the organizational effectiveness domain. These performance metrics are deemed necessary, but insufficient for defining total effectiveness. Beyond this core, operational performance indicators such as product quality and market share create a broader conception of organizational success by concentrating on the elements that eventually lead to financial performance." (Washington, 2007:53).

Given the very fast changing competitive and regulatory environment, managers are expected to gain corporate goals while addressing the needs of numerous stakeholders such as customers, lenders, vendors, and employees as observed by many research as Munir, Baird, & Perera, (2013), Ashrafi & Mueller (2015) (Summers, 2018:44-46). Measuring firm success has been a means for all stakeholders investing in a company, but it is not easy because there is no commonly accepted metric for this notion. Even organizations have begun to monitor company performance in order to manage their resources (Hançerlioğulları et al., 2016:41).

There are many performance indicators used by researchers in literature. Growth, market share, profitability indicated by Lumkin and Dess (1996); return rate of assets, increase in sales, increase in exports indicated by Zahra and Garvis (2000); financial performance, organizational effectiveness, business performance indicated by Venkatraman & Ramanujam (1986), and innovation performance indicated by Alegre & Chiva (2008), diversification, product development are among the firm performance indicators used in the literature (Karaboğa, 2015:23).

Financial and non-financial variables are combined by Eniola & Entebang (2015), enabling businesses to assess corporate performance from several angles (Summers, 2018:46). As noted by Lo et al. (2015), Banker et al. (2016), previous literature typically characterized company performance in terms of financial metrics such return on investment (ROI) and return on assets (ROA). These criteria are more stringent for small and medium-sized enterprises (2004). However, scholars are increasingly going beyond financial instruments to define organizational performance (Summers, 2018:44). The methods and factors used to evaluate company performance are varied. According to Venkatraman and Ramanujam, the evaluation of performance includes both financial and non-financial performance indicators (operational performance). Examples include things like product quality, manufacturing effectiveness, client contentment, market share, and R&D capacity. The performance measures in these papers were categorized as financial and operational performance by Murphy et al. (1998) after surveying 124 articles (Wen et al., 2008:149).

Kaplan and Norton (1992) claimed that other intangibles, such as knowledge, personnel expertise, and customer service are also necessary and that financial indicators alone are insufficient (Summers, 2018:44). Non-financial performance indicators, such as innovation and stakeholder performance, will be included in some corporate performance metrics in addition to financial performance indicators. R&D expenditures, product innovations, and process innovations make up the indicators of innovation performance (Wen et al., 2008:150). In addition, Kaplan and Norton (1992) suggested that the BSC's four key pillars—finance, customers, learning/innovation, and internal processes—offer firms a comprehensive approach. The customer viewpoint comprises measures to define target groups for the company's products in addition to metrics focused on marketing that

measure customer happiness and retention. This is in addition to the well-known financial approach (Sharma & Djiaw, 2011:118). Contrary to what Camps and Luna-Arocas (2012) said, organizational performance is assessed using firm-adopted internal methods. Small and medium-sized businesses (SMEs) must have their financial and non-financial KPIs in line if they are to survive over the long run (Summers, 2018:44).

According to Kaplan (2001), stakeholders should take into account both financial and non-financial performance indicators to determine how well a business is performing. Examples of financial performance indicators include revenue, earnings per share, stock price, employee compensation, customer satisfaction, franchisee satisfaction, employee satisfaction, and supplier relations in comparison to the competition. According to Hoque (2004), there is a strong correlation between general strategies and non-financial business performance in addition to financial business performance. As a result, assessing a company's performance can be either objective or subjective. According to Croteau and Bergeron (2001), the subjective technique was added to the objective method, which refers to the defendant's financial performance (Hançerlioğulları et al., 2016:41).

Resource Based Value (RBV) has been utilized in studies on business performance to distinguish performance indicators. The performance of a firm may be significantly influenced by the influences of individual and firm-specific resources. Resources that are excellent and valuable provide you a competitive edge. A company's success metrics are typically outlined in management literature as share growth, return on investment, return on assets, market share, sales, and profit. By separating two dimensions, Ravinchandran and Lertwongsatien (2005), Mosakowski (1993) measured firm performance. Operational performance, which includes profitability, efficiency, and financial performance, was described as one dimension. Market-based performance, which assessed the firm's effectiveness in expanding into new markets and developing novel products and services, was the second dimension. A method with many dimensions and potential facets is firm performance. The definitions of most dimensions are similar to those found in literature. Customer satisfaction is one type of performance that is focused on the customer. It covers market and financial performance, earnings per share, income, market positions, and cash-to-cash cycle time. It focuses on employee satisfaction and

organizational effectiveness as grouped by Mithas et al. (2011), as well as human resource performance, innovation, and adaptability (Aydiner, 2016:31).

4.1 FINANCIAL PERFORMANCE

One of the main topics of the strategic management field is the concept of firm performance. Considering that the main purpose of businesses is profitability, it is seen that corporate strategies and business strategies are important in affecting the profitability performance of the company, that is, the financial performance, said by Beard and Dess (1981). Especially in constantly changing market conditions and extremely competitive markets, it is of great importance for companies to be financially strong. For this reason, studies examining the performance of businesses in the academic field have increasingly tended to measure financial performance. E.g; Miller and Friesen (1986), Hunt and Morgan (1995), Yamin et al. (1999) are researchers who examine the relationship between strategy and financial performance (Karaboğa, 2015:24).

While classifying the performance, it is divided into two as primary source performance indicators based on data obtained directly from businesses or secondary source performance indicators created with data obtained from publicly available sources. Another classification is related to the fact that the performance is based on objective and subjective measurements. Objective performance indicators are generally related to numerical, unbiased data obtained directly from companies. Subjective performance data, on the other hand, are obtained in line with the information based on the subjective evaluations of the participants, and argued by Venkatraman & Ramanujam (1987), Gonzalez-Benito (2005) (Karaboğa, 2015:25).

Financial statements can reflect the operation of a company. They provide the data necessary to evaluate the business (Wen et al., 2008:148). Among the main financial performance indicators of enterprises, return on assets (ROA - Return On Assets), return on equity (ROE - Return On Equity), return on sales (ROS - Return On Sales), return on investments (ROI - Return On Investment), profitability, growth rates, liquidity market share and productivity (Karaboğa, 2015:25). Studies have attempted to measure firm performance by identifying changes in financial measures including cost-benefit analysis e.g. Keen (1981), self-return on capital - ROE e.g. Hitt and Brynjolfsson (1996),

Strassman /1990), return on investment - ROI e.g. Cron and Sobol (1983), Hitt and Brynjolfsson (1996), return on assets - ROA e.g. Cron and Sobol (1983), Barua, Kriebel and Mukhopadhyay (1995), Hitt and Brynjolfsson (1996), added value e.g. Hitt and Brynjolfsson (1996), management feedback e.g. Strassman (1990), market share e.g. Barua, Kriebel and Mukhopadhyay (1995), improved cost control e.g. Harris and Katz (1991), and sales growth from a particular or a group of IT investments (Pierce, 2002:64).

In this study, primary data was collected based on the subjective evaluations of the participants. In addition, participants' subjective evaluations of financial performance were examined by asking questions about profitability and growth.

4.2 INNOVATION PERFORMANCE

Firm performance is an indicator of the extent to which businesses realize their economic goals, as well as how well they adapt to rapidly changing environmental conditions and survive (Karaboğa, 2015:25). In addition to financial targets, non-financial targets are also useful for estimating and evaluating corporate performance as supported by Elbashir, Collier, & Davern (2008), Lo et al. (2016). Piccoli & Lui (2014) argued financial metrics alone provide a limited view of corporate performance, as financial targets often focus on cost reduction and no improvement direction. Besides, managers will often strive to inflate short-term profits and sacrifice employee training and development as stated by Nyantakyi (2016), Elbashir, Collier, & Davern (2008) (Summers, 2018:47).

Businesses must attentively monitor constantly shifting trends and place a high value on innovative goods and services in order to adapt to shifting environmental conditions. Companies are forced to innovate due to the swift shift in client wants and expectations in order to compete in both local and worldwide markets (Karaboğa, 2015:25). Today's businesses must focus on a more nuanced aspect of competitive performance, such as what may seem incongruous or even contradictory, including quality and innovation (Prajogo & Sohal, 2005:300). So when evaluating the performance of a company, innovation performance is a crucial factor.

Research has demonstrated that many commercial companies gain from higher earnings and market share, which is one of the primary sources of competitive advantage that has long been acknowledged. The development of managerial practices that can be utilized as a resource to assess innovation success is crucial from the standpoint of innovation, and the impact of TQM on this evaluation is significant (Prajogo & Sohal, 2005:297).

Ernst (2001) highlights when measuring innovative performance, the whole process from the emergence of a product and service idea to its production and market launch is considered. Rabor et al. (2011) mentions the factors affecting the innovation performance of enterprises are environmental factors (market fluctuations, technological changes-developments, competition intensity), internal factors (strategic orientations, human capital and organizational culture), strategic capabilities of the firm (production capacity, technological capacity, marketing capacity, knowledge and learning ability), production, marketing and R&D integration (Karaboğa, 2015:26). Prajogo et al. (2007) studied the relationship between strategy and innovation performance. According to the results of their research, the effectiveness of technology and R&D management affects the innovation performance of enterprises. Another result found is that differentiation strategy is a significant variable that affects innovation performance (Karaboğa, 2015:27).

There are variations in how businesses measure their performance in terms of innovation, according to a review of prior studies on organizational innovation. This study developed the framework for measuring product and process innovation on the basis of numerous criteria that were defined and applied in prior empirical innovation studies in order to fully capture all aspects of innovation performance. These factors include quantity of innovations, innovation speed, innovation level (technical innovation aspect), and market "firstness." The scope of innovation performance indicators includes the final two criteria, which include topics that might be referred to as "radical" innovation. These four innovation-related traits have been used in two key areas: process innovation and product innovation. Conceptually, process innovation refers to changes in how businesses produce end products or services through the adoption of an innovation developed elsewhere, whereas product innovation deals with idea generation or the creation of something entirely new that is reflected in changes to the final product or service offered

by the organization. Innovation literature has outlined the differences between these two types of invention (Prajogo & Sohal, 2005:301-302).

The study discussed in this article is based on investigations into how management and artificial intelligence technologies are used to assess performance in terms of new products and process development.

4.3 STRATEGY AND COMPANY PERFORMANCE RELATIONSHIP

Firm performance is one of the most important topics of strategic management. As a matter of fact, competitive advantage based on performance and the resulting sales and profit means the artery of a business. When evaluated in this context, in today's dynamic-changing and changing business environment, both academic and business circles see firm performance as an important indicator in gaining competitive advantage. Naturally, today, public units, sectors, companies, non-governmental organizations, workers, and customers are under the pressure of intense global competition brought about by globalization. Therefore, in this dynamic environment, it becomes more difficult to have a better performance than the competitors and to make it sustainable as mentioned by Haarla (2003), Zyl (2006) (Eraslan, 2014:25).

According to Montgomery et al., strategy content research is defined as "... research work which covers the scope of the firm (the mix of markets in which a firm competes) and the methods of competing within individual markets (business-level, competitive strategies)" (1989). As argued in various searches by Balogun et al. (2003), Bowman et al. (2002), Johnson & Huff, 1998), traditional, content-oriented strategic management research has been linked to centralized, formal, top-down planning that primarily emphasizes the role of top management and the relationship between strategy and performance (Dederichs, 2010:9).

Hayes' (1977) findings show that financial measures of performance are inadequate when dealing with R&D or marketing departments. Therefore, when these functions gain importance within the firm, non-financial measures are expected to be more important than financial measures in evaluating performance. Prospective firms are likely to operate in dynamic market environments, and a larger portion of their product mix is

likely to be growth products (due to a constant focus on developing new products) (Kalagnanam, 1997:23).

Porter (1980; 1985), who concentrated on economic success as the most important dependent variable in his research, is a significant contributor to the concentration of strategic management research on one dominant goal and research methodology (Dederichs, 2010:12). Porter's five forces of competition are what define the nature of competition and the overall industry structure (Porter, 1985). Designing potential areas where a firm might obtain a competitive advantage in that market necessitates a thorough understanding of the industry structure and the dynamics that drive it. While the company's relative competitive edge influences actual profitability and growth, the company's position in the market generally determines its profitability and growth potential as mentioned by Hamel, 1993 (Zuhdi, 2012:22).

According to Johnson and Kaplan (1987), non-financial indicators of progress toward accomplishing long-term goals are preferred over short-term financial metrics (Kalagnanam, 1997:6). According to Kaplan and Norton (1992), internal business procedures, operational measurements of customer happiness, and an organization's innovation and improvement efforts all influence future financial performance. Like this, Rees and Sutcliffe (1994) claim that measurements like orders received, incomplete order backlog, and on-time delivery are effective indicators of long-term profitability (Kalagnanam, 1997:29).

As suggested by Nanni et al. (1990) and Richardson and Gordon (1980) respectively, these features support a greater emphasis on the use of financial versus non-financial measures. Ittner et al. (1997) concluded that "... the relative weight given to non-financial measures is greater in firms that follow an innovation-oriented "agent" strategy than in firms that follow a cost leader or "defensive" strategy," Competition strategy is perhaps a very important determinant of performance criteria used in compensation contracts (Kalagnanam, 1997:24).

Young and Selto (1991) argue that strategy affects external performance, e.g., market share, stock price. Strategy provides direction that helps firms develop their long,

medium and short-term plans and, in turn, defines the actions needed to implement those plans. These actions include processes, accounting, and control systems, etc. It might include things like change. Effective implementation of plans leads to expected internal results (e.g., efficiency, quality, etc.) that later translate into external performance (Kalagnanam, 1997:26).

Porter's (1980; 1985) work, which examines competitive advantages and variations in organizational performance based on the theory of industrial organizational economics, is of particular relevance in Hoskisson's (1999) study stream. Porter expanded the use of quantitative research techniques and included econometric tools to strategic management study along with the economics of industrial organization (Dederichs, 2010:9).

According to Grant (2002), a firm has a competitive edge over its rivals when it consistently earns (or has the potential to achieve) a greater rate of profit when two or more firms compete in the same market. Thus, the ability of the company to surpass its rivals in performance is related to competitive advantage. According to Pereira et al. (2011), it reflects the value a business develops to set itself apart from its rivals and thrive in a dynamic and competitive market. It also promotes "creative destruction," innovation, and continual development within the firm (Zuhdi, 2012:28).

4.4 TECHNOLOGY AND COMPANY PERFORMANCE RELATIONSHIP

According to Barney (1991), resources and capabilities only give lasting competitive advantages when they are valued, scarce, non-replaceable, and inimitable (Ortega, 2008:1273). Information systems capabilities, which are resources and skills related to information systems that can influence business value and create connections across functions and departments (Aydiner, 2016:32). According to Teece et al. (1997), a "technological competency" is "the capacity to carry out any relevant technical function or volume activity within the firm, including the capacity to develop new products and processes and to run facilities successfully." In the past ten years, businesses' technology capabilities have become a crucial strategic asset that allows them to dominate their markets, particularly in high-tech ones (Ortega, 2008:1274). According to Davies and Brady (2000) and Tell (2000), technological capabilities—which are a subset of firm capabilities—are particularly significant because they are hard for rivals to imitate and

are linked to the quick conversion of technological knowledge into new products that result in first-mover advantages (Bergek et al., 2009:446).

As depicted by Xue et al. (2012), since innovation has become a major effect of IT for businesses, the topic of IT-powered innovation has gained attention. They claimed that whereas innovation meant looking for new information, creating novel products and services for brand-new markets, and enhancing innovation performance, efficiency meant using knowledge to boost business efficiency and represented the process of exploitation (Ong and Chen, 2013:74). As a result, they improve the performance of the company and their competitive position (Aydiner, 2016:32).

According to earlier research, there are strategic advantages when combining all facets of information systems with other corporate resources (Aydiner, 2016:32). According to Chi, Holsapple, and Srinivasan (2007), information systems research aimed to better understand the connections between investments in information systems (IS), competitive advantage, and company performance (Sandra, 2010:215). The connection between IS and company performance has been clarified by numerous earlier studies. There is a clear connection between IT and business performance, according to some studies that examined IS from an IT standpoint. However, the management effects of the IT-firm performance link can be seen in the firm's productivity, profitability, and consumer surpluses (Aydiner, 2016:31).

This makes technological capabilities one of the most significant sources of long-term competitive advantage, as previously noted. A number of authors, including Acha (2000), Etemad and Lee (2001), Lee et al. (2001), Afuah (2002), Schoenecker and Swanson (2002), Vanhaverbeke et al. (2002), Tsai (2004), and Zahra et al. (2007), have highlighted the direct impact of technological capabilities on business performance (Ortega, 2008:1273).

For instance, Franko (1989) demonstrates that in a global setting, technological capabilities deriving from businesses' R&D activities (measured as R&D intensity) are a significant determinant of corporate performance compared to competition in a wide range of industries (Bergek et al., 2009:447).

According to Porter's (1990) theory, a country's ability to compete depends on its ability to innovate and modernize its industries. Additionally, Greenwald (2005) noted that businesses obtain a competitive edge through innovation activities that include identifying new technology and methods of doing things. The process of gaining clients and reaching economies of scale provides the greatest competitive advantage, in addition to owning innovative and proprietary technology (Zuhdi, 2012:28).

While thorough study of the returns on company success from investing in IS has made significant progress. The majority of studies, including Carr (2003), Wade & Hulland (2004), Brynjolfsson (1993), Brynjolfsson & Hitt (1998), and Malone (1997), concur that gaining competitive advantage only through technology acquisition is challenging. As a result, many IS researchers have started to look at information systems, competitive advantage, and firm performance using theories like the resource-based view of the firm, as in Barney (1991), Barua et al. (2004), Bharadwaj (2000), Mithas et al. (2004), Sambamurthy et al. (2003), and Wernerfelt (1984), Mosakowski (1993) as well as the knowledge-based view of the firm (Sandra, 2010:14). According to this viewpoint, businesses can achieve a competitive edge by utilizing information, information resources, and IS capabilities that are integrated into organizational processes and routines (Sandra, 2010:16).

Zahra and Covin (1993) examined the relationships between firm strategies, technology policy and firm performance in their study on a total of 103 production-based firms operating in 28 industries that have completed their development. According to the research results; companies that go to different business strategy configurations; it has been revealed that this configuration affects the degree of relationship between technology policy and firm performance, and the harmony between technology policy and business strategy affects firm performance (Eraslan, 2014:28).

Another important contribution to our understanding of the strategic alignment of IT was made by Henderson and Venkatraman (1993). They propose a model in which the strategic fit is represented as an alignment between the internal domain (business and IT infrastructure) and the external domain (business and IT strategy). According to the model, alignment also requires consistency in the choices made in business and

technology. The authors propose four approaches to aligning the IT and business domains. Two of these approaches are driven by business strategy. The strategy execution approach proposes that business strategy is used as a basis for structuring both business and IS infrastructure. The technology transformation perspective suggests that business strategy primarily has an impact on IT strategy, which translates into appropriate IT infrastructure. Two other perspectives imply that IT strategy can also be a driver of business strategy. The competitive potential compliance perspective suggests that in some cases, strategic choices made in IS may influence strategic choices made in business. The business strategy will affect the organizational infrastructure. The service level compliance perspective proposes that the IT strategy can determine the IS infrastructure that will have an impact on the enterprise infrastructure. The authors state that because strategic alignment is a complex process, neither alignment can be seen as superior to another, in some cases it can be initiated through business strategy, and in other cases it can be driven by new developments in IT area. It is worth noting that although strategic alignment requires consistency between internal and external, technological and business domains, the adoption process is always guided by the external domain, rather than the internal domain (Milova, 2001:12-13). Mahmood (1993) The purpose of the study was to investigate how information technology investments affect organizational strategic and economic performance. The data on IT investment used for the study was obtained from a Computerworld study that reported the list of 100 most influential users of information technology (Milova, 2001:13).

Carl Pegels and Thirumurthy (1996) contend that technological capabilities—measured as technological cycle time and technological power—play a significant role in predicting business performance. They support their claim with data from patents (Bergek et al., 2009:447).

The usage of IS capabilities, according to Powell and Dent Micallef (1997), ultimately results in better company performance. They asserted that IS skills, however, cannot directly support maintaining firm performance. To attain long-term business performance, it was stated in the study discussion that IS capabilities must collaborate with other organizational resources. Integration with other organizational resources is necessary since corporate culture, business process performance, decision-making

performance, and top management commitment all affect how well a firm performs. Therefore, significant evidence from certain research streams has indicated that IS capabilities, as mentioned by Wade & Hulland (2004), have an indirect impact on business performance (Aydiner, 2016:32). Chan & Huff carried out one of the first significant empirical studies on the strategic alignment of IS in 1997. The study sought to determine how strategic alignment, business strategic orientation, and information systems strategic orientation affected company performance (Milova, 2001:13). Finally, Venkatraman's suggestion that business performance be measured in terms of both growth and profitability was implemented (Milova, 2001:14).

Aw and Batra (1998) use aggregate R&D spending and on-the-job training as proxies for technical capability to study the relationships between technological capability and business productivity in Taiwan's manufacturing sector. They came to the conclusion that technological aptitude and business productivity are positively correlated (Ortega, 2008:1274). Booth and Philip's (1998) study used the data from semi-structured interviews with 16 senior executives from leading edge companies. The study sought to compare the competency-driven approach to gaining competitive advantage with the technology driven approach proposed by Michael Porter. The authors found that Porter's generic strategies work better in isolation together and that technology and innovation can play an important strategic role, but not in isolation from other factors. The authors concluded that the dynamic environment of the modern business world suggests that managers should move from the relatively static approach proposed by Porter to a more flexible and dynamic approach, such as the competency-oriented approach. Technology also needs to be used for competitive advantage along with a competency-oriented approach (Milova, 2001:37-38).

A company that has exclusive access to priceless resources, in Zack's opinion (1999), gains some sort of competitive edge. This might not always be achievable, though, as rivals might copy or replace such resources. Organizations with better commercial acumen can, nevertheless, coordinate and integrate their conventional resources and talents in novel and inventive ways, giving their consumers more value than their rivals. That example, an organization with superior intellectual resources can use business intelligence technologies to better understand how to build and use its traditional

resources than its rivals. Knowledge can therefore be regarded as the most crucial strategic resource. The most crucial skill for creating and maintaining a competitive advantage is the capacity to acquire, integrate, store, share, and use it (Sharma & Djiaw, 2011:119).

Like this, Acha (2000) shows a positive link between technological aptitude and a firm's operational performance in the upstream oil business using R&D spending, publications, and patents as proxy for technological talent (Ortega, 2008:1274).

According to McEvily et al. (2004), businesses with advanced technology skills exhibit higher levels of innovation and performance. According to Teece et al. (2007) and Teece and Pisano (1994), companies with stronger technological capabilities can increase productivity by pioneering process advances and increase differentiation by developing products in response to shifting market conditions (Ortega, 2008:1274).

According to Tsai's (2004) empirical study of a seven-year panel dataset of 45 significant Taiwanese manufacturing companies, technological prowess is a key factor in determining a firm's performance in the electronic industry (Ortega, 2008:1274).

Researchers in the information systems (IS) field have also studied various aspects of information technology innovation and adoption in organizations. Due to the prevalence of information technology in modern organizations, it is important to evaluate the impact of IT on a firm's performance. But IT sometimes does not directly affect sales and profits, sometimes, it is a sunk cost with no short-term return on investment. Therefore, it is difficult to assess the impact of IT on firm performance (Wu, 2001:15). Economic metrics of the effectiveness of IT investments are appealing due to the objectivity of the data they trust and are most familiar with. The main criticism of economic-based studies, however, focuses on their inability to capture intangible impacts like improved product and service quality, enhanced business reputations, enhanced client relationships, and elevated marginal efficiency. Additionally, they give scant details on the dynamic procedures used to produce and ultimately assess business value (Pierce, 2002:65). Studies that consider the effects of technology at the firm level often confuse measures of financial performance with measures of productivity. For example, researchers have

evaluated ratios such as Return on Equity (ROE), Return on Sales (ROS) together with measures of financial productivity such as Return on Investment (ROI) and Return on Assets (ROA), which is improved by Rumelt (1974), Roach (1989), Strassman (1990), Roach (1991). These measures are widely used in practice but have been repeatedly criticized for their relevance to IT studies. These measures are subject to influences beyond the control of managers, such as interest rates, inflation and market volatility. Therefore, evaluating the impact of technology or other organizational changes can easily be confounded (Galal, 1997:129).

From these arguments the study proposes that technological capabilities have a positive influence on firm performance.

5 ARTIFICIAL INTELLIGENCE

This chapter defines Artificial Intelligence definitions and explains its improvement till today. AI technologies and usage areas focusing on telecommunication and finance sector are explained and the importance of digital transformation with AI technologies are presented through literature.

With its current capabilities, artificial intelligence (AI) is viewed as a point where many different fields converge and where it is beginning to drive an industrial revolution. The cost of cloud computing and data storage outsourcing has significantly decreased, which is one of the primary factors enabling the viability of AI robots in many businesses (Almarzooqi, 2019:32).

According to a McKinsey Global Institute study, artificial intelligence has advanced significantly over time, leading to disruptive shifts in the commercial world. Existing firms now have a wealth of opportunities and problems because to developments in AI-based technologies. Rapid technology advancement would have a substantial social impact in addition to an economic one, as demonstrated by McKinsey's study. According to Manyika, Chui, Madgavkar, and Lund (2017), the use of AI enhances organizational performance and boosts the world economy (Almarzooqi, 2019:32).

The concept of "intelligence" refers to characteristics that can be applied to analysis, planning, troubleshooting, and improvement. It also contains the ability to swiftly and over the internet acquire languages, making them concretely conceivable and useful (Al-Sukkar et al., 2013:5). A subfield of computer science called artificial intelligence tries to give computers the ability to carry out operations that are almost identical to those carried out by human intelligence, such as learning, deduction, and decision-making (Al-Sukkar et al., 2013:5).

The most recent branch of computer science, which is related to the current generation of computers, is artificial intelligence. It attempts to offer the computer the ability to mimic the cognitive functions of the human brain, allowing it to solve issues and make well-thought-out judgments just like the human brain. These procedures consist of:

1. Learning: Acquiring information and the usage guidelines for it.
2. Explanation: arriving at approximations or firm conclusions by applying earlier rules.
3. Automatic or self-correcting. (Al-Sukkar et al., 2013:5)

One area of computer science that emphasizes the mechanization of intelligent human behavior is artificial intelligence, and we need it for the following reasons:

1. Data systems are used to model knowledge and information.
2. Algorithms describe how to make use of this data.
3. Information and algorithm modeling software language (Al-Sukkar et al., 2013:5)

While the industrial revolution significantly altered businesses and employment, the digital revolutions continued to reduce employment in industry and agriculture while significantly increasing the demand for services, especially in the computer, internet, and mobile phone markets. Large industrial enterprises have also declined as a result of the digital revolution. It will be far more difficult to foresee the anticipated changes brought on by artificial intelligence technologies because they are projected to be as significant as or even more significant than those brought on by the Industrial Revolution. First, it will rely on how quickly artificial intelligence (AI) technologies are able to automate and eventually replace the non-repetitive mental work that humans currently perform, and second, on how quickly technology is changing as intelligent computer programs become available. They are able to create new programs themselves. Therefore, there is little question that advancements in artificial intelligence coupled with the Internet's exponential expansion will have an impact on employment trends by changing how businesses run, how they market and sell their goods and services, and how they are managed (Makridakis, 2017:53).

Consumers can now buy goods and services online without physically visiting a store or office thanks to the digital revolution's huge efficiency advantages for businesses' back-office operations. It also altered employment patterns by getting rid of a lot of mentally exhausting repetitive chores that were once carried out by people (Makridakis, 2017:55).

Operational excellence, algorithmic judgment, and big data are competitive prerequisites. Let's say a sophisticated algorithm is created to foretell customer preferences in great detail. In addition to being proprietary, competitors will eventually figure out how it works and use their forecasts. If this algorithm is affordable for all users, all competitors will soon adopt it to stay competitive. Those who don't use it risk losing their jobs because it can anticipate customers' needs. The sophisticated algorithm won't be particularly useful because it will be necessary to compete to continue running. Big data (Schonberger & Cukier, 2014) presents the chance to create effective algorithms to comprehend what clients want and is therefore very helpful for decision makers. The problem is that almost anyone who is interested may access the data and the methods used to evaluate it, making their advice a competitive need. Thus, Jankel (2015)'s claim that "computers will never develop disruptive inventions" and cannot provide guidance on the three key issues (picking the suitable technologies, managing people, and making wise purchases) is likely accurate (Makridakis, 2017:56).

The market worth of digital corporations in comparison to traditional businesses is perhaps more intriguing than simply "size." The two groups have several significant distinctions from one another. While traditional businesses employ roughly 15% more people than do digital businesses, the market value of the former is greater than 67% that of the latter, and traditional businesses' revenues are greater than 218% that of those of digital businesses. High-tech enterprises have an astounding \$4.13 million in market value per employee while their revenue per employee is \$0.38 and \$0.31 million, respectively, compared to digital firms' much smaller workforce, higher market capitalization, and lower sales. These significant differences likely have a number of causes, but the three main ones are the enormous productivity gains made possible by the widespread use of digital technologies, including the Internet, the constant updating of the goods and services offered to consumers, and their anticipated rapid future growth rates, which raise share prices (Makridakis, 2017:53).

As a result of the impending AI revolution, technology will change quickly, creating tremendous opportunities for growth and profitability as well as fresh challenges and competition from new garage-style start-ups. This is because ground-breaking ideas can

come from anywhere, and crowdsourcing and venture capital management make it easier to develop and finance them (Makridakis, 2017:56).

5.1 DEFINITION AND HISTORY OF ARTIFICIAL INTELLIGENCE

Before the 1950s, there was some research on intelligence and its uses in electronic devices, but there was no conclusive evidence to support the existence of computational intelligence. Can machines think? Turing (1950) posed this intriguing subject in his outstanding essay "Computing Machinery and Intelligence," which cast doubt on the likelihood of teaching an electronic computer to act intelligently (Doğan, 2018:5).

The idea of humans creating a sentient, thought-capable computer machine was examined in Turing's 1950 paper (Almarzooqi, 2019:31). A test known as the "Turing test," created by Alan Turing in conjunction to this work, is intended to evaluate whether a machine may be classified as intelligent (Doğan, 2018:5). The article described a game with three players—an interrogator, two players, a human, and a computer machine—known as the Turing Test or imitation game. The interrogator's job is to tell which of the participants is a person and which is a computer. In order to evaluate if a machine is considered intelligent, the Turing Test was applied (Almarzooqi, 2019:31). According to Perez, Deligianni, Ravi, and Yang (2018), the word "Artificial Intelligence" initially appeared as the field's name during the Dartmouth Conference in 1956, shortly after Alan Turing's test and article were published in the 1950s (Doğan, 2018:5).

Despite being inspired by Alan Turing, computer scientist John McCarthy and other researchers first used the phrase Artificial Intelligence in 1956 at a symposium held at Dartmouth College in the United States. As a result, the discipline of artificial intelligence (AI), as described by Mijwel (2015), evolved to focus on teaching computers to execute tasks that ordinarily require human intelligence (Almarzooqi, 2019:31).

Pan (2016) observed professors and academics described artificial intelligence as: the ability of machines to understand, think, and learn in a way similar to humans, demonstrating the prospect of utilizing computers to replicate human intelligence after coining the phrase at the 1956 Dartmouth Conference (Doğan, 2018:7)

At the time, AI was understood to be the process of using a computer to build a sophisticated machine that shared many of the same fundamental traits as human intelligence. Later, the term "artificial intelligence" was created (Chen, 2019:6). AI and the first theory of AI evolved in the mid-20th century with the advent of computing technology in the early 20th century (Chen, 2019:6).

Following these improvements, the word "Artificial Intelligence" (AI) was formally incorporated into the system during the first International Computer Science Joint Conference, which was held in Washington state in 1969. Kornienko, Fofanov, & Chubik (2015) also note this development (Doğan, 2018:6).

For instance, Shenoy (1985) characterizes AI as a mysterious subfield of computer science (Chen, 2019:6).

According to Rich and Knight (1991), artificial intelligence (AI) is displayed by machines, and unlike natural intelligence, which is exhibited by people and other animals, AI allows computers to perform intelligent actions similar to those of humans (Chen, 2019:6).

In his article "Credit Card Management," Panczyk (1999), "A sensible choice for collectors?," he notes that Artificial Intelligence (AI) technology "truly came to life with the introduction of the computer in the early 1940s." (Nordlander, 2001:19).

Veale (2001) and Young (1998) have differing perspectives on how current AI came to be. Along with others, they think that the inaugural AI conference, held in 1956 at Dartmouth College in New Hampshire, marked the beginning of what is now known as "Modern Artificial Intelligence." Ten scientists got together at this symposium to talk about the potential for "behaving" computers. The Turing test, according to Veale (2001), was the catalyst for this gathering (Nordlander, 2001:19).

According to Nilsson (2014), AI is a branch of computer science that deals with how to give machines cognitive complexity (Chen, 2019:6).

From the perspective of strategic application, artificial intelligence is defined as follows by Kornienko, Kornienko, Fofanov, & Chubik (2015): AI is seen as a technology that mimics how individuals solve complicated problems in their daily lives. However, they claimed that while explaining AI, they also highlighted the major problems with its analysis and application. the creation of frameworks and mechanisms via which intellectual answers are applied, as well as the lookout for strategical touchstones for the aforementioned solutions. the main thread in the study and application of AI is thought to be caused by specific symbol structures and actions (Doğan, 2018:8).

Pannu (2015) contends that because AI stresses computation, perception, reasoning, and action, it is neither psychology nor computer science. He argues that artificial intelligence (AI) offers advantages over natural intelligence because it can record and perform particular activities more quickly and effectively than people, and it is more permanent, more consistent, cheaper, and easier to replicate and spread (Chen, 2019:6).

According to Kasemsap (2017), artificial intelligence is a field of study that aids robots in identifying the best method to resolve challenging issues in a kind way (Chen, 2019:6). Design adds a level of logic that can eventually outsmart human intellect to help with precise and detailed tasks, while artificial intelligence is a study that concentrates on human intelligence and synthetically replicated activities (Doğan, 2018:7).

The discipline of study that aims to give machines the ability to execute tasks like reasoning, planning, learning, logic, and perception is frequently referred to as artificial intelligence. Perez, Deligianni, Ravi, and Yang (2018) claim that it revolves around the idea of an intelligent machine as a whole, in terms of both operational and social outcomes (Doğan, 2018:7). Despite the fact that academics define AI differently, they all agree that it encompasses linguistics, philosophy, psychology, computer science, information engineering, and psychology (Chen, 2019:6). Following a brief discussion of some relevant literature and a brief historical review, it is critical to highlight a few subcategories of AI, including their significance, application, capabilities, and benefits (Doğan, 2018:8).

Figure 4 depicts the three stages of AI development, according to CAICT and Gartner (2018): infancy (1956–1980), industrialization (1980–2000), and development (2000–2018) (Chen, 2019:7).

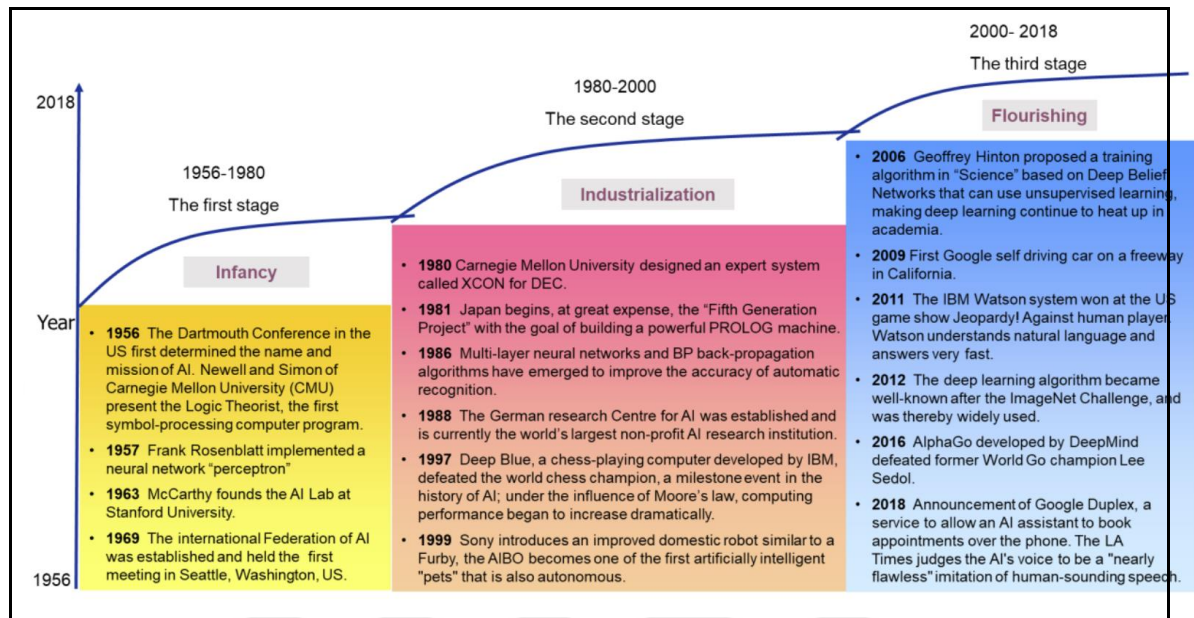


Figure 4. AI Development Milestones by CAICT & Gartner, 2018

Source: (Chen, 2019:7)

The initial phase saw the beginning of AI work. McCarthy (1960), for instance, outlines how AI works. The knowledge and awareness of AI has expanded and become more focused. In several wealthy nations, AI has entered industrialization in its second stage. For Digital Equipment Corporation (DEC), the second-largest computer manufacturer in the United States at the time, Carnegie Mellon University created XCON (eXpert CONfigurer) in 1980. A chess-playing supercomputer known as Deep Blue was created by IBM over the course of 12 years beginning in 1985. On May 11, 1997, Garry Kasparov, the current chess world champion, was defeated by Deep Blue. The McCorduck's (2009) comment that this is a turning point in the evolution of AI is accurate. However, the advancement of AI has not simply taken place in the United States. According to Shapiro, Japan committed \$850 million in 1982 to the development of AI computers with the intention of creating a potent PROLOG machine (1983). According to Schmidhuber (2007), Germany founded an AI research center in 1988 that was the largest non-profit AI research organization in the world at the time. The third phase of AI development is made possible by massive data support, rapid development

technology, particularly sensors and processors, and AI. AI technology is used in many different goods, including autonomous vehicles, sophisticated robotics, and smart computers (Chen, 2019:7-8).

It took until the late 1970s for the first commercial AI-based system, XCON (Expert System), to be created. Practical, commercial uses of AI were still uncommon at the time. Fuzzy Logic approaches were used in manufacturing applications by a Danish cement plant and on Japanese subway trains in the early 1980s. According to WFMO (2001), just a few million dollars are now made by commercial AI products (Nordlander, 2001:19).

In the middle of the 1980s, expert systems—which businesses started to use—and AI groups were established in many significant corporations. Expert systems started to exhibit constraints on how many rules they could use, and sales of hardware and software based on AI reached \$425 million in 1986 (WFMO, 2001). The use of neural networks in business applications has also grown in popularity. As described in WFMO (2001) and MIT, Timeline of AI (2001), further AI approaches were put to use in the late 1980s and began to be employed more and more in industry. These applications frequently remained unrecognized but had positive consequences (Nordlander, 2001:19).

Early in the 1990s, automated scheduling software, investment decision-making software, personal information management software, and automatic mortgage underwriting systems were among the AI applications in use. The development and deployment of AI software, credit fraud detection systems, and support systems improved corporate forecasting of daily revenues and personnel needs in the middle of the 1990s. According to Buchanan (2001), it wasn't until the late 1990s that programs like web browsers, e-mail filters, and data mining tools were created and became widely used (Nordlander, 2001:20).

The world wide web and other contemporary information systems have seen a dramatic movement in recent years toward producing enormous amounts of data in order to actualize evidence-based marketing. Data mining, predictive modeling, data analytics, and big data are examples of technological sub-categories of AI that are evolving

extremely swiftly and serving as reliable tools in the contemporary marketing environment. According to Stalidis, Karapistolis, and Vafeiadis (2015), the most recent and sophisticated form of artificial intelligence generates a number of automated processes and applications that have the potential to alter how business is conducted on a daily basis. As a result, it is thought to have significant economic benefits and advancement potential (Doğan, 2018:10).

5.2 ARTIFICIAL INTELLIGENCE TECHNOLOGIES AND PROPERTIES

IT systems that detect, comprehend, act, and learn are referred to as artificial intelligence (AI) systems. AI is made up of a variety of technologies that give computers the ability to perceive their environment (such as computer vision, sensor processing, and audio processing), understand and interpret information gathered (such as natural language processing or knowledge representation), make decisions or recommend actions (such as inference engines or expert systems), and learn from experience (including machine learning). Intelligent machines are computers and software that incorporate AI. Intelligent systems link several machines, processes, and individuals (Accenture Report, 2018:6).

Since many current applications in the actual world today exhibit time-varying nonlinear and uncertain behavior, the requirement to tackle highly nonlinear, time-variant problems is expanding quickly. Traditional and typical mathematical model-based strategies can successfully address linear, time-invariant issues, and model-based techniques can also, but to a lesser extent, resolve more challenging nonlinear, time-variable problems. These issues, along with others with conventional approaches, have raised interest in artificial intelligence methods (Bahrammirzaee, 2010:1187). Recent improvements in Artificial Intelligence (AI) have made it possible for technology to carry out a number of tasks that ordinarily require human intelligence, such as speech recognition, image recognition, and prediction. Giving technology the ability to learn from experience without being explicitly programmed using different types of algorithms is known as machine learning (ML), a subset of artificial intelligence. As stated by Brynjolfsson & McAfee (2012), this is why ML is regarded as one of the most important technologies influencing the future of employment in many industries today (Almarzooqi, 2019:33).

Businesses must understand how AI may benefit them and where to use it in order to effectively use it. This is a hard process. Organizations will be able to use Gartner's planned study to use AI's capacity for quick and effective data extraction to unearth important truths that people will find much more slowly. Businesses will be able to reach customers, assign workers, and decide on budgets more quickly as a result. AI will be utilized to produce fresh insights, revolutionize decision-making, and boost corporate results (Gartner Report, 2017:7).

This includes a wide range of academic disciplines and technological advancements that support tools like voice recognition, natural language processing (NLP), image processing, and others that make use of sophisticated image processing and computational techniques like machine learning and deep learning. New data-driven business models and a wide range of organizational-wide impacts are the result of these quickly developing skills (Gartner Report, 2017:7).

Although there have been a number of AI technologies accessible for years, it is only recently that commercial uses of AI have become feasible because to faster network and data processing as well as hardware advancements. The evaluation of processing power, a wealth of data, and theoretical knowledge are driving the development of AI technology in the twenty-first century. Making AI research and technology into effective goods has advanced greatly (Chen, 2019:9). Table 1 provides a list of these core AI technologies (Gartner Report, 2017:4).

Table 1. Core AI Technologies

Core AI Technologies
Machine Learning, Deep Learning and Neural Networks
Natural-Language Processing, Speech Recognition and Text to Speech
Computer Vision
Machine Reasoning, Decision Making and Algorithms
Business Analytics and Data Science
Robots and Sensor
Core AI Technologies

Source: (Gartner Report, 2017:4)

Additionally, the researchers, such as Davenport & Ronanki (2018) and Schatsky, Muraskin, & Gurumurthy (2015), categorize the uses of AI-based technology in businesses into three primary groups: automation of processes, cognitive understanding, and cognitive engagement. Utilizing AI-based technologies to input and transport massive data through various Information Technology (IT) platforms is known as process automation. In order to discover patterns and comprehend vast amounts of data for advanced decision-making, cognitive insight integrates AI-based technologies. According to numerous academics, including Davenport & Ronanki (2018) and Schatsky, Muraskin, & Gurumurthy (2015), cognitive engagement entails employing AI, a branch of Natural Language Processing (NLP), which enables technologies to communicate with people (Almarzooqi, 2019:4).

The researchers emphasized that rather than automating human talents, AI-based technology should be seen as collaborators and partners (Almarzooqi, 2019:3).

5.2.1 Machine vision (Computer Vision)

Machine vision, also known as computer vision, is the use of cameras and computers to process images in addition to assisting the human eye in object tracking, measurement, and recognition. Observing with the human eye or delivering photos to the device is now more practical thanks to computer processing (Chen, 2019:9).

Digital picture acquisition, processing, and analysis, as well as the interpretation of their context and meaning, are all tasks performed by computer vision technologies (CVTs). There are other subsets of CV technology, such as machine vision, image recognition, motion detection, optical character recognition, face identification, pattern recognition, and edge detection (Gartner Report, 2017:10).

One of the crucial fundamental technologies of AI, according to Barcelo & De Almeida (2012), is computer vision technology. Machine vision, as opposed to conventional visual technology, enables computers to recognize image features with high speed, high accuracy, and high sensitivity. Fast speed, a lot of information, and various functionalities are its best qualities. It is frequently used in areas such as autonomous vehicles, face and vehicle recognition, video surveillance, aerial remote sensing measurement, medical image analysis, and archeology (Chen, 2019:9).

5.2.2 Natural language understanding

Artificial intelligence (AI) and linguistics are combined in the discipline of computer science known as natural language processing (NLP). It takes into account how intelligent machines and people interact. According to Reshamwala (2013), natural language algorithms are used to create intelligent machines that can understand speech and text (Almarzooqi, 2019:33). Natural language comprehension, according to Qi et al. (2007), encompasses speech recognition, speech synthesis, and natural language processing (NLP) (Chen, 2019:10).

The form of search that is now growing at the fastest rate is voice-based search (Chen, 2019:10). AI programs may also comprehend human language and respond accordingly. Speech recognition is the process of converting and transforming spoken language into text or command formats that may be used by computer programs. By reading the corresponding commands or material, a computer may produce speech that sounds like human speech. Chen (Chen, 2019:11).

Computers can be programmed to gather information, comprehend language, and translate languages, according to Norvig (2012). In particular, NLP enables computers to comprehend and communicate in natural language texts the thoughts or intents of natural language texts. Because NLP makes it easier to analyze sentence structure, meaning, sentiment, and intent through statistical and machine learning techniques, it is effective for text analysis (Chen, 2019:10).

Interactive voice response systems, voice assistants, and mobile applications are only a few examples of utilization domains that Kasemp (2017) highlights (Chen, 2019:11). Additionally, Hauptmann, Witbrock, and Christel (1997) state that NLP is being used in automated assistants, captioning, text semantic comparison, unstructured data mining, machine translation, and fraud detection and security (Chen, 2019:10).

5.2.3 Machine learning

Leaders in business and IT should concentrate more on the situations where algorithms are not only offering insight but are also becoming essential for competitive differentiation and are acknowledged for their value contributions (Gartner Report, 2017:11).

According to Chen, Chen, Gorkhali, Lu, Ma, & Li's work, the goal of machine learning is to utilize algorithms to parse data, learn from it, and then make choices and predictions about actual events (2016). In order to train and learn how to do tasks, machine learning therefore makes extensive use of data (Chen, 2019:11). The most effective tool provided by AI is machine learning, according to Feng & Xu (2000) and Kasemsap (2017). By offering algorithms and training, it involves building and deploying models to applications, processes, and other machines. Data, toolkits for development and training, application programming interfaces (APIs), and computational power (Chen, 2019:11). Many of the fundamental issues in machine learning (such supervised and unsupervised learning) are well-understood, according to the Stanford University Search Report (2016). The present emphasis is on scaling existing algorithms to operate on extraordinarily huge datasets. Traditional approaches, for instance, allow for multiple runs over the dataset, but newer approaches are only intended for a single pass; in some circumstances, only sublinear approaches (those that only look at a portion of the data) are appropriate (Stanford Univ Report, 2016:15).

According to Colin Priest, head of product marketing at DataRobot, "machine learning has entered the mainstream of marketing." "This is mostly caused by rising rivalry, which encourages creative marketing teams to use new technologies that allow them access to data from their multichannel touch points," (Korzeniowski, 2018:32) According to Forrester Research, better customer experience is what 57 percent of executives say will be the most significant benefit of machine learning in customer service. Companies can develop models that forecast what the consumer wants and react proactively rather than just answering questions that are randomly posed (Korzeniowski, 2018:32). Additionally, businesses use machine learning to analyze segmentation. They are attempting to distinguish high-value clients and figure out how to better serve them, as well as low-value clients and try to reduce the resources they spend (Korzeniowski, 2018:32).

The most significant technology of our time, according to Brynjolfsson and McAfee (2012), is machine learning, a subset of artificial intelligence that enables technologies to continuously improve their performance without explicit human programming through experience. ML has made progress mostly in the domains of prediction and cognition.

Due to this, technology could now carry out tasks like image identification, natural language processing, speech recognition, natural language processing, and problem solving. According to Brynjolfsson and McAfee (2012), ML will have a profound effect on numerous industries in the decades to come by fostering new business models that will ensure the longevity of existing industries. Many scholars, including Davenport & Ronanki (2018), Laurent et al. (2015), Parloff (2016), and Reshamwala et al. (2013), have especially emphasized three Machine Learning-based applications that are among the most significant drivers of the present digital revolution (Almarzooqi, 2019:32-33).

5.2.4 Deep Learning

Deep learning, also referred to as a deep neural network, is a machine learning application technique (Chen, 2019:11). Deep learning (DL), according to Parloff (2016), is a branch of machine learning that consists of techniques that let smart machines carry out specific tasks like speech and picture recognition by subjecting multilayer neural networks to a lot of data (Almarzooqi, 2019:33). Deep learning, a particular kind of machine learning, enables computers to learn from experience and comprehend the world using the hierarchy of concepts as established by Goodfellow, Bengio, Courville, & Bengio (2016), Li et al. (2018), and others (Chen, 2019:11).

According to Davenport & Ronanki (2018), deep learning forecasts brain activity to distinguish various patterns (Almarzooqi, 2019:33). By gaining knowledge from data, business issues are resolved. Deep learning expands on traditional machine learning by making it possible to find intermediate representations. With the help of these intermediary representations, more challenging issues can be addressed and perhaps even resolved with greater precision, fewer observations, and less time-consuming human adjustments (Gartner Report, 2017:8).

Artificial neural networks (ANNs) with numerous abstract layers are used in deep learning. By using backside methods as described by LeCun, Bengio, and Hinton, it can detect complicated structures in big datasets and show the machine how to modify internal measurements and settings (2015). Deep learning is proficient at recognizing unstructured data, including audio, text, visuals, and video. It is applicable to practically all widely used AI applications. Deep learning will be the only way to comprehend all

viable options, pertinent data, and offer the most insightful conclusions as data complexity increases (Chen, 2019:12).

Deep learning is currently mostly employed in pattern recognition and classification applications that are supported by big datasets, as described by other authors such as Kasemsap (2017) and Xu, He, and Li (2014) (Chen, 2019:12).

5.2.5 Artificial Neural Networks (ANNs)

Artificial neural networks are made up of straightforward components that operate in tandem. The connections between the components define how the ANN, which resembles a biological nervous system, operates. The network can "learn" by altering the values between links (weights between elements) if it has explicit knowledge of the desired values (Hilovska & Koncz, 2012:65). Recently developed computer modeling techniques called artificial neural networks are frequently used to model challenging real-world issues across a wide range of fields. In recent years, ANNs inspired by biological nervous systems and brain structure have served as the main motivation for numerous novel methodologies with a wide range of applications (Bahrammirzaee, 2010:1166).

According to Hlaváek et al. (2005), ANNs are frequently employed to tackle classification, prediction, and control problems. The fundamental benefit of utilizing ANNs is their capacity to detect nonlinearity even when the functional relationships between variables are unknown. ANNs are advertised as "universal approximation systems" capable of simulating any function dependency. They don't need a particular distribution and are robust to outliers. Fanta (2001) emphasized that ANN produces findings faster than econometric models. By adjusting the weight and parametric system and employing ANN, a certain level of accuracy may be achieved (Hilovska & Koncz, 2012:65).

Additionally, the use of artificial neural networks has drawn increasingly greater attention (ANN). It has been applied to identify, classify, and make predictions about issues. Applications for it include those in business and finance, research and information, and industry and engineering. Studies connected to this show that the neural network model outperforms the conventional statistical model in terms of prediction

accuracy. ANNs have a solid mathematical foundation, the ability to process large amounts of data in parallel, the ability to be fault-tolerant, and the ability to filter noise and correlate. Many of the fictitious conditions needed by statistical modeling can also be established using them (Wen et al., 2008:149).

From a broad perspective, ANN can be thought of as highly adaptive information systems that learn and generalize usage (Bahrammirzaee, 2010:1166).

The estimation of costs is essential to business and product cycles. Despite the limited uses, neural networks have provided several benefits over conventional methods for cost assessment (Tkac & Verner, 2016:790). Numerous important choices have an impact on every business operation. In the current uncertain climate, having a trustworthy decision support system where models can handle uncertainty is becoming a crucial issue for businesses. In the papers, neural networks have been shown to provide a number of benefits over conventional models, particularly for nonlinear and complex data. Li et al. (2007) 's smart future scenario generator for business planning outperforms the constraints of conventional approaches in terms of learning capacity. West et al. (2005) concentrated on applications in financial decision making while Thieme et al. (2000) effectively contrasted neural networks with conventional least squares and discriminant analysis in new product development decisions (Tkac & Verner, 2016:792).

5.2.6 Robotic process automation (RPA)

It involves the fusion of various automation-based artificial intelligence technologies. According to Laurent et al. (2015), smart technologies are frequently set up in enterprises to replace a range of intricate activities run by humans (Almarzooqi, 2019:33).

5.2.7 Internet of Things (IoT)

Much of the research is devoted to the idea that a wide array of devices can be connected to collect and share their sensor's information. Such devices can include cameras, appliances, buildings, vehicles, and other things. While connecting devices is a matter of technology and wireless networking, AI can process and use the resulting massive amounts of data for intelligent and useful purposes (Standford Univ Report, 2016:16).

5.2.8 Expert System

Russell & Norvig (2016) claim that the expert system is one of the most popular and commonly used technical features in the field of artificial intelligence. It is also one of the first truly successful applications of AI. It consists of a well-structured body of knowledge that mimics expert problem-solving abilities in a specialized field with only three components: an inference engine, a knowledge base, and a user interface, and is backed by numerous studies, including those by Bahrammirzaee (2010), McDermott (1982), and Pannu (2015) (Chen, 2019:9). The expert system is more than just strict simulations or mathematical formulas. According to Jayaraman & Srivastava (1996) and Waterman (1986), it may cope with facts as well as unclear, untrustworthy, or even missing data (Chen, 2019:10).

Concern about extracting information from across the organization has led to increased interest in executive support systems or executive information systems (EIS). Systems are designed from the point of view of senior executives by presenting the organization's "big picture" and its external environment with summary reports and graphical methods (McGill, 1990), providing the opportunity to "drill down" to explore the area of interest (Ernest, 1998:19).

5.2.9 Advanced Analytics

Analytics is the study of logic and mathematics used to data to produce insights for better decision-making. Many firms strive to utilize analytics with self-service capabilities to satisfy the time-to-insight requirements of today's competitive business environment (Gartner Report, 2017:11). Business executives use advanced analytics as a strategic tool in a variety of divisions inside organizations, including marketing, production, sales, and customer support. As a result, company executives will be able to improve client experiences, spur revenue development, and prevent losses through real-time automated event detection, customer profiling, risk modeling, and decision support. All of this gives us a market competitive advantage. Additionally, it aids businesses in automatically synthesizing sizable amounts of data to aid automation and human decision-making. Advanced analytics in particular uses deep neural networks (Gartner Report, 2017:15).

5.3 DRIVERS OF ARTIFICIAL INTELLIGENCE FOR STRATEGY

The late 1980s saw a dramatic increase in the respected importance of strategic planning for Information Systems (IS) and Information Technologies (IT). It has become a competitive requirement for an organization to carry out some form of planning if its competitors are themselves seeking opportunities for competitive advantage as pointed out by Lederer and Mendelow (1986) (Ernest, 1998:13). Reasons there are: First, the prevalence of mobile terminals, the Internet, sensor networks, vehicle networks, and wearable technology has significantly altered the information environment in the twenty-first century. Cities are widely covered in sensors, and the unprecedentedly fast spread of networks connecting people and organizations around the world continues to reflect and collect needs, knowledge, and capabilities (Pan, 2016:410). Second, as social demands for AI grow quickly, academic curiosity as a driving force in AI research is quickly being replaced by demands from outside academia (Pan, 2016:410). Thirdly, AI's objectives have significantly changed, moving away from the goal of "using a computer to replicate human intellect" and toward: 1 highly developed hybrid intelligence systems that integrate machines and people.

Three more complicated intelligence systems, such as smart cities that integrate residents, societies, physics, and cyber systems, comprise two new crowd intelligence systems managed by machines, people, and networks.

Fourth, data sources for AI are evolving. A new information environment is created by AI, which is built on data-driven algorithms. A growing amount of big data, sensors, and networks, as well as cross-media information, will power these calculations (Pan, 2016:410-411).

The value of business intelligence realized in the case of a successful business task is the main emphasis of the technological strategy. Loshin (2003) asserts that for business information to be effective, it must be put into practice. For today's firms to succeed, it is crucial to "understand how this technology might produce meaningful and durable competitive advantage," as emphasized by Popovi et al. (2010) (Huie, 2014:33).

Ansoff (1985) has already determined IT diversity is a driving force in business strategy; every new development creates a ready-to-use market opportunity (Ernest, 1998:15). The technological lead in business strategy can come from both manufacturing technology and IT. They converge as the information content of products and services increases. Each new technology introduction creates a market opportunity, while the integration of technologies creates productive opportunities. At a time of such IT developments, business strategies become vulnerable to rapid obsolescence as supported by Burch (1990), Blanden (1990). Therefore, technological change makes it crucial for businesses to conduct IS strategic planning as well as regular or frequent reviews to cope with the pace of change as added by Cash and McLeod (1985), Grossi (1990) (Ernest, 1998:16).

Researchers in statistics and computer science have created sophisticated methods for drawing conclusions from various huge datasets. Different types, sources, and quality levels of data, such as structured and unstructured data, are all possible. These methods can make use of computers' capacity for learning from experience while doing tasks like picture recognition and language processing. Artificial intelligence (AI) is a term used to describe the use of computational tools to perform jobs that would typically require humans to handle their complexity (AI). AI has been a field for a long time. But recent advances in processing power, along with growths in the volume and accessibility of data, have reignited interest in the uses of artificial intelligence (Financial Stability Board, 2017:3).

The value chain for intelligent machines or AI can be seen from both the perspective of technologies and business outcomes. Product categories, applications, and particular use cases are examples of technologies and business outcomes. The number of observed cases significantly rises as we move from technological developments to business outcomes. What begins with a small number of essential technologies develops into a larger group of product categories, thousands of applications, and millions of distinct uses, leading to a vast range of various commercial results. The AI Technology Value Chain by Gartner is depicted in Figure 5 (as of June 2017) (Gartner Report, 2017:16-17).



Figure 5. AI Technology Value Chain

Source: (Gartner Report, 2016)

The AI revolution was sparked by a number of things. The most notable of these is the development of machine learning, which has been helped in part by cloud computing capabilities and vast, web-based data collection. "Deep learning," a type of adaptable neural network that is trained through a technique called backpropagation, has dramatically improved machine learning. Along with this improvement in information processing algorithm performance, hardware technology for fundamental tasks like object recognition, sensing, and perception has made tremendous strides. The development of AI-driven technologies has also been aided by the introduction of new platforms and marketplaces for data-driven products as well as financial incentives to develop new goods and markets (Stanford Univ Report, 2016:15).

According to Al-Sukkar (2013), AI applications shaped the cost leadership strategy and required the corporation to lower the cost of its products while maintaining an acceptable level of quality (2013:11). According to Manyika, Chui, Bughin, Dobbs, Bisson, and Marrs (2013), businesses that are experiencing low income or profitability and a decline in the rate of return on capital on their income statements will seek and pursue greater efficiency, productivity, low-cost production methods or resources in an effort to keep up with the competition and meet customer demands (Dirican, 2015:566). According to Al-Sukkar et al. (2013), the use of AI has an impact on the differentiation strategy and encourages businesses to sell their goods at the greatest possible standards. As these methods promote the corporation to form alliances with suppliers and agents to produce more effective marketing operations, they are an example of how artificial intelligence has influenced the formation of alliance strategies. As these apps assist the corporation in providing a variety of items under several brands, they have an impact on how the diversification strategy is shaped (Al-Sukkar, 2013:11).

According to Porter (1985) in his book "Value Creation and Competitive Advantage Theory," governments and related organizations will look for new opportunities to cut costs and increase revenue based on emerging trends such as artificial intelligence, semantic studies, robotics and mechatronics developments, big data and mining, cloud computing, neural networks, or social media. There are only two strategies that businesses may adopt to increase profitability and sustainability: minimizing expenses or maximizing value. Additionally, Manyika, Chui, Bughin, Dobbs, Bisson, and Marrs (2013) touched on this subject and stated that efforts to achieve these goals will be supported by advancements in technologies, various sciences, and disciplines, and that new discoveries that have the potential to significantly alter business, life, and the global economy will continue to be made in the years to come (Dirican, 2015:566-567). In the study of large data, computational intelligence collection of computational methodologies and approaches inspired by nature—is essential. It gives the analytics agent the ability to computationally process and analyze historical and real-time data as well as deeply uncover and explain underlying patterns, correlations, and a deep comprehension of particular activities. Network operators' massive amounts of raw data are transformed into useful data and information using computational analysis tools and procedures (Nguyen et al., 2018:32331).

Hongo (2015) made a different point and mentioned that advancements in mechatronics and robotics will have an impact on a variety of job positions in the customer relationship management fields, including but not limited to marketing, sales, after-sales, operations, production lines, call center agents, security guards, and even managers (Dirican, 2015:567). With the use of technology, businesses may do away with the contact center's customer care agent and provide their clients with the 24/7 experience they demand (Gartner Report, 2017:18). AI and sales technology work well together, as evidenced by the ability to employ guided selling to boost sales growth, identify new leads based on commonalities with existing customers, and nurture expectations by developing relationships through smart messaging (Gartner Report, 2017:23).

5.3.1 Impact of Artificial Intelligence on Companies

The world is altering as a result of AI's quick progress. According to the CAICT & Gartner (2018) report, many nations and companies have devised strategic plans to take advantage of the potential presented by AI (Chen, 2019:12).

AI integration is encouraged by competition, and most sectors feel pressure to quickly adopt new technology to stay competitive. More than a third of respondents Berlucchi et al. (2016) surveyed think artificial intelligence will let internet companies disrupt their industry's operations. In addition, according to 44% of respondents, implementing AI will make their companies more susceptible to tech-based robberies. Additionally, up to 46% of all respondents think startups will positively disrupt the market. However, the majority of respondents believe that within five years, AI will contribute to important performance measures like revenue, operationalization, decision-making, and quality control (Rahimov, 2019:11).

According to numerous authors, including Rust & Huang (2014), Brynjolfsson, Rock, & Syverson (2018), and Schwab (2017), artificial intelligence (AI) is being employed more and more in marketing nowadays and is acknowledged as a significant source of innovation (Chen 2019/2:2). Organizational qualities, such as structure, size, and performance, define organizations. These elements offer various contexts for the development and application of AI and reflect the advantages or disadvantages of the technology. Management can employ technology as a business strategy and plays a crucial role in its adoption and promotion (for instance, by providing resources). AI is not always the same thing; instead, it is shaped and shaped by the other two foundation elements (Duchessi et al., 1993:152). Power transfers, cost reduction, improved service, reassignment of decision-making responsibilities, staff changes, and downsizing are some effects of AI on enterprises (Duchessi et al., 1993:152).

AI system implementation can either lower expenses, enhance a service offered by an enterprise, or do both. Authorization Assistant has allowed American Express to cut human expenses and better manage a card supply with no set limits in addition to automating the authorization decision-making process. Management increasingly values

these commercial benefits more than traditional ones (such as faster decision-making, better use of expert time, and information coding) (Duchessi et al., 1993:153).

Expert Systems, which are the current focus and offer product/service differentiation and/or cost reduction, directly influence management strategies to obtain competitive advantage. In some ESs, management may employ offensive or defensive strategies to counteract competitive dynamics and fortify the company's position. Strategies need not be confined to items; they could also involve other measures, like training up the personnel (Duchessi et al., 1993:154).

Machine learning, deep learning, neural networks, supervised, semi-supervised, and unsupervised learning are the main approaches employed in AI. According to Carbonell, Michalski, & Mitchell, these serve as the technological foundation for the creation of AI (1983). For AI to be implemented successfully, devices (IoTs) need to receive enormous amounts of data (big data) in order to train the system, as well as powerful computers in order to process this data according to predetermined algorithms (Chen, 2019 / 2:2).

Although the user experience is where AI has the biggest influence, using AI also leads to more effective and productive interactions in customer service. Additionally, the most significant honors are given out by product and service firms based on consumer data research. According to Byrum (2018), the use of artificial intelligence in business today is a crucial strategy that necessitates specially created solutions to address answers to certain difficulties (Rahimov, 2019:11). Marketing offers a solid foundation for evaluating and putting AI advances into practice thanks to the large amount of buyer-seller transaction data it contains. Popular AI applications include customized tagging, text recognition, image identification, and voice recognition. AI had a significant impact on sales and marketing strategies (Chen, 2019 / 2:2).

According to Agrawal, Gans, and Goldfarb (2018), the use of Artificial Intelligence (AI) based technologies will be crucial for improving decision-making through more accurate forecasting. This will make it possible for intelligent machines to significantly improve organizational efficiency, corporate operations, and client experiences (Almarzooqi, 2019:33).

According to recent studies, smart robots can assist a range of organizational demands by automating organizational procedures, employing data analytics to resolve issues, and communicating with both consumers and employees. Process automation, cognitive insight, and cognitive engagement were the three primary categories into which the researchers, Davenport & Ronanki (2018) and Schatsky, Muraskin, & Gurumurthy (2015), separated the functions of intelligence robots (Almarzooqi, 2019:34).

• **Process automation**: involves the use of robotic process automation (RPA), in which data entry and transfer between various information technology (IT) systems are predominantly handled by robots. RPA will be very helpful to businesses in automating routine financial and administrative chores that are often done in the office, like handling finances and transferring data from calls and emails. RPA is considered to be the most popular and affordable AI function with the highest Return On Investment (ROI) for businesses (Almarzooqi, 2019:35).

• **Cognitive insight**: use AI systems that use Deep Learning (DL) to discover patterns and analyze vast volumes of data. DL is especially utilized for difficult tasks that are outside the scope of human intelligence, such as the analysis of massive amounts of data and speech and picture recognition. Consequently, this enhances the performance of companies by enabling them to make more accurate forecasts, such as determining the likelihood that a specific client would make a purchase (Almarzooqi, 2019:35).

• **Cognitive engagement**: uses Natural Language Processing (NLP), a field that studies how intelligent machines can communicate with people. NLP enables intelligent machines to recognize sound in addition to text. Smart machines can communicate with staff members and clients in specific scenarios by providing answers to specific queries, proposing a course of treatment, and dealing with particular concerns with the use of NLP. NLP is therefore mostly utilized in businesses for customer service goals (Almarzooqi, 2019:35).

Nowadays, when people gain access to technology, consumers often use digital services (e.g. music), online banking services, mobility services (e.g. car telematics) and so forth, with technology-mediated services Self Service Technology as mentioned by Meuter et

al. (2000) (Young, 2010:5-6). Moon (2000) explained that it is based on the fact that human-like computer technology can be considered as human to similar language pattern in speech. Reynolds & Beatty (1999) also assumes that consumers can view Artificial Intelligence as a front-line employee. Service workers increase the value of the information provided and enhance the employment of the shopping experience in a retail environment (Young, 2010:8).

According to Wright and Schultz, current advancements in artificial intelligence, machine learning, robotics, and sensors enable devices to automate activities that have existed for some time (2018). Additionally, there is a high demand for artificial intelligence services from businesses that lack the financial resources to create such technology on their own. According to Axel Montes and Goertzel (2018), autonomous artificial intelligence developers also lack recognition and assistance (Bolton et al., 2018:52).

In addition to enhancing human abilities and competency, artificial intelligence technology may be used to separate out and analyze data streams from a variety of sources and enable the automation of laborious, ongoing tasks. Technologies based on artificial intelligence can lead to better outcomes and enhanced efficiencies. Organizations must modernize their processes, create new sorts of human-machine business connections, and consider novel staff roles if they are to realize the full potential of artificial intelligence (Bolton et al., 2018:55).

Expert Configuration Systems, which take a product specification or description and provide a parts list and assembly instructions, are the most prevalent examples of applying AI for product differentiation (Duchessi et al., 1993:154). The company's capacity to provide excellent production to clients, who no longer need to select from a model with a variety of possibilities because they can define what they want and have it created specifically for them, has the most influence. Maintaining and using a qualified workforce is essential to profitability for many service firms (Duchessi et al., 1993:154). In certain cases where customers lack the marketing expertise to differentiate between different service providers, these systems can lower labor costs, increase accuracy, and provide product differentiation for vital services (Duchessi et al., 1993:154). Figure 6

shows Accenture Report's predictions for the growth of the AI industry until 2035 (Bolton et al., 2018).

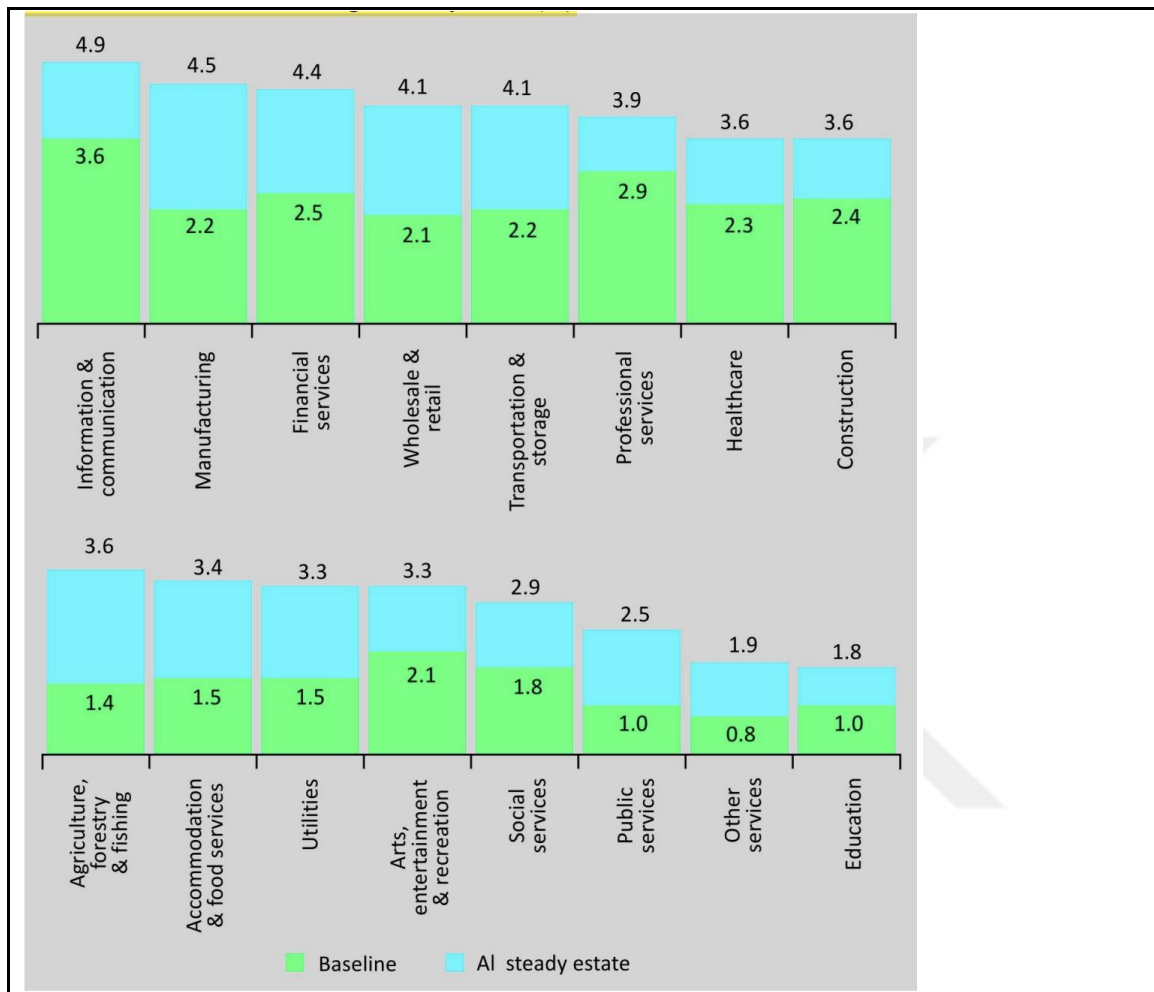


Figure 6: The Impact of AI on Industry Growth: Real Annual GVA Growth by 2035 – Accenture

Source: (Bolton et al., 2018:53)

In order to find the applications of AI that make the most sense for their teams and organizations, executives and managers must be prepared to experiment. This is what most survey participants said when they listed "creative thinking and experimenting" as the second most desired new ability. They will be able to focus on the most promising opportunities, such as the use of intelligent computers to speed up human learning, by starting organized AI trials. AI will make it possible for managers to simulate scenarios at a minimal cost and without being exposed to many of the risks involved with live tests, such as endangering customer relationships or endangering their own health and safety. Managers can use intelligent machines to filter through vast amounts of data to find

patterns by guiding them with human questions and problem framing (Accenture, 2018:15).

Data mining, data analytics, predictive modeling, and big data are examples of terminology used to describe fast developing technologies that are effective instruments in contemporary marketing and many other corporate operations, according to Bousset (2007). As there are numerous businesses that provide specialized software, data analytic services, and training in smart strategies based on data analytics, these techniques can now be deemed broadly accepted and established (Stalidis et al., 2015:107). It was anticipated that the knowledge acquired in a Knowledge Base (KB) would enable users to solve difficult problems without the need for specialized knowledge or in-depth understanding of data analysis and interpretation. Knowledge is manageable, expandable, and easier to integrate with new information than data, which frequently cannot be reused, which is another crucial advantage. Last but not least, it is important to remember that by using the right formalism, information may be shared between systems and accessed via the semantic web, making it feasible to ask intelligent questions rather than just requesting data from a database (Stalidis et al, 2015:107).

The manager of the future will consider intelligent machines to be colleagues. Even while judgment is solely a human ability, smart robots may speed up the learning that underpins it by helping with data-driven simulations, scenarios, and exploration and discovery tasks. Some choices need for knowledge that goes beyond what the facts can reveal. Applying knowledge and skills to important business decisions and procedures is the best use of human judgment. High social intelligence will be necessary for the next generation of managers to operate well in teams and networks, finding and fusing many viewpoints, insights, and experiences to assist group decision-making, complicated problem-solving, and thinking. Additionally, it will look for methods to employ digital technology to benefit from the expertise and judgment of its partners, clients, external stakeholders, and industry leaders. While a manager's creative skills are important, it's possible that their capacity to tap into the creativity of others is even more crucial. Executive designers are experts in fusing several concepts into cohesive, workable, and appealing solutions. They incorporate design thinking into their teams' and organizations' routines. Design and business processes will be facilitated and accelerated by intelligent machines, which will

support problem representation, data and solution visualization, as well as digital and physical prototyping (Accenture report, 2018:16).

Businesses should gradually incorporate intelligent robots as they take on increasingly sophisticated roles as assistants, consultants, and players. This premise is supported by organizational and technological concerns. Applications based on artificial intelligence are now the most developed. Actor-type applications are still being developed, while consultant-type applications are currently being widely piloted in a number of sectors (Accenture report, 2018:17).

5.3.2 Impact of Companies on Artificial Intelligence

Business settings have a significant impact on decisions. A firm's possible courses of action are determined by decisions taken by management (Aydiner 2016:27). The contribution of AI systems is rather dependent on how they work in conjunction with other organizational structures, software, hardware, rules, and procedures to improve business processes. AI technologies will therefore be included in larger corporate systems with complex cost and benefit considerations (Duschessi et al., 1993:155).

The implementation of AI systems is influenced by organizational factors like as culture, process design, and job design. For instance, O'Leary and Watkins (1992) claim that the adoption of expert systems is influenced by organizational features including size, technological awareness, and IS budget. When employed in the context of various organizations and cultures, the same system can be implemented and/or used in different ways (Duschessi et al., 1993:153). Companies must adapt their AI adoption strategy to local and organizational contexts, as there are differences in the readiness and resilience of AI across management levels, age groups, and geographical regions. At least two significant advantages for enterprises will result from the adoption of AI-embedded computers and applications, which involves managers at all levels. Smart machines must first be trained to understand context. These kinds of machines, like humans, require on-the-job training because they typically only have very basic skills. To get the most out of AI, managers at all levels need to be involved in the training process (Accenture report, 2018:10).

Operational and organizational capabilities are part of business processes. The primary business functions of an organization are referred to as organizational capabilities. Operational capabilities explain how a company produces or provides services. According to Bernhard et al., business process performance gauges financial and non-financial flexibility, dependability, responsiveness, costs/assets of organizational and operational capabilities (2006). To make prospective model enhancements, it similarly evaluates business performance, design, and operational performance. These enhancements are taken into account from a comprehensive standpoint. Business processes collect information from several sources, including information systems and capabilities, decision-making effectiveness, and operations management, because they include multidisciplinary and complicated situations. By examining interactions and identifying potential enhancements to support decision-makers, intervention from several disciplines enhances business processes and performance. According to Stefania & Armando's (2016) contribution (Aydiner, 2016:27–28), operational performance criteria should be in line with a firm's goals and provide continual assistance for decision-making and strategy setting. Business processes, as described by Oliveira et al. (2016), primarily strive to convert strategies and decision-making performance into operational outcomes, organizational diagnostics, and the development of engagement plans (Aydiner, 2016:28). One of the most blatant effects of the information revolution has been a broadening of the traditional policies that businesses have adopted in the area of personal selling. This has led to changes in how businesses manage and organize personal sales and interact with customers through databases, websites, direct communication, and customer email. According to Al-Rabeea (2007), laptops, mobile phones, the internet, and information networks have had a significant impact on vendors' efficiency and effectiveness in the new millennium, leading to numerous significant changes and impacting marketing philosophy and efficacy (Al-Sukkar et al., 2013:7).

Al Sakarnah (2005) discusses how artificial intelligence (AI) technologies enable integration with raw material suppliers, agents, and sales points as well as power and knowledge sharing with other businesses to improve the competitive position (Al-Sukkar et al., 2013:3.) According to Al-Rabeea (2007), it became more pronounced in the new century as many specialized multinational corporations started to abandon the

conventional wisdom and rely on direct marketing techniques and approaches to build direct interactions and conversations with clients (Al-Sukkar et al., 2013:7).

Even though AI will inevitably take on more regular tasks and even enhance human decision-making, it will never be able to completely replace human labor. Applying human experience and expertise to crucial business decisions and procedures when the information at hand is insufficient to propose a successful path of action or is dependable enough to point out an evident optimal course of action. Considering sales analytics and big data marketing can help you understand the nature of the judgment business. Such analytics frequently offer data that can guide promotional campaigns, including the ability to foretell which promotions will result in the desired sales outcomes. However, there is growing fear that methods for long-term branding, which are more difficult to suggest with data, may be sacrificed in favor of analytics-driven short-term results. The future profits and strategic position of a company may suffer from a failure to engage in long-term brand creation. Marketing managers must exercise judgment, integrating data with their own and others' understanding and experiences, and balancing short-term and long-term priorities in order to further build their brand in the future (Accenture report, 2018:11). As managers progressively free up AI's time and mental bandwidth, they will concentrate on three categories of judgment work: data interpretation, idea production, and application of context and history to decision-making (Accenture report, 2018:11).

Even though they may not fully understand the notion, managers have an understanding of what judgment work entails. According to Accenture's survey from 2018, managers believe that new high-level talents including digital aptitude, innovative thinking and experimentation, data analysis and interpretation, and strategy formulation will be necessary in the future. While judgment work necessitates the use of creative, analytical, and strategic talents, digital competencies will allow managers to work effectively with computers and realize their full potential as partners rather than as tools (Accenture report, 2018:11).

Organizations are placing more value on experimentation and collaboration, thus the need for creative and social intelligence will increase as AI assumes more tasks that are more governed by rules (Accenture report, 2018:13).

According to Drucker (1988), businesses are eschewing the traditional organizational structure. New prospects for AI are opening up as technology enables decentralized decision making, more consistent decision making, and higher reliability in decision processes. These developments include autonomous teams, distributed responsibility, and decentralized frameworks (Duschessi et al., 1993:154).

5.4 ARTIFICIAL INTELLIGENCE USAGE IN INDUSTRY

Many businesses anticipate that AI will improve customer experience, drive efficiency and cost savings, and enhance processes at the core of their present business. In more digitally advanced industries, much of this is already being done at scale. Over the next few years, it is anticipated that this will greatly spread across all industries (Microsoft Report, 2019:40).

What distinguishes the most "mature AI" businesses from the competition? According to the Microsoft MEA AI research, they believe that AI is primarily the result of a technological push and a commercial pull (57% of "more mature" organizations and 38% of "less mature" companies) (2019). 53% of "more mature" firms and 42% of "less mature" companies, respectively, report employing a combination of structured and unstructured data for AI, as well as data from both internal and external sources (53% of "more mature" companies and 37% of "less mature" companies). 82% of "more established" organizations and 64% of "less mature" companies use AI for insights to "change products and services." They anticipate that AI will assist businesses in "engaging customers" (75% of "more mature" businesses and 50% of "less mature" businesses) (Microsoft Report, 2019:9).

Attendees from high-performing firms (or AI high performers) reported greater scale and experienced larger revenue growth and cost reductions than other companies utilizing AI in the McKinsey Global Survey (2019). However, the results suggest that AI high performers are more likely to follow core principles to leverage AI to generate value across the enterprise, decrease technology-related risks, and educate employees to prepare for AI, offering a potential path for laggards (McKinsey Report, 2019:2).

Respondents were questioned about 33 AI use cases spanning eight different business functions, as well as the effects that each of these activities had on income and expenses in the business units that deployed AI. The findings demonstrate that AI offers reasonable value to businesses. In business units where their company utilizes AI, 63% of survey participants said that adoption of AI has increased revenue. High-performers respondents are roughly three times more likely to say that their company's revenue has increased than respondents from other companies. The development of products and services, supply-chain management, and marketing and sales use cases for AI are more likely to be cited by respondents as driving revenue growth. Respondents primarily mention revenue growth in marketing and sales due to the application of AI in pricing, purchase likelihood predictions, and customer-service analytics. The development of new AI-based products and new AI-based advancements are examples of revenue-generating use cases in product and service development. Additionally, respondents frequently cite expenditure analytics and sales and demand forecasts as examples of supply-chain management use cases that generate money. In total, 44% of respondents said that using AI has cut costs in their deployed business units by at least 10%, and high performing respondents were four times more likely to claim this than other respondents. Manufacturing and supply-chain management are the two areas where the greatest proportion of survey respondents indicated cost reductions in specific AI use cases (McKinsey Report, 2019:3).

The main applications of AI nowadays are in the fields of visual services, NLP, large data, and intelligent robots. According to the CAICT & Gartner Report, the majority of AI applications are used in the commercial, automotive, financial, and healthcare sectors (2018). According to Zang, Zhang, Di & Zhu (2015), intelligent healthcare covers voice recognition, drug discovery, medical imaging, clinical decision support, pathology, healthcare management, etc. AI has the potential to be used in smart healthcare (Chen, 2019:13).

AI also gives robots human-like perception, coordination, decision-making, and feedback capabilities. According to a CAICT & Gartner Report, intelligent robots can be divided into three categories: intelligent industrial robots, intelligent service robots, and intelligent specialized robots (2018). Positioning, sorting, packaging, assembling, and

sensing can all be handled by intelligent industrial robots. Intelligent professional robots can do household assistance, commercial services, healthcare, retail, and disabled person rehabilitation. According to numerous additional authors, intelligent expert robots can perform reconnaissance, search and rescue, and firefighting missions. These authors include Alsamhi, Ma, and Ansari (2018), Nolfi, Bongard, Husbands, & Floreano (2016), and Siciliano & Khatib (2018). AI has been used in industries other than health, finance, and robots, including retail, according to Semenov, Chernokulsky, & Razmochaeva (2017), Syam & Sharma (2018), smart homes, according to Xu, Wang, Wei, Song, & Mao (2016), smart driving, according to Basarke, Berger, & Rumpe (2007), Meiring & Myburgh (2015), education, according to Timms (2016), Zhou & Law (Chen, 2019:14).

5.4.1 Artificial Intelligence in Finance Industry

The actions of a nation's financial sector have a significant impact on the economic and social well-being of developing nations with specialized economies. The financial sector is a crucial pillar for the growth of the private sector (Bahrammirzaee, 2010:1165). Since at least the previous century, it has been understood how crucial healthy financial institutions are to encouraging and facilitating capital accumulation and economic growth (Bahrammirzaee, 2010:1165). According to Moro, Cortez, and Rita (2015), banks are businesses that operate in the financial industry and deal with tasks like managing deposits, lending tasks like making loans, and investing in capital markets. Researchers in a variety of fields, including marketing, finance, and information technology, place a high value on the banking sector since it is essential to the health of the economy (Doğan 2018:10).

Hanafizadeh, Keating, and Khedmatgozar noted that the financial services industry has undergone an information technology-based transition that has fundamentally altered how banking products and services are provided to customers (2014). According to another author Morgan (2017), the banking industry's future is dependent on the swift convergence of technology and the financial sector (Doğan, 2018:10-11). Because of the time sensitivity and information intensity, and thanks to the collaboration of Lee & Shin, practically all areas of the banking business value chain have profited from the innovative application of these technologies (2018). Research by Berger (2003) also identified implications on banking efficiency (Doğan, 2018:12).

All organizations have been impacted by the rise of digitization and emerging technologies like artificial intelligence (AI). Banks and financial institutions typically implement new technology upgrades quite early on. They have achieved economic success and are also among the pioneers in the application of AI technology. According to a 2019 Mckinsey report, organizations who adopt strong digital skills and proactive initiatives should expect improved profit margins and a performance gap (Patil & Kulkarni, 2019:4296).

In the financial services sector, the use of artificial intelligence (AI) and machine learning is expanding quickly for a variety of applications (Financial Stability Board, 2017:1). Digital financial services have been made possible through the deployment of AI in the financial sector. The expansion of the financial industry as a whole has been advantageous. The potential uses of AI in the financial sector are generally acknowledged. The adoption of AI happens over time. The evolution of the financial sector is greatly impacted by the use of AI (Lu, 2009:18). Therefore, it is crucial to begin considering how such uses may affect financial stability. Any analysis should be preliminary, and advancements in this field should be closely watched, as the use of this technology in finance has not yet developed and is at a stage of rapid development with little data available (Financial Stability Board, 2017:1). According to Jung, Dorner, Weinhardt, and Pasmaz (2018), financial technology (FinTech) is becoming a crucial component of banks' and financial start-up enterprises' strategies. Beyond e-banking and consumer digitization, the FinTech idea focuses on the creation and effective distribution of novel technology tools to satisfy customers' financial demands. According to Park et al. (2016), AI gives a clear opportunity to promote the financial sector's transformation by enhancing customer experience and boosting business revenue (Belanche et al., 2019:1). Operational excellence and big data optimization analytics have been the foundation of the key competitive advantage of fintech collaboration, but this will complicate the strategic choices made by financial companies to control market dynamics. Traditional financial organizations will benefit greatly from the new innovation approach:

- a. Possibility for a more rapid global rollout of digital business models.

- b. Redesigning the customer experience to satisfy the needs of new generations and educational levels under the pressure of demographic changes that have occurred over the past 20 years.
- c. Strategic integration with related fields (such as healthcare, retail, and telecommunications), as seen by the growth in smartphone users.
- d. Given complimentary knowledge and customer interaction models, integration between banking and telecom services may quicken (Öztürk, 2019:8–9).

The banking industry is defined as having a significant role in the storage and delivery of numerous financial transactions that customers require in the paper by Mili et al. (2017). Queues, delays, and an abundance of paperwork are just a few of the service-related problems that limit how efficiently service operations operate in the banking sector. By removing lengthy lines at bank branches and allowing access to all types of customers' information online, platform banking, internet, and mobile branches improve the customer experience. Modernization can be anticipated in the way that banking services, payments, and customer-banking interactions are conducted, as well as in ensuring that new distribution channels for services are more securely provided. According to Mili, et al. (2017), focus should be placed on the technology of tools (back office and customer interfaces) that will ensure information security and safeguard the trust between banks and clients (Öztürk, 2019:7).

There are already several "use cases" for AI and machine learning. The adoption of these use cases has been influenced by both demand and supply factors, such as the need for profitability, rivalry among businesses, and regulatory requirements, as well as supply factors like technological advancements and the availability of financial sector data and infrastructure (Finance Stability Board, 2017:4). AI is a service for the financial sector as well as an analysis of financial data. AI, for instance, offers users a secure and convenient service. According to Bahrammirzaee (2010), Fethi & Pasiouras (2010), AI can increase the detection, early warning, prevention, and control capacities of many types of risks. AI also provides decision assistance for transactions, credit, and analytics in finance (Lu, 2009:18).

The following are some examples of both current and future uses for AI and machine learning (Financial Stability Board, 2017:1):

- In order to evaluate credit quality, price and sell insurance contracts, and automate client engagement, financial institutions and vendors employ AI and machine learning.
- Institutions examine the market effects of large position trading and model back-testing, as well as the use of AI and machine learning to make the most of limited capital.
- To uncover indications for higher (and uncorrelated) profits and optimize their trades, hedge funds, brokerages, and other companies use AI and machine learning.
- These technologies can be used by both public and private sector organizations for regulatory compliance, surveillance, data quality assessment, and fraud detection (Financial Stability Board, 2017:1).

By forecasting financial trends, managing asset portfolios, making loans and other financial products available, evaluating targets, simulating financial and investor behavior, pricing initial public offerings, determining the optimal capital structure, spotting patterns in the movements of securities prices, forecasting defaults and bankruptcies, etc., researchers in a wide range of fields sought to make the work of the financial industry easier during this time. This approach has been applied with various techniques. These techniques can generally be divided into three categories: soft-computation techniques, parametric statistical techniques (like discriminant analysis and logistic regression), and non-parametric statistical techniques (like k closest neighbor and decision trees) (for example, artificial intelligent algorithms and rough sets). In recent years, the most widely employed technology in the financial markets is artificial intelligence (Bahrammirzaee, 2010:1165). Due to their many beneficial characteristics, NN's have gained popularity as a tool for financial decision-making, especially in recent years (Bahrammirzaee, 2010:1166). Numerous research have been conducted in this regard to review and categorize the uses of NN in the financial field. For instance, a classification about the suggests that the incorporation of ANN technology could significantly enhance the following potential corporate finance applications: financial simulation, pricing of public offerings, forecasting investor behavior, loan approval, choice of the best capital structure, financial appraisal, and management of the portfolio of securities and/or assets. Another classification is the listing of the financial analysis

tasks that include risk grading, credit authorization screening, mortgage risk assessment, detecting regularity in price movements of securities, project management and bid strategy, fixed income investments traded on the stock exchange, and forecasting of default and bankruptcy (Bahrammirzaee, 2010:1166).

AI and machine learning are revolutionizing financial services in addition to product creation, asset trading, and process automation. Asset management companies are looking at new applications for AI and ML that go beyond portfolio analytics. To reach their full potential, according to Gartner, asset management CIOs must integrate AI and deep learning into four key functional areas: client acquisition, risk and compliance, customer engagement, and investment support (Gartner Report, 2017:27).

Automation and social media connectedness are catalyzing a disruptive stage of innovation in the financial services sector, according to an assessment of the top academic research publications. The ability of research journals to pinpoint significant strategic consequences for conventional banking institutions in light of new financial technologies is still in its infancy. Brătășanu (2017) asserts that technological innovation has successfully revised the finance industry's business model. Recent reports claim that automation and social media connection technologies have helped both customers and traditional banking structures. The models forecast that automated customer relationship management, sophisticated predictive analytics, and AI technologies will enhance customer satisfaction and boost the effectiveness of risk management (Öztürk, 2019:8).

An further idea is relationship banking. In response to the industry's obligation to transition to real-time payments, technology has now become the driving strategy for banks as they strive to create new business opportunities and cultivate partnerships with enterprise customers. The strategies involve creating client interfaces while upgrading and incorporating new functionality through the use of blockchain, AI, and APIs (APIs). Clients anticipate forming strategic collaborations to meet their financial or operational needs. They transition from a lender and depositor to a competent advisor who can offer insightful advice to corporate treasury departments or special budgets as a result of the numerous new ways technology can support them in expanding company models as well as individual demands as mentioned by Johnson (2017) (Öztürk, 2019:9).

The banking industry has undergone a radical change as a result of IT innovations. The cost-effectiveness of banks has increased due to IT improvements. Economies of scale are mentioned in payment processing, clearing, and settlement systems by Beijnen and Bolt (2009), Schmiedel et al. (2006), and Li and Marin (2018), Schmiedel, et al., (2006), Li and Marin (2018). Advanced transaction credit mechanisms, electronic and mobile payment systems, and online and mobile access channels all result in additional cost savings. In their essay, Jaki and Marin (2015) identify increased communication, decision-making, automation, and customer empowerment as the four main ways that IT innovations are reengineering banks (Öztürk, 2019:11).

By processing non-linear relationships, learning and evolving over time, and producing expert-level conclusions, studies support the use of artificial intelligence approaches in a variety of economic applications. For optimization issues like stock market timing and portfolio construction, genetic algorithms are applied. Genetic algorithms are combined with other artificial intelligence techniques to solve prediction challenges. Quantitative tools for short-term forecasting of exchange and interest rates can be created using data mining techniques (Hilovska & Koncz, 2012:72).

IT-supported advisory processes, according to Heinrich and Schwabe (2018), boost client learning and help them make better financial product decisions (Belanche et al., 2019:4). According to Park et al., the successful implementation of robo-advisors in the context of AI and FinTech expansion poses a difficult problem while simultaneously being a source of competitive advantage for many financial sector companies (2016). However, due to its novel and standout qualities, consumers could be hesitant to transfer to an automated robo-advisor (e.g., lack of human–employee control). Additionally, as stated by Jung, Dorner, Weinhardt, and Pasmaz (2018), the benefits of robo-advisors have made it possible for these systems to manage an expanding amount, providing a chance to expand the market by offering the service to a wider clientele (Belanche et al., 2019:13-14).

According to numerous authors, including Dutta et al. (1988), Chaveesuk et al. (1999), and Manzoni (2004), artificial neural networks have been used to overcome generalization issues in corporate bond rating estimation, where standard mathematical

modeling techniques have done badly. Kim et al. (2009) used artificial neural networks to simulate a system that compares present time series to historical stationary time series using a stationary autoregressive model. On the Korean stock market, the proposed model's potential was put on display. According to Hlaváek et al., ANNs are frequently utilized by central banks to forecast government interest rates and monetary policy (2005). In studies like Haider (2009), Choudhary et al. (2008), Mc Nelis (2004), Moshiri et al. (2000), and Nakamura (2005), ANNs are frequently used to forecast inflation. These studies primarily compare forecast accuracy with econometric models as shown by Haider (2009), Hlaváek et al. (2005), Choudhary et al. (2008), Mc Nelis (2004), and Moshiri (Hilovska & Koncz, 2012:66).

Fuzzy systems are highly suited for use in the financial sector when decisions are made on the trading volume of underlying assets because they excel at decision-making tasks characterized by uncertainty. The usage of fuzzy systems was combined with other artificial intelligence methods. As indicated by Kuo et al., an evolutionary algorithm based on fuzzy neural networks was used to build a database to examine the quantitative effects of various events (such as political events) on stock markets (2001). An expert system for financial forecasting built on evolutionary principles was developed by Romahi and Shen in 2000. Inductive rules and fuzzy logic were used to produce a system that could generalize (Hilovska & Koncz, 2012:70).

According to John McCarthy (2000), credit card issuers and collectors are two more industries where researching customer behavior using AI technologies has proved successful. Card issuers can use expert systems to help them decide whether to approve a proposed credit card purchase (Nordlander, 2001:37).

In addition, according to Panczyk (1999), MasterCard and Visa provide their users with a Neural Network (NN) approach that can spot changes in cardholders' purchasing patterns that can be signs of fraud. In his paper "Artificial Neural Networks," Kay (2001), covers this service in the "Computer world." In their paper "Life & health/financial service" in the National Underwriter from 1999, Rabkin and Tingley reveal that credit card firms employ ANN to identify fraud. They also point out that in order to increase

fraud detection, genetic algorithms and expert systems are used in addition to ANN (Nordlander, 2001:37).

Williams (2001) discusses why money managers take their time applying AI techniques to stock selection in his article "Pensions & Investments." He also mentions that an increasing number of businesses, like Fidelity Investments Inc., NeuWorld Financial, Advanced Investment Technologies, the Dutch pension fund ABP, etc., are beginning to apply AI. Since its founding in 1860, Standard & Poor (S&P) (2001) has offered financial research and insight. Boyd (2001) cites Standard & Poor's Neural Network, also known as the Neural Fair Value Portfolio, in the "Puget Sound Business Journal." Boyd claims that the AI techniques employed strive to identify inexpensive stocks and forecast when they would be the focus of the greatest price appreciation. Andre Archambault, S&P's Research Director, outlines how the Neural Fair Value Portfolio gives credibility to the employment of AI approaches in the financial industry in William's (2001) essay "Pensions & Investments" (Nordlander, 2001:50).

Agent-based Computational Economics (ACE)

The economy can be viewed as a sophisticated adaptive system that can change in response to its surroundings. Without being aware of it, economic agents modify their conduct to fit the system. Economic agents consider their acts and their effects, and they modify their conduct in light of these considerations. They create the concept of the system to which they belong, and their actions have an impact on the system as a whole (Umpleby, 2007). Agent-Based Computational Economics (ACE) is derived from the idea that economics is a complex adaptive system. Using simulations outlined in Bruun's (2006) work, ACE is a bottom-up system that builds agent models and interaction rules before constructing the full system (Hilovska & Koncz, 2012:71).

In recent years, agent-based computational economics has gained popularity. The focus of the present ACE is financial market modeling. To explore the nonlinear relationship between variables and their propensity to function under uncertainty, the Artificial Neural Networks approach has been put into practice. They are frequently employed to address forecasting issues, such as those related to time series forecasting in financial markets and forecasting macroeconomic indicators (Hilovska & Koncz, 2012:72).

AI applications in the financial services industry, include algorithmic trading, model validation, robo-advising, market impact analysis, portfolio composition and optimization, virtual client assistants, regulatory compliance, back-testing, and stress testing (Buchanan, 2019:11).

Chatbots and robo-advisors:

An area of venture investment and customer service budgets that is quickly rising is chatbots and conversational interfaces. Such chatbots needed to be developed with strong natural language processing engines and consumer interactions tailored to the finance industry. It is getting harder for bank customers to identify whether they are speaking to an AI interface or a human due to natural language processing (Buchanan, 2019:14).

Natural language processing (NLP) and machine learning (ML) algorithms are now being used to power chatbots and robo-advisors, which are effective tools for giving users in a variety of fields a tailored, conversational experience. Millennial investors, who don't need a physical advisor to feel comfortable investing and are less able to verify the fees paid to human advisors, have shown a strong preference for chatbots and robo-advisors (Buchanan, 2019:13).

Given the current trend toward enhancing customer service, all businesses that prioritize serving their customers have a tendency to gradually advance in terms of digitalization and technological development. In this day and age, one of the services that improve client connection is digitally connected bank chatbots. A chatbot is a computer program that can converse with a human. The word "chatbot" is derived from the word "robot," which basically refers to an automated program that converses with the person in front of you instead of a real person. A chatbot is an artificially intelligent computer program that mimics human communication in its natural form, such as text or spoken language, using a technique like natural language processing (NLP), image processing, or video processing, and ensures that the final task is completed as instructed by the user. A new platform for clients to develop communicative intelligence is the chatbot. Since the release of Alexa and Siri Chatbot, the use of chatbots in commercial operations has increased in popularity and largely replaced 24/7 call center supervisors (Patil & Kulkarni, 2019:4296).

According to Hongo, 2015, a female-appearing robot named Aiko Chihira created by Toshiba Corporation provides six-minute assistance to consumers with information with Japanese about the mall in Mitsukoshi shop in Nihonbashi (Dirican, 2015:567).

In addition to those at Bank of Tokyo Mitsubishi UFJ, other humanoid robots in customer care can carry on spoken conversations or respond to inquiries. The banking industry, which was most impacted by the 2008 financial crisis, is still looking for ways to be more profitable and efficient. Many areas, including the front end, can use robots. Robots with artificial intelligence built into them can replace tellers or contact center agents. Furthermore, as explained by Goldberg, the reasoning presuppose that robots and artificial intelligence would be utilized even in management roles, and the early adopters are beginning to support this assertion (2015). Another method of cutting costs will be to employ drones to reduce the cost of internal papers between the main office and any satellite offices (Dirican, 2015:567). By increasing the real working hours to 7/24 and maximizing the 7/24 nominal benefits of alternative distribution channels or sales points, it will be possible for banks and businesses in the retail sector or in other industries to implement Porter's Value Creation Theory by Porter (1985). This will increase the efficiency and productivity in business processes (Dirican, 2015:568). Jaki & Marin (2019) also noted that with the growth of AI, the role of humans in banking needs to be reevaluated (Öztürk, 2019:12).

According to Moro, Cortez, and Rita (2015), the majority of banking services and procedures have been transferred to the computer environment due to recent advancements in the field of information technology, creating a significant amount of data in the process. Finding and evaluating relevant sets of information becomes a more challenging process as the amount of data collected and stored digitally increases quickly, as indicated by Harris (1992). Large databases are available at banking institutions where crucial client information can be saved, queried, and extracted in order to make decisions on the banking transaction behavior patterns of customers. In banking branches, the majority of data analysis solutions are provided by banking computer support staff and banking consultants based on the types of issues they run into. The main benefit of mobile technologies over conventional bank branches is that they combine all available options and services into a single, unified access point. According to

Ogwueleka, Misra, Colomo Palacios, & Fernandez, by doing this, the technology structure aids in lowering the costs of removing the procedures required in sorting, merging, and processing enormous amounts of crucial data (2015). According to Stalidis, Karapistolis, and Vafeiadis (2015), technologies like data mining/analytics, predictive modeling, and big data have advanced quickly in the data extraction sector and have already established themselves as authoritative instruments in today's marketing and banking fields (Doğan, 2018:15).

Robo-advisors have the ability to lower costs while raising the transparency and quality of financial advice for clients. Behavioral biases, low-cost execution of a diversified asset allocation, and access to and rebalancing of passive and rule-based investing strategies are the three situations in which Rohner and Uhl (2017) describe robo-advisory services. They discovered that robo-advisors can save investors up to 4.4% annually in costs when compared to traditional investment advisory (Bucanan, 2019:15).

Fraud detection and compliance:

The prevalence of e-commerce coincided with an upsurge in online fraud (Buchanan, 2019:11). Because ML algorithms can examine millions of data points to find fraud transactions that usually escape human detection, AI is helpful. At the same time, ML decreases the quantity of erroneous rejections while enhancing the accuracy of real-time approvals (Buchanan, 2019:11).

One of the most popular and effective uses of machine learning is in the identification of credit card fraud. Banks employ workflow engines or tracking systems that have been conditioned on previous payment data. Credit card transaction data from very big datasets is used for algorithm training, back testing, and validation. According to van Liebergen (2017), classification algorithms can categorize events as "fraud" or "non-fraud," and fraudulent transactions can be halted immediately (Buchanan, 2019:11).

Clearly, ML algorithms offer potential future methods for detecting money laundering (Buchanan, 2019:13).

Insurance, mortgages, and credit rating for both individuals and businesses are further fields where AI techniques have been successfully implemented. In the article "How will Artificial Intelligence systems and Expert Systems impact the estate planning field?" in the "Journal of Financial Service Professionals," Littell (2000), the director of the Broker's Resource Centre, asserts that an increasing number of life insurance companies are using specialized underwriting systems for easier cross-checking of smaller "clean case" underwriting functions so the insurer can devote time to more challenging tasks. It is confirmed by Rabkin and Tingley (1999) and (2001) that AI techniques benefit insurers in this way (Nordlander, 2001:38). Expert systems are used in both the study of securities and the evaluation of companies in an effort to get expert level conclusions. Fuzzy systems might be the best option if we only have a sketchy notion of the steps that will lead to a decision. Insurance is where fuzzy methods are primarily applied (Hilovska & Koncz, 2012:72).

5.4.2 Artificial Intelligence in Telecommunication Industry

After 2000, high-tech and data-centric networks became the center of the telecom business, instead of simple telephone and Internet services (Chen, 2019:15). Since the collapse of the Internet bubble, the telecoms sector has undergone significant change. The value creation process' development was defined by Steinbok in 2005. (Zuhdi, 2012:40). The service changed as a result, moving away from voice calls and toward video and data. The telecom industry is always dealing with new challenges and issues as a result of the expansion of network scale and the development of business types (Chen, 2019:15). Li and Whalley (2002) analyzed the value chain transformation in the telecom industry and found that it expressed itself not only in the overall industry but also in the submarkets (Zuhdi, 2012:40). According to Castro, Richart, Baliosian, and Grampn (2018), the telecom sector is experiencing significant difficulties with the digital transition. On the other hand, there is a growing need for multimedia apps, higher definition images, and faster video streaming. Additionally, threats from quick and efficient web-scale businesses are becoming more potent. Telecom companies are being forced by difficulties to increase their user base by providing improved services and additional features (Chen, 2019:15). Businesses in the telecom sector compete for customers' business while attempting to set themselves apart through superior customer service. According to Hu et al., some claim that maintaining customer happiness alone

is insufficient to ensure a company's existence (2009). However, increasing client satisfaction and perception, as well as the caliber of the services provided, will directly impact customer loyalty and cut down on customer churn (Zuhdi, 2012:40).

Volatility in the telecommunications industry has led to significant changes in firm strategies. Volatility will remain the norm for the industry, at least in the foreseeable future. As the industry has reached a state of pure competition and is moving toward an oligopolistic, mature, and declining market status, turmoil will likely continue from sources such as new technologies, acquisitions, mergers, and other market conditions. As telecommunication firms change their strategies to meet environmental conditions, acceptance and adjustments must be made that correspond to the factors that make up firm strategies and firm capabilities (Snedegar, 2009:3).

The telecom industry's competitive environment has been dramatically altered by the Internet's strong entry and growth into the public realm. The structure and rules of the competitive game are undergoing a significant change in the telecom business. Market barriers are dissolving, products are standardizing, services are combining, and businesses are joining forces to form alliances and partnerships. When a group of competing goods start to function similarly and are used in similar ways, they become commodities. Companies will contend for a larger portion of the same small market space on the basis of price. This forces telecom businesses into direct contests that degrade company profitability and lessen the appeal of the overall industry (Zuhdi, 2012:55).

The introduction of each technology will significantly alter the current network architecture and technology. The Internet of Things and 5G networks are significant roadmaps for the development of current telecom networks. The design, operation, and maintenance of the telecom network will also provide significant difficulties. How to manage and run the intricate 5G/Internet of Things (IoT) networks of the next generation represents the main problem for telecom operators (Chen, 2019:15-16).

Telcos, which were primarily monopolies in the past, are currently under intense competitive pressure. There is some pressure from non-traditional rivals like OTT providers and cloud telecom providers. Due to their high levels of innovation and

efficiency, these businesses can offer a serious threat to the current telecoms industry. Additionally, we've discovered that industry deregulation has given rise to a number of decoupling models for the traditional incumbent's operation, allowing us to divide it into services, communications, and infrastructure (Zuhdi, 2012:79).

Telcos must set up their networks to handle the continuous exponential expansion in bandwidth demand. However, the growth of the Internet and the deregulation of the telecom sector have greatly lowered entry barriers. Since internet advertising and commerce are booming, incumbent operators must get ready for this competition and capitalize on it by providing personalized and interactive services. To reduce their cost structure, operators must take advantage of trends toward network convergence. Cloud computing and cloud-based services are an additional industry trend that can assist operators in reducing costs and providing customers with more value (Zuhdi, 2012:80).

Zuhdi (2012) believes that operators have a tough time making the switch from monopolistic telecom to competitive telecom as a result of the aforementioned changes (Zuhdi, 2012:64). The dynamic and technologically dependent nature of the telecom sector presents a challenge for communications organizations. Operators should therefore be aware of industry developments and the development of competition, and the business model should alter as necessary (Zuhdi, 2012:45).

The characteristics for some of these challenges are shown in figure 7.

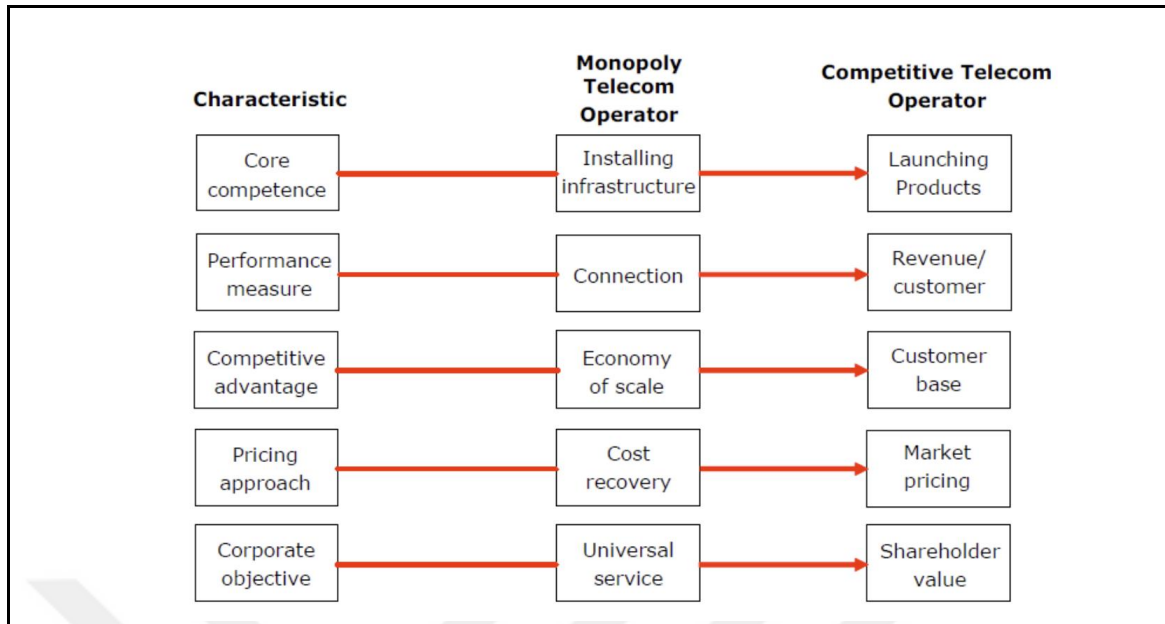


Figure 7. Challenges of Operators for Transition to be Competitive by Peppard&Rylander (2006)

Source: (Zuhdi, 1012:64)

Operators must now concentrate on bringing items to market at competitive rates and generating income from their sizable client base, as the figure and Peppard and Rylander's (2006) analysis illustrate. They are able to increase the value of their stockholders as a result. This graph went a step further and encapsulated the change in the emphasis on communications. By paying attention to and taking care of consumers' requirements, the emphasis should be on forming relationships with them and keeping them around. Additionally, the real profit is more crucial than the income. To maximize profit per user, costs must be maintained under control. Additionally, the network and terminals need to be smart and capable of delivering various types of content and services. Last but not least, telecoms firms need to exploit their main assets as a source of long-term competitive advantage (Zuhdi, 2012:64).

There are several issues that communications service providers (CSPs) face that can be resolved with AI and machine learning. Their networks contain a large amount of high-speed data, and they use increasingly sophisticated automation, predictive analytics, and troubleshooting methods. Additionally, workers and customers engage in a range of interactions with machines and other people, especially through their own channels and methods like natural-language processing. Additionally, there are prospects for improved

decision-making and robotic process automation across a variety of CSP domains (Gartner Report, 2017:35).

Cost and service drivers:

In general, subscribers are more demanding yet less eager to increase their wireless bills. The consumption of network resources must be optimized immediately in such a situation. The user-centered service paradigm is also replacing the network-centered service model. In order to retain profit margins, network operators must I control traffic depending on service and application, (ii) boost efficiency, (iii) enhance network performance without raising costs, (iv) minimize disruption, etc (Nguyen et al., 2018:32330).

Technology drivers:

Network resource virtualization, network slicing, mobile edge computing, next-generation wireless networks It integrates different air interfaces, network layers, and supports a variety of use cases, among other technological features. To effectively organize virtualized network resources, network operators need a strong analytical framework. The network administrators can balance dispersed and centralized functionality with the aid of analytics. The most effective approach to slice traffic, for example, depending on the type of traffic and how it evolves over time and space, is provided by data analytics for network operators (Nguyen et al., 2018:32330).

Managing Complexity:

In particular, to create predictions and offer recommendations based on the datasets, ML and AI are two alluring techniques that have emerged as solutions for managing massive volumes of data. Network operators may benefit from using machine learning and artificial intelligence to address new problems that lack historical data or are too complicated to be comprehended using conventional methods. AI and ML tools can link data from various sources and identify what is pertinent. As a result of its automated procedures' ability to analyze and audit data more thoroughly and methodically, they can also disclose prior events and dependencies (Nguyen et al., 2018:32332).

Data-Driven Coverage and Capacity Optimization:

A single infrastructure must effectively and flexibly deliver a variety of services, including advanced mobile broadband, ultra-reliable and low-latency communications, and massive machine type communications, in a next-generation service-oriented network. Additionally, it must coordinate a heterogeneous network made up of multiple base stations (BSs), including macro, micro, femto, and pico BSs, as well as a variety of user devices and applications. A network operator faces a tremendous difficulty in effectively managing a network that can support such flexibility while satisfying demand for a variety of services (Nguyen et al., 2018:32328).

With the right analytics, large data can reveal previously undiscovered patterns and correlations, leading to greater knowledge and understanding. It is beneficial to have a thorough understanding of all the different unknown variables since it presents fresh ideas for how to boost performance at various wireless network levels. Expanding the number of data sources and using a quality of experience (QoE)-based strategy to optimize end-to-end network performance are how analytics provide value to optimization (Nguyen et al., 2018:32329).

The system must be intelligent, self-aware, self-adaptive, and capable of running network services efficiently as well as managing and operating networks on its own from the standpoint of operational costs. Reactive maintenance done the old way is ineffective today. Big data analytics allows for the proactive and preemptive maintenance of network components. The network can help and/or anticipate the operations and maintenance unit with decision choices and the outcomes of actions, among other things, due to the volume of data, the pace at which it flows, and the variety and kind of data sources. Artificial intelligence (AI) and machine learning (ML) can assist reveal previously unrecognized characteristics of wireless networks, spot correlations and anomalies that we couldn't discover through visual inspection and offer novel approaches to enhance network deployments and operations (Nguyen et al., 2018:32329).

Cloud and AI in Telco:

A recent development in both IT and telecommunications is cloud computing. In essence, it is an adaptable and expandable online computing environment that includes service-

centric solutions to deliver affordable, on-demand network access to computing power and storage. While putting all of the complexity and intelligence (servers, storage, networks, apps, and services) in the cloud, it attempts to simplify networking and peripherals at the customer ends (Alcatel-Lucent, 2010b). According to Kundra (2011), cloud computing has five features: resource pooling, on-demand service, measurable service, broad network access, and quick flexibility. Self-service and on-demand provisioning of computing resources are provided via cloud computing, along with access to shared resources. These solutions can be accessed more quickly and with less administrative and management expenses and resources because they are part of a highly aggregated and shared resource pool. According to Hall (2010), it also provides far more flexibility and scalability in terms of upgrades and extensions (Zuhdi, 2012:76).

According to Qi et al., the first applications of AI in the telecom sector appeared in the 1980s and mostly utilized expert systems (2007). Applications of AI have been used to enhance the management and upkeep of telecom networks and services. Studies on AI applications in the telecom industry were sparked by this application. For instance, Macleish (1988) demonstrates how the first-generation expert system may support offline equipment diagnosis in the telecom sector. Muller et al. (1993) go over the advantages of using AI to address telecom issues. Seshadri (1996) provides an overview of the artificial intelligence (AI) technology and applications used by telecom operators and claims that these technologies can be used to address real-world issues in the telecom sector (Chen, 2019:15).

AI that is capable of thorough data analysis and information extraction opens up new possibilities for telecom networks. Telecom networks, which serve as the foundation for information exchange, offer tremendous scope and promise for the use of AI. According to Zhang & Lorenz (2018), integrating AI into the design, implementation, maintenance, operation, and optimization of telecommunication networks has emerged as a crucial issue for the telecom industry. This is because AI algorithms have the ability to perform powerful analysis, judgment, prediction, and other tasks (Chen, 2019:16).

Telecom companies offer AI services in addition to huge infrastructure for the global network of interconnected things. Telecom builds ecosystems for the data-driven

economy, according to Anuradha and Sharma (2017). (Chen, 2019:20). Leading telecom companies are currently using AI to process Big Data. Most businesses prioritize AI because it has the ability to enhance customer experience, enhance forecasting and sourcing, and optimize and automate network operations. The telecom operator is now a big data platform and carrier that supports the entire intelligent industry in the age of AI, rather than a simple industrial carrier and a simple industry descended from it (Chen, 2019:21).

The telecom sector can use artificial intelligence (AI) technologies for new digital services, user experience, network automation, and infrastructure maintenance. Customer service levels have a significant impact on customers' experiences and satisfaction for telecom carriers. To make sure that the client response is efficient and fast, the customer service system needs a lot of work. The development of artificial intelligence (AI) based on facial recognition, speech recognition, and NLP opens up new opportunities for telecom carriers in smart customer care. AI can assist telecom operators in being more efficient in terms of data routing configurations, predictive performance, and network performance monitoring (Chen, 2019:18).

Customer service chatbots

Customer relationship management systems can use artificial intelligence to automate customer support requests, route clients to the best agent, and route prospects with purchase intent to the salesperson. A chatbot using artificial intelligence (AI) natural language processing technology may comprehend the nature of the issue, search the pertinent knowledge base, and automatically answer for instant messaging, web page interaction, and other text-based customer support channels. AI-powered chatbots help speed up and scale customer assistance. The automated chatbot can provide several joint consultations, significantly lessen the workload of customer support staff, and improve the effectiveness of customer service (Chen, 2019:18). For instance, Vodafone introduced TOBi, the first real-time AI chatbot, in the United Kingdom before implementing it in Turkey. More than 70% of client enquiries are handled by chatbots, which offers quicker customer service (Chen, 2019:19).

China Mobile debuted "Yiwa," a self-created intelligent robot customer service, in 2016. It has natural language-based communication and service capabilities that can be used with more conventional channels like SMS and hotlines, WeChat, websites, and other Internet channels to address customer complaints, information requests, greetings, and other needs. This allows it to provide "24 hours" of online and "all-weather" service, as stated in GG-robot, and further improve the customer service experience (2016). According to CCTIME (2018), Yiwa has grown to be the largest intelligent interactive robot for customers around the world with monthly interactions over 200 million, equivalent to the workload of 1000 customer service agents, an accuracy rate of 93%, and a reach customer channel of over 170. (Chen, 2019:33-34).

Speech and voice services for customers

According to Sehgal, Agarwal, and Rai (2018), AI-based speech and voice services enable users to search for or buy media content by speaking instead of using the remote control. For instance, Chung, Park, & Lee state that Amazon's Alexa responds to smart home gadgets by acting first (2017). With the use of NLP, telecom operators hope to create a similar satisfying client relationship. Semantic speech analysis can also assist the quality control division in quickly identifying sensitive complaint keywords and handling client complaints and discontent. It denotes a significant volume of input on customer feedback, network issues, quality, and service. The amount of network and service problems are examined using techniques like NLP to help the network process and repair it. Speech recognition technology is used to transcribe a huge number of customer support calls. According to Kumar, Irsoy, Ondruska, Iyyer, Bradbury, Gulrajani, & Socher, NLP can also be used in conjunction with sentiment analysis technology to anticipate customer satisfaction, enhance customer service quality, and maximize the customer experience (2016). By deploying voice assistants, several telecom companies are marketing mobile chatbots (Chen, 2019:19).

Network monitoring and management

As any interruption anywhere on the telecom line can be very expensive, telecom operators must continue to check their infrastructure and equipment, including base stations, power lines, and servers. According to Xu, Xu, Cai, Jiang, Luo, & Gu (2017), they can guarantee the dependability and security of their networks in this way. In self-

healing networks, AI may search for patterns, discover, forecast, and localize anomalies or other network issues. It can also do preventative maintenance and monitor the condition of equipment. Even before customers are impacted, AI can take proactive measures to fix the service (Chen, 2019:20).

Prediction Models Using Machine Learning Algorithms in Telecom Industry

Numerous studies have looked at loss estimation using machine learning approaches in the context of mobile telephony. Churn is a crucial problem for mobile operators because it directly affects their ability to make money (Verbraken, 2013). It is typical for a service's profitability to be directly correlated with the expansion of its clientele (Choi, 2018:12). Huang (2012) provided seven methods (LR, LC, NB, DT, MLP, and SVM) for anticipating customer turnover (Choi, 2018:13). DT, ANN, KNN, and SVM data mining classification algorithms were tested by Keramati (2014) utilizing information from an Iranian mobile company. In Keramati's (2014) study, machine learning algorithms' precision performance was compared (Choi, 2018:14). Mobile operators struggle to identify the thresholds for service quality elements that determine consumer complaints when it comes to complaints from customers. Real mobile carriers will be able to use this to try to improve customer service if thresholds can be found using projected models (Choi, 2018:56).

5.5 ARTIFICIAL INTELLIGENCE IN TURKEY

According to Meschi, Taymaz, and Vivarelli, technology adoption from more developed countries efficiently serves as a channel for technological upgrade, hence Turkey demonstrates favorable technological adoption and trade openness, especially with European Union countries (2011). It is a significant trend since Turkey must stay up with the advancement of technology on a worldwide scale. According to Dede & Akçay (2016), while advanced military and space technologies have received the majority of technological investments, other sectors must also be developed and public awareness must be increased (Rahimov, 2019:12).

The application of artificial intelligence in the financial services industry is still in its infancy. AI will permeate additional areas of finance, which will present new hurdles in the form of economic, social, legal, and ethical issues. The global financial ecosystem will also continue to get more complex as a result of AI. AI algorithms will become more

complicated as data availability and computer power both grow (Buchanan, 2019:29). Technology advancements are altering how the finance function generates value. Financial leaders should therefore attempt to comprehend developing technologies in order to choose the best moment to invest in and test new advancements (Ernst Young Report, 2017:5). Future corporate environments may frequently experience uncertainty and swings. For multinational corporations, particularly those whose activities are becoming more globalized, problems might come from pressure on natural resources, more frequent and severe climate disasters, and increasingly sophisticated cyberattacks. CFOs should continually assess future-proof and adaptable analytical tools with the goal of enhancing the performance of their firms in a number of areas (Ernst Young Report, 2017:5).

Financial institutions have started to recognize the benefits of artificial intelligence in lowering costs and increasing revenues, identifying fraud, and enhancing customer experience, as highlighted in Türkiye AI Platform. Banks and other financial institutions are focused on the potential of this technology to improve their operations and better anticipate the goods that will be supplied to clients in Turkey. Financial firms have enjoyed a substantial edge since the beginning thanks to the use of big informational databases and analytical technologies. Applications to banking administrations are now more easily executed thanks to information from payment systems. Consumers trust their banks with their personal information in 67% of cases, according to Accenture's Turkish Banking Sector Research (2019), and 63% of private banks' personal recommendations to customers (such as predetermined loan allocations, market-specific interests, etc.). Turkish banks are already beginning to satisfy this customer demand (Öztürk, 2019:18).

When the topics chosen by CFOs for the future finance function are examined by Ernst Young Consultancy, big data and analytics come to the fore for managers in Turkey. (Ernst Young Report, 2017:6). Automation creates an opportunity to take financial activities to the next level. 58% of respondents in that survey think that 'the latest technology should be combined with process improvement'. Especially reducing waste, standardizing methods, standing against bureaucracy in the name of flexibility, automation in large and complex global organizations are even more important on the agenda of CFOs (Ernst Young Report, 2017:6).

While Global Finance Leaders see the handling of the newest technology together with process development as their focus, we have seen that this rate is lower in Turkey than in the global business world: Finance managers from Turkey who participated in the research stated that they will carry out process improvements by focusing on the latest technologies in the %44 ratio. They found that financial managers participating in the research consider process improvements together with the latest technologies (Ernst Young Report, 2017:7).

Artificial intelligence systems can adopt information and instructions, learn from their interactions with humans, and respond fluently to new situations and questions. In addition to following the rules, artificial intelligence also complements technologies such as RSO, with its ability to distinguish ongoing trends and adapt to new situations using its learning ability. For example, rule-based automation approaches often encounter exceptions to defined processes. Artificial intelligence can overcome these exceptions by targeting where necessary. Because of these features, artificial intelligence plays an important role in shaping the finance function of the future (Ernst Young Report, 2017:8).

The primary element that will guarantee an unbroken and secure existence is a high-quality connection infrastructure. Since there are more linked devices and network traffic, the telecoms sector must keep up with other industries (KPMG Report, 2018:3). Investments have a direct impact on customer experience, which in turn has a direct impact on market shares (KPMG Report, 2018:3). The rigorous examination of this data and its incorporation into the system are prerequisites for all the solutions that will propel the telecommunications sector into the future. All cutting-edge solutions are built on a foundation of big data analysis, cloud computing, Internet of Things, artificial intelligence, mobile technologies, and artificial intelligence (KPMG Report, 2018:3).

While new technologies are a threat to the telecommunications industry, they also bring opportunities. In the KPMG Disruptive Technologies in Telecommunications Industry 2017 Survey, we see that companies are eager to use disruptive technologies to improve their products and services, reduce costs and gain an edge over their competitors. Measured based on data and insights from the research, disruptive technologies were evaluated using three different metrics: Impact on operations, impact on business models,

and level of investment needed. The 'Disruptive Technologies Map', which has been created by combining these three metrics in a single framework in Figure 8, helps telecommunications leaders to guide their investment decisions for disruptive technologies. It also allows companies to evaluate their own situation against their peers to prioritize different disruptive technologies as shown in Figure 8 (KPMG Report, 2018:22).

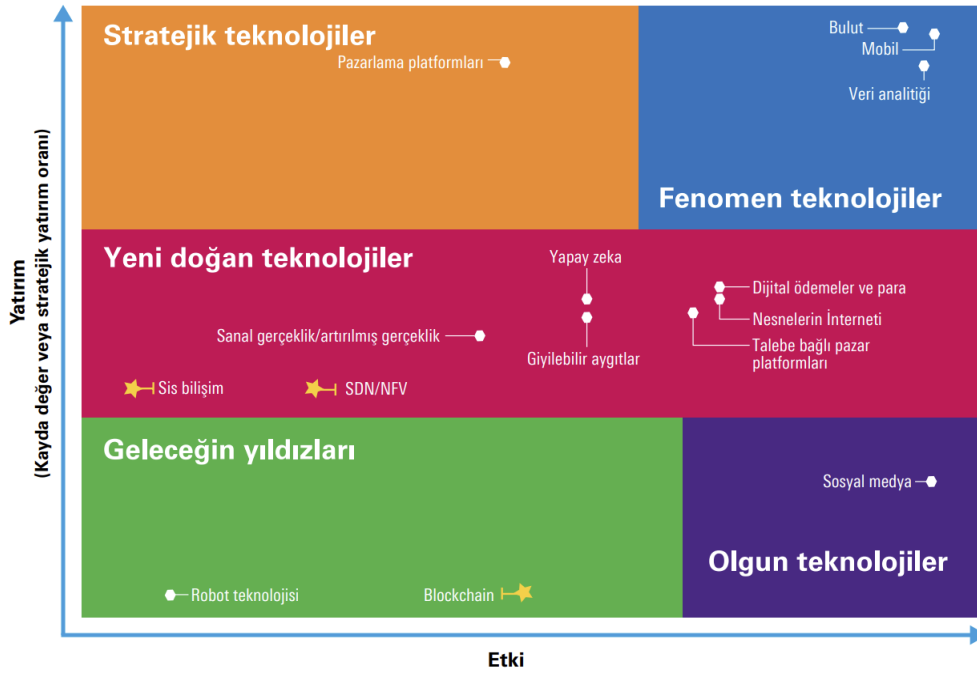


Figure 8: Disruptive Technologies Value Map Chart

Source: (KPMG, 2018)

1- Phenomenal technologies: Today, a lot of investment is made in destructive technologies, which are called phenomenal technologies, and these technologies are extremely effective. In telecommunications, mobile, cloud and data analytics represent phenomenal technologies. For many telecommunications companies, it represents the future of the 5G mobility and cloud capability product line, and possibly a strategic investment. These companies are at the forefront of developing and selling these technologies. Therefore, great importance is attached to the use of data analytics to develop the work to be done in this field and to commercialize the product groups in question (KPMG Report, 2018:23).

2- Mature technologies: Social media has entered the maturation period for telecommunications companies. Social media can provide crucial real-time feedback on network performance; It can provide insight into many strategic and operational decisions, bringing a perspective to customers and regulatory stakeholders (KPMG Report, 2018:23).

3- Strategic technologies: Those who seek stronger impact for tomorrow are making significant investments in strategic technologies today. The appetite for investment in these technologies is high, but the impact is still moderate to low. Marketing platforms that provide customer targeting services in the cross-selling of telecommunication services, improve conversion rates and reduce subscriber movements, have developed day by day in parallel with technology and have become a vital tool for telecommunication companies in a very short time. Backed by powerful datasets and detailed analytics, this capability should help telecommunications companies gain competitive advantage as they embark on content and other new services (KPMG Report, 2018:23).

4- Emerging technologies: Moderate investments are made in emerging technologies, and these technologies have started to have a medium impact again. On-demand sales channels, Internet of Things, wearables, and virtual reality/augmented reality technologies are all in their nascent stage in the telecommunications industry (KPMG Report, 2018:23).

5-Stars of the future: Investments in technologies, which are called the stars of the future, are at a low level, and their effects on business models have not yet started to form and appear (KPMG Report, 2018:23).

It is thought that besides their traditional business models, telecom companies will develop new products and services by cooperating with companies from different sectors, and with these products and services, they will focus on technologies that create experiences that transform customers, rather than just responding to the current needs of their customers (KPMG Report, 2018:25). Use of Internet of Things and artificial intelligence as well as data analytics; It creates an opportunity for businesses to transform

the market in which they operate and to get ahead of their competitors by using these disruptive technologies (KPMG Report, 2018:25).

Numerous drivers and innovations in the corporate world have given manufacturing and consequently society a direction. According to the report by TUSIAD - Turkish Industry and Business Association (TUSIAD, 2016) with reference to Boston Consulting Group (2016) (Gürsev, 2019:28), these are summarized in Figure 9. The business world started to take on a variety of patterns that can be classified under four broad themes, as seen in Figure 9.

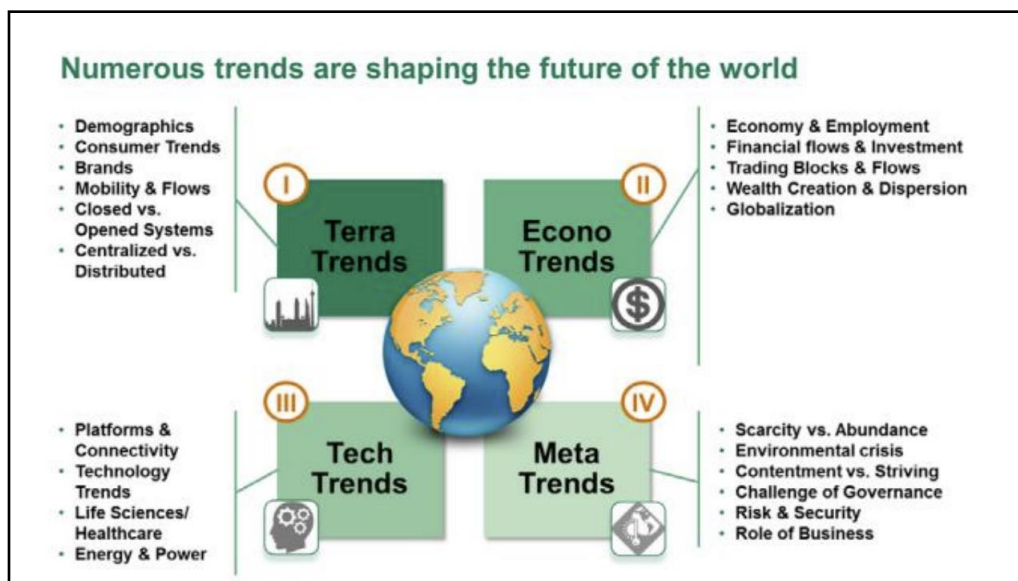


Figure 9: Various streamlines of economies affecting business.

Source: (Boston Consulting Group, 2016)

- Regional trends: Increased international trade and social engagement.
- Economic developments - Growing, powerful economies accelerated globalization by increasing the flow of financial resources.
- Increasing connection and the growth of platform technologies are two current technological trends.
- Metatrends: Kagermann (2014) noted dwindling resources and rising environmental and safety concerns (Gürsev, 2019:28).

These changes call for a linked value chain that extends beyond a single organization and includes sensors, equipment, work items, and IT systems. In order to foresee failure,

configure themselves, and respond to changes, these interconnected systems must communicate using industry-standard Internet-based protocols and data analysis. To achieve this goal, Industry 4.0 wants to make it possible to prepare and evaluate machine data. This enables higher-quality products to be produced through quicker, more effective, and more adaptable procedures. According to Schlick (2014), it will result in increased production efficiency, more industrial growth, a healthier economy, and a new labor profile (Gürsev, 2019:28).



6 VARIABLES IMPACTS BETWEEN STRATEGY, ARTIFICIAL INTELLIGENCE AND PERFORMANCE

In this chapter, independent, dependent and mediator variables are analyzed to determine if there are any impacts on each other and examine the previous research through this perspective.

According to Council on Competitiveness (1991), Franko (1989), Fusfeld (1989), Mitchell (1989), and Fusfeld (1989), the basic importance of technology in determining market performance is becoming more widely acknowledged as businesses adapt to global competitiveness. Companies have boosted their use of cutting-edge technologies as well as the introduction of technologically advanced products as a result of this acknowledgment. Companies have been made aware of the necessity to create technology policies that are suited to or consistent with business strategy by Clark and Hayes (1985), Collier (1991), and other authors due to these shifting practices. This alignment makes sure that a company's technological resources and capabilities are successfully utilised in line with the goals of its business plan. According to Porter (1985), this efficient use of technological resources contributes to the development of a long-lasting competitive edge that enhances a company's financial performance (Zahra and Covin, 1993:451).

My research focuses on how business decisions made using artificial intelligence technologies can lead to better corporate performance. It implies that high-performing businesses will choose AI technologies that give them a competitive edge. In light of the intense worldwide rivalry in today's marketplaces, the results show how crucial the interface between technological and business strategy elements is for a company's success.

6.1 IMPACT OF CORPORATE STRATEGIES ON ARTIFICIAL INTELLIGENCE

Adler (1989) defines the business strategy as the long-term plan of action that a company can follow to achieve its goals. Technology policy covers the choices companies make in acquiring, developing, and applying technology to help them achieve the goals of their

business strategies (49-OK- Zahra and Covin, 1993:452). The literature agrees on three generic benefits of computing technology that generate competitive advantages:

- a. the efficient information flow between managers
- b. the ability to quickly evaluate large amounts of information.
- c. the ability to share this information efficiently (O'Brien, 1983).

In this way, the costs can be expanded across products and markets so that the final level of benefit achieved by the firm is effectively leveraged. Each of these capabilities is important, but subject to the pre-existing trends of each firm. The key to success is to match the firm's trend strengths with the right type of technology implementation model that will reinforce the positive aspects of a business model and highlight or eliminate weakness (Addicott, 2000:48).

Integrative, normative models that forecast harmony between many aspects of technology policy and corporate strategy have been presented by a number of scholars (Zahra and Covin, 1993:453). The literature emphasizes the necessity of corporate strategy and technology policy being in alignment. According to Porter (1983), "fit" means that decisions about company strategy and technology will be complementary and hence support one another (Zahra and Covin, 1993:452). As highlighted by Kantrow, many authors have claimed that technology and strategy are strongly related (1980). According to Abernathy and Utterback, this connection has a well acknowledged complicated, multivariate, non-recursive structure (1978). Three studies create typologies of technology-strategy gestalts in an effort to make sense of this complexity. These are the works of Miles and Snow (1978), Ansoff and Stewart (1967), and C. Freeman (1974) (Miller, 1988:240).

Studies by Abernathy and Utterback (1978) and Utterback and Abernathy (1982) have been linked to innovation rates and strategy (1975). This research team has connected innovation patterns to the production techniques used, the firm's capital intensity, the dominant type of R&D, the achievable level of product differentiation, market share achieved, the practice of backward integration, and the level of intra-organizational coordination necessary—all factors that are important to strategists. According to Hofer

and Schendel (1978), the degree of technological change in an industry as a whole affects strategy in a significant way. New product development is a sort of innovation that contributes to technical change. Two very different theories of strategic momentum—one conservative and the other entrepreneurial—by Miller and Friesen (1982) have demonstrated how strategy and innovation are intertwined (Miller, 1988:241).

Similar methods are used by Porter (1983) to establish connections between company strategy and technological policy. In general, these studies have influenced how people think about how technology and strategy interact (Zahra and Covin, 1993:453).

Candidates prioritized product innovation more than Defenders, according to Hambrick, MacMillan, and Barbosa's (1983) analysis of the relationship between the intensity of product innovation and business strategy (defined in terms of the Miles and Snow (1978) typology). By offering empirical testing of the performance impacts of alignment between specific characteristics of technology policy and business strategy, this study and others like it have advanced the discipline (Zahra and Covin, 1993:454).

Pybun (1983) states that due to increasing opportunities, formulating Information systems strategy has become more complex in terms of matching the strategic needs of an enterprise with appropriate systems activities. He points out that the growing importance of aligning business and IS strategies are increasing for three reasons:

- 1) increased competition requires greater efficiency,
- 2) the use of IT to create connections with suppliers and customers, and
- 3) IT becomes more integrated with products and services such as banking.

He argues that IT strategy derives from business strategy and that the two are so much linked. Effective strategic IT planning is therefore the process of building consensus on the role of IT among business and IT units within the company to identify the resources to be committed to achieve this role (Pierce, 2002:48).

The best illustration of this conceptual research comes from Maidique and Patch (1988). They begin by outlining the six components that make up a technology policy: the kind

of technology, the desired level of expertise (closeness to cutting-edge technology), internal vs. external sources of technology resources, R&D investment, the timing of technology introductions, and the R&D organization. After that, the writers categorize company strategy into four groups: go-to-market, market segmentation, first-to-market, and second-to-market. The authors also recommend that IT policies be in line with business strategy (Zahra and Covin, 1993:453).

Mintzberg (1994) states that the strategic plan is the result of a very long series of discussions and analyses. It provides the ability to trace the line of reasoning. It provides the ability to trace the line of reasoning, drill down to primary evidence, quickly and easily find where IT resource needs are. Boar (1994) states that the tight coupling between business and Information technologies assets allows companies to better manage business needs, technological changes, and competition (Pierce, 2002:48).

Business strategy is a business driver, according to Clayton Christensen (1997), and IT strategy is a facilitator (Pierce, 2002:47).

According to Robert Craig's (2001) research, when an organization needs to make a decision to address a complicated issue, it typically consults specialists for guidance who have sufficient knowledge of the issue's nature and are aware of the potential solutions as well as their pros and cons. The study's findings also showed that expert systems are decision-making systems or any computer or software for solving problems, any computer or software that can achieve a certain level of performance, particularly that equals or even exceeds the performance of human experts in certain fields of expertise, and expert systems are inherently an applied branch of artificial intelligence with specific applications in medical diagnosis, metal prospecting, and other fields. Expert systems also dominate some very complex applied fields, including the administration of systems' real estate, electricity, business strategies, and fault analysis (Al-Sukkar et al., 2013:4).

The goal of Saleh and Faten's 2009 study is to ascertain how using artificial intelligence and emotional intelligence techniques can affect decision-making. Since the administrative manager cannot make independent decisions using AI tools and methods due to the diversity of administrative duties and levels, the study found a favorable

relationship between the application of artificial intelligence methods and the quality of administrative decisions. Although the results show a favorable statistically significant association between the type of smart program and the quality of decision making, they also indicated that, in contrast to other traditional systems, the smart program will produce high quality administrative decisions (Al-Sukkar et al., 2013:4).

Economic growth has been evaluated by economists across time in terms of measures in the two main production components, labor and capital. Generally speaking, an increase in either labor or capital is what economic growth looks like (Kendrick, 1975). Total Factor Productivity (TFP), which assesses the impact of technology and other advances on the economy, is also a crucial indicator of economic growth (Hulten et al., 2001). Traditional factors of production, according to Purdy and Daugherty (2017), can no longer guarantee economic advancement. Purdy and Daugherty (2017) noted that this is the reason why AI systems have the ability to drive TFP and be introduced as a new element of production that will soon cause massive economic transformations. As a matter of fact, Purdy and Daugherty (2017) suggested three methods AI might spur economic growth: (a) creating a virtual workforce; (b) growing labor alongside physical capital; and (c) raising Total Factor Productivity (TFP) (Almarzooqi, 2019:43).

Intelligent robots have the potential to totally automate or supplement complex human work in a variety of fields, which will considerably boost productivity and promote global economic expansion. The incorporation of AI technology, according to Autor (2015), not only boosts overall productivity but also frees up enterprises to concentrate on launching new goods, services, and innovations. To maintain economic growth, this will in turn play an even more significant role in raising Total Factor Productivity (TFP) (Almarzooqi, 2019:44).

Performance is impacted by the harmony between control systems and IT spending in diversified firms, which is why we may say that the two factors interact to affect performance. It might be claimed that increasing IT spending will align with strategic controls because they demand a rich flow of information between business executives and divisional units. Generally speaking, IT can improve employees' ability to communicate with one another, share information, and so coordinate actions and choices.

For efficient strategic controls in diversified firms, a certain degree of investment in information and communication technology becomes necessary in this situation. But managers' cognitive limitations need for a wide range of forms (Liu, 2009:10-11). According to John & Harrison (1999), the use of synergistic firm resources and capabilities across lines of business may not result in performance gains in related diversification unless the advantages outweigh the costs, the latter of which take the form of administrative burdens in coordination and control between business units. Theoretical and empirical studies, such as those by Dewan, Michael, and Min (1998), Gurbaxani and Whang (1991), Hitt L. M. (1999), Malone, Yates, and Benjamin, have demonstrated how IT dramatically lowers coordination costs within businesses (1987). IT can also be utilized to improve the performance of strategic controls that are in line with the pertinent diversification plan. According to Clemons & Row (1991), technology can be leveraged to lower the costs of linked diversification while also increasing the advantages of the diversification approach. Tanriverdi (2005). Relevant diversification and strong performance must drive IT spending (Liu, 2009:12-13).

According to Jarvenpaa & Ives, a multinational corporation trying to coordinate global operations, spread innovation globally, or provide integrated services to a global corporate customer can benefit from global information technology infrastructure (i.e., shared computer hardware, software, and data communications across national borders) (1993). It has been suggested that IT can help with two key advantages of regional diversification: obtaining economies of scale/scope and leveraging intangible assets globally. The first characteristic of regionally diverse enterprises is their dispersed and heterogeneous markets. According to Stephens, multinational businesses can benefit from lower costs for conventional inputs like labor and raw materials (1999). IT enables businesses to source raw materials electronically from all over the world at lower prices, allowing them to enjoy economies of scale and scope. Second, the internalization theory contends that knowledge-intensive and international intangible assets like patents and technological know-how are disseminated. Bühner (1987) asserts that a company can produce abnormal returns by exploiting its firm-specific assets, particularly intangible assets, in foreign markets. IT can improve cross-national coordination of knowledge-intensive operations like R&D (Liu, 2009:14-15).

The high market capitalizations of businesses that create and/or use AI point to the fact that investors value these businesses highly. The financial market will treat a company fairly if the receivables secured by its assets are publicly traded and the markets are functioning efficiently (Brynjolfsson et al., 2017:35).

Which industries are driving growth and change in global markets? Both electronics and computers are the least localized; and as a group, they are growing faster than all other industrial groups combined. Much of the investment in information technology by the world's largest companies is focused on infrastructure – the implementation of enterprise-wide software that allows the creation of hardware, networks, and optimization of business applications worldwide (Addicott, 2000:14). A number of businesses are employing AI strategically to improve the effectiveness of their operations and/or to market AI systems as new products. The theory of strategy-structure linkages can be used to analyze how management, organizations, and AI interact in these businesses (Duchessi et al., 1993:157).

A literature summary showing the link between strategy and technology and Artificial intelligence as a component is shown in Table 2.

Table 2. A Literature Summary Showing the Link Between Strategy and Technology and Artificial intelligence as a Component

Writer	Subject	Focus Area
Shan (1990)	An empirical examination of organizational strategies used by innovative high-tech companies	- competition and technology life cycle - product diversity - strategic alliances
McCann (1991) Feeser & Willard 1989)	Growth: Specific Technology-Based Determinants	- incubator factors - technology-related intensive marketing
Cardozo & Ardishvili (1994) Cardozo, Reynolds, Miller & Ardishvili (1993)	Growth: Geographic expansion and Product-market combinations	- growth / profitability dependents - stage of the firm technology
Zahra and Covin (1993)	Business strategy, technology policy and firm performance	- low marketing and narrow focus - aggressive technology posture - automation/process innovation - new product development
Dvir, Segev & Shenhar (1993)	Miles & Snow's typology and technology dependency	- monitoring technological innovation - adopting technological innovation

Herman (1998)	Technology Strategies in the US Electronics Industry	- technology policies - content of the strategies and the processes
Milova (2001)	Exploring Strategic Role of IT from the Perspective of Ansoff's and Porter's Generic Strategies	- strategic alignment of information technology
Pierce (2002)	The effect of business and information technology strategic alignment on information technology investment returns and corporate performance	- business strategy - IT strategy - alignment and ROI and company performance
Giguere (2004)	High-Growth Strategies of entrepreneurial firms in technology industries	- high-growth entrepreneurial firms and the strategies - venture strategies
Liu (2009)	Diversification and Firm Performance	- exploring the moderating effects of Information Technology spendings
Liu (2009)	Corporate Growth Strategy and Firm Performance: A Contingency Perspective	- diversification - moderating Role of IT in Strategy
Dederichs (2010)	Growth: Implementing an External Growth Strategy within a Subsidiary	- intended corporate-wide external growth strategy into practice in the subsidiary of a multinational corporation - technology platforms to leverage the synergies across diverse business operations
Kouakou (2013)	Examining the moderating effect on the relationship between strategic alignment maturity and information technology effectiveness	- enterprise corporate business strategy - IT governance - strategic alignment
Al-Sukkar et al. (2013)	The Effect of Applying Artificial Intelligence in Shaping Marketing Strategies	- cost leadership - differentiation - alliance - diversification
Huie (2014)	Decision and Technology: Perceptions of Business Intelligence Professionals about factors related to Business Intelligence Input in Decision Making	- intelligent decision support systems - business intelligence
Makridakis (2017)	AI Revolution - Impact on society and firms	- companies growth analysis with AI
Chen H. (2019)	Sustainable Growth: Success Factors Impacting Artificial Intelligence Adoption Perspective from the Telecom Industry in China	- AI adoption factors

Source: Prepared by author

6.2 IMPACT OF CORPORATE STRATEGIES ON COMPANY PERFORMANCE

The ability of a company to preserve its competitive advantage and lower operational costs through growing revenues and market shares is how business performance is gauged (Pierce, 2002:80). According to Porter, strategic groups offer a valuable frame of reference in between examining each firm individually and viewing the sector as a whole (1980). The emergent idea of a strategic group of businesses, according to Schendel & Hofer (1979), offers a framework for responding to recent empirical arguments that "strategies differ among organizations and that superior strategies make a difference in performance results" (Dess and Davis, 1984:468). The classification of all competitors' strategies in an industry is believed to be possible using Porter's framework of overall strategies and competitive dimensions (Dess and Davis, 1984:469).

It is evident that organizational theory and strategic management, as indicated by Murphy et al. (1996), encompass the majority of research on company strategy formulation, firm performance, performance assessment, and the relationships between them (Eraslan, 2014:28). Due to a number of factors, including the Industrial Organization Economics-based interest in connecting strategy with measurable performance and the Strategic Management Association's pursuit of more quantitative, empirical research, as mentioned by Hoskisson et al. (1999), Montgomery et al. (1989), Pettigrew et al. (2002), and Spender, positivist research paradigms have dominated the field of strategic management (1992). Similar to this, Rumelt (1974) publicly investigated how company strategy and financial success are related (Dederichs, 2010:12).

Meyer & Roberts (1984) found that firms with limited products and markets grow faster than firms that focus only on the original product and market combination and firms that diversify into unrelated products and markets as stated by Cardozo, Reynolds, Miller & Ardishvili (1993). In addition, Feeser & Willard (1990) worked on 39 high-growing and 39 low-growing small firms in the electronic computing equipment sector. Their results support the argument that a focus on product-market strategy has high growth potential. They also found that the "founding strategies of high and low growth firms differed systematically among the firms studied". Specifically, high-growth firms are more likely to maintain their original product and market focus and to earn substantial revenues from

foreign markets than low-growth firms (62- Giguere, 2004:43). In technology-based sectors, product-market strategies are specifically important. Competitive technology strategies are defined as the faster time-to-market of technical skills and capabilities as clarified with many writers e.g. Friar and Horwitch (1985), Mansfield (1988), McCann (1991) (Giguere, 2004:44).

Young and Selto (1991) argue that strategy ultimately affects external performance, e.g., market share, stock price. Strategy provides direction that helps firms develop their long, medium and short-term plans and, in turn, defines the actions necessary to implement those plans. These actions include processes, accounting, and control systems, etc. Effective implementation of plans leads to expected internal results (e.g., efficiency, quality, etc.) that later translate into external performance (Kalagnanam, 1997:26).

Porter (1996) indicates that companies operating in a highly competitive environment are under extreme pressure to continuously improve both their products and operations. In today's business, it is not enough to sustain competitive advantage by positioning or operational efficiency alone. Competitors can easily copy or duplicate activity or simulate and eliminate temporary or very short advantage windows. Corporations must continuously benchmark their operations to monitor and improve their competitive position. Managers should find the required matters to outsource tasks to achieve efficiency and maintain core competencies. Links provide interdependencies between the value chain and its suppliers and channels in addition to connecting value chain operations within a company. A business can gain a competitive edge by coordinating or maximizing these external linkages (Pierce, 2002:82).

To identify the best high-growth strategies, Ireland & Hitt (1997) analyzed High-Growth-Business firms from a random sample of 118 firms. They found that only cost leaders and high-quality strategies were positively associated to growth (Giguere, 2004:36). Fast growing companies can derive many benefits from rapidly launching new products or technologies, such as surprising the competitor, exploiting the competitor's weakness, helping to improve competitive momentum, gaining market share and greater legitimacy, improving customer loyalty, accessing to capital as argued by Deeds & Hill (1996), Ireland & Hitt (1997). This observation supports Covin & Slevin's (1997)

“complexity management model of firm growth”, which suggests the need for rapid and broad-based actions that restore their firms’ compliance with the environment while also creating effective internal organizational system alignments (Covin & Slevin 1997) (Giguere, 2004:37).

Upton, Teal & Felan’s (2001) found that out of 65 fast-growing family businesses that supported the above results, 66% chose the high-quality product strategy (differentiation) (Giguere, 2004:36).

Researchers argue that high-tech firms should try “breakthrough innovations”, which are entirely new products or services in existing or new businesses, mentioned by McCann (1991). The results obtained by McCann’s (1991) from his review of 100 high-tech firms show that “the highest performing enterprises pursue internal innovation through R&D for product breakthroughs” (Giguere, 2004:45). Easingwood & Beard (1989) identified four general go-to-market strategies using a sample of 14 high-tech firms as stated by Covin, Slevin & Covin (1990). Feeser & Willard (1989) also pointed out the firm can collaborate with other manufacturer’s by sharing its technologies, position its product in the market by adopting certain innovations, gain market support by building a winning reputation or reduce the risk of adoption by experimenting without purchasing (Giguere, 2004:45).

Table 3 below concisely presents examples of studies reflecting the strategy-performance relationship available in the strategic management literature.

Table 3. A literature summary showing the link between strategy and company performance.

Writer	Subject	Focus Area
Kalinowski (1987)	An empirical analysis of executive continuity and performance	- diversification level and firm performance
Katz (1991);	Downsize strategy and performance: Narrow scope of customers	- debate regarding its profitability - targeted segment of geographic market localized business operations
Feeser & Willard (1990)	Growth: Incubators and Performance: A Comparison of High- and Low Growth High-Tech Firms	- relationships between dimensions of strategy for new firms and performance - incubator factors, such as the incubator’s technology specializations

Ibrahim A. (1990)	Strategy types and small firms' performance: an empirical investigation.	- regards to innovation, technology's key role in the innovation process in the new knowledge-based economy
Slater and Narver (1993)	Analysis of Miles and Snow's Strategy Types and Performance	- low cost - differentiation - market focus
Dowling & McGee (1994)	Business and technology strategies and new venture performance - a study at telecom	- the implications of technology and business strategies on the performance of new ventures
Kalagnanam (1997)	The use of nonfinancial performance measures and their relationship to strategy: Prospector, defender and analyzer firms	- influence of nonfinancial performance measures on their actions/decisions - prospector, defender and analyzer firms
Booth, Philip (1998)	The role of information technology and competencies of the company for competitive advantage	- strategy - IT use - business performance
Pelham (2000)	Relationship between market orientation, growth/differentiation strategy and performance	- the relationship between performance criteria and choice of strategy, firm size and industry characteristics
Milova (2001)	Exploring strategic role of IT from the perspective of Ansoff's and Porter's generic strategies	- technology use and its impact on performance - growth industries and attention to the development of strong technological architecture to support differentiation strategy - IT's impact on their business strategy.
Pleshko and Soulden (2002)	The profit effects of product-market growth strategy: A financial services example	- growth strategies focusing on new market segments and profitability
Giguere (2004)	High-growth strategies of entrepreneurial firms in technology industries	- new venture strategies associated with higher growth - complexity of strategy patterns and the different high-growth strategies to use across time
Chari et al. (2008)	The Impact of Information Technology Investments and Diversification Strategies on Firm Performance	- impact on IT investment on firm performance - levels of diversification

Source: Prepared by author

6.3 IMPACT OF COMPATITIVE STRATEGIES ON ARTIFICIAL INTELLIGENCE

In today's business environment, due to the impact of business practices and strategy and the critical role of information technology on business strategy success, information systems are treated as primary activities in an organization and can play vital roles in the value-added chain and business process as informed by McPhee & Wheeler (2006) (Bani, 2011:50).

Innovational rivalry is fierce during the commercialization of developing technology. There is frequently a large incentive to be the first innovator when the first-mover advantage is significant and patenting is likely to happen. When an innovation is produced, the inventor must launch it as soon as feasible since, in the absence of such action, imitators or better and more advanced developments could quickly undermine the innovator's monopoly position. Competition shortens inventions' anticipated commercial life and accelerates the rate at which they spread, reducing their favorable value. A partnership has the potential to boost a business involved in the commercialization of developing technologies in two different ways. A company can acquire a first-mover advantage, hasten the launch of new products, and keep competitors at bay through cooperative relationships. As a result of imitation, the technology's lifespan will be shortened, but it can also increase revenue (Shan, 1990:131). New product advancements are required by markets and consumers swiftly. To speed up the development of information technology, marketing departments frequently do not receive the information required to generate new products. Consequently, the requirement for an automated market intelligence system is increasing. As indicated by VanDoren (1995), it is crucial to reassess the changes and update company strategy to continuously flow with market intelligence as technology advances step-by-step and extensive industry consolidations alter the competitive landscape (Grooms, 2001:77). Businesses that prioritize the cost leadership aspect of their company strategy frequently strive to outperform their rivals on a crucial variable that results in a long-lasting competitive advantage, a low-cost position. Additionally, businesses who take an aggressive attitude in terms of technology frequently try to set up a scenario where, via their proactiveness, they can acquire a special competitive position based on their technological capabilities. Therefore, even while the precise ideas of these two concepts—cost leadership and

technology positioning—may differ, they could be a part of a bigger framework that reflects a company's ambition to establish a distinctive market position. However, it is anticipated that a strategic cost leadership move will be positively connected with an aggressive technical approach. According to Dess and Davis (1984), improved empirical research demonstrates that cost leadership depends on the efficient application of process technology to produce economies of scale (Zahra and Covin, 1993:458).

The large amount of information available to the management that needs to be read and taken into account causes the decision makers to make mistakes or not read and consider information anymore due to such a large amount of information leads to errors in decision-making. With the development of information technologies and information sciences, the amount of information has increased dramatically, causing many difficulties for decision makers due to huge amount of information they have at their disposal, as well as reducing uncertainty (Klepik,xx:706). However, managers need to make a planned and continuous work in order to avoid the confusion created by the abundance of data and information resources, large amount of information, the time spent on collecting them, energy, money and other resources, transforming this information so that they will get a new, enriched product called intelligence, in such a transformation process knowledge represents a raw starting material and intelligence is the final product. The process of transforming knowledge into intelligence can be explained if intelligence is viewed as a product of knowledge that has been pre-selected, analytically processed, evaluated, reconstructed, and repackaged to be used for immediate decision making, solving a particular problem. And a certain level of needs of managers who cannot otherwise obtain it or use it in many documents or in a form found in its original form. Figure 10 shows the data processing process and info transformation to intelligence (Klepik, xx:706-707).

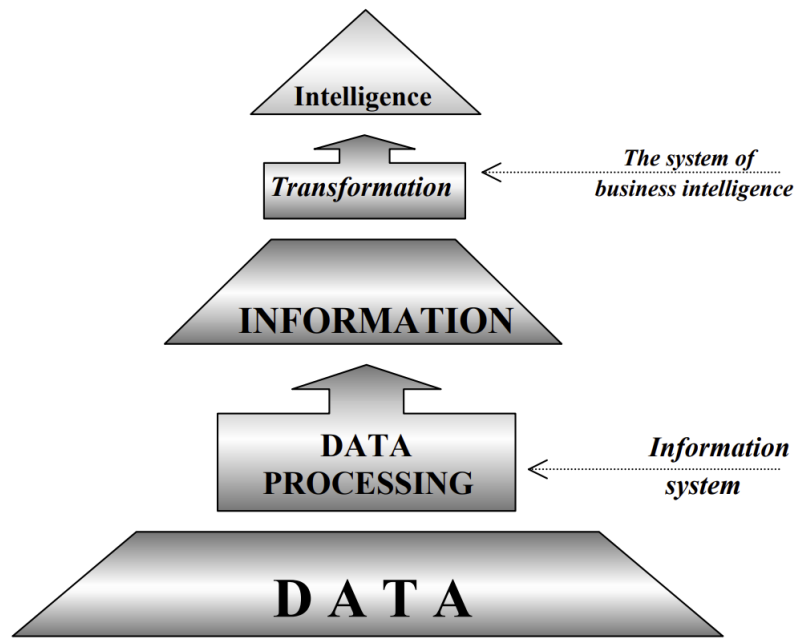


Figure 10: Presentation of the data processing and the transformation of information into Intelligence

Source: (Klepicić, xx:706-707)

According to Daniels (1994), the common point of information technologies that contribute to competitive advantage is that they are designed and implemented to reduce costs, improve differentiation, or change the scope of competition (Galal, 1997:15).

The use of technology as a competitive advantage was strongly influenced by early theoretical and conceptual frameworks by many researchers such as Ives and Learmonth (1984), Wiseman and MacMillan (1984), McFarlan (1984), Rackoff, et al. (1985), Porter and Millar (1985), Bakos and Treacy (1986), Johnston and Vitale (1988), Cash, et al. (1992). Many researchers have used case studies to demonstrate the strategic impact and benefits achieved through IT practices (Pierce, 2002:84). The strategy management literature contains a significant amount of work on the links between strategy and firm performance. Various authors, such as Leonard and Barton (1992), Snow and Hrebiniak (1980), and Ford (1988), have written about the importance of technology role as a basis of competitive advantage and how it can play in creating core competencies. Selznick (1957) is generally credited with developing the concept of core competencies in companies (Herman, 1998:25).

Parson (1983) identified three levels of interaction where IT can be used for competitive purposes: company level, strategy level, and sector level. The Parson framework was based on Porter's five forces model as well as other general business strategies such as cost leadership and differentiation. According to the framework, IT influences the nature of the industry's products and services, the product life cycle, and the speed of product deployment. The primary way is to change the factors that affect the economy of production, such as flexibility and standardization, and economies of scale. This in turn leads to a change in overall market demand, degree of segmentation, and geographic distribution potential. Parson's framework is one of the first to highlight linking IT to firm level strategy as a core part of an organization's business model (Galal, 1997:17).

Rumelt (1984) mentioned technological developments as the key source of economic rents and linked them to insulating mechanisms (patents and knowledge) that firms use to capture and maintain these rents (Herman, 1998:25).

One of the first theoretical frameworks for analyzing the strategic effect of information systems was presented by McFarlan in 1984. He proposed to consider several key matters to assess the strategic effect of information technology.

1. Change the basis of competition by allowing cost, product differentiation, or market expertise advantages,
2. Create new products by allowing existing products to be tailored to specific customer needs,
3. Improve product quality and distribution. Additionally, information systems operating in an inter-organizational network can shift the balance of power between buyer and supplier organizations strategically (Milova, 2001:8).

Porter (1985) contends further that any position of cost leadership or differentiation is significantly influenced by the technology a firm uses or develops, and in particular, that a firm's ability to pioneer and maintain technological change in its industry ultimately creates a sustainable competitive advantage. Furthermore, as a company's technological capabilities influence its capacity for R&D, these capacities ought to enhance that company's competitive edge. The positive relationship between a firm's cost leadership

strategy and performance, for instance, can be strengthened if the firm also possesses significant technological capabilities. For instance, technological capabilities will allow the company to manage more effective production processes and reduce production costs, the product's material content, simplify logistics, and/or improve economies of scale (Porter, 1985: 178). Similar to how improved product quality, added features and value, or improved economies of scope boost the competitive advantage of the differentiator, greater technological skills (Ortega, 2008:1275).

IT, according to Porter and Millar (1985), permeates the value chain at every stage, changing the nature of how value activities are connected and how they are carried out. There are physical and information-processing components to every value action. Information processing can sometimes even drive physical components, such as a fully automated robotic processing environment. Today's pace of information technology outpaces that of physical processing technology. Technology is extending the capabilities of businesses more quickly than managers can identify opportunities. By facilitating the flow of new information, IT not only affects how individual tasks are carried out but also significantly improves a firm's capacity for leveraging linkages between tasks carried out both inside and outside the company. Now, businesses can more closely coordinate their actions with their customers and suppliers (Pierce, 2002:88-89). According to Porter and Miller's (1985) study, there are three distinct ways that information technology can give businesses a competitive edge.

1. Information technology changes industry structure
2. Information technology promotes differentiation and cost leadership strategies
3. It can also create completely different jobs.

His work also suggests ways to identify opportunities to gain competitive advantage from information technology through value chain analysis (Milova, 2001:9). They suggest five steps the company can take to capitalize regarding the chances provided by the information revolution:

1. Determine how much information is contained in items and processes.
2. Consider how information technology affects industry structure.

3. List the various ways that information technology can give you a competitive edge.
4. Take into account the potential for new business development.
5. Create a strategy for using information technology.

This theoretical investigation emphasizes the connection between technology use and differentiation strategy as well as cost leadership. Additionally, it highlights the significance of industry structure analysis in terms of competitive strategy and technological application (Milova, 2001:10).

According to David Ford (1988), a company's core competences are not its markets or its goods but rather its technology, or what it knows and is capable of doing (Herman, 1998:25).

Closely related to the technology strategy archetypes literature is the literature on the scope, purpose, and role of technology strategies. Authors include R.P. Rumelt (1984), John McGee and Howard Thomas (1989), H. Igor Ansoff (1986), J. O. Hilbrink (1989), David Teece (1988) and others (Herman, 1998:28).

Porter (1990) stated that technological change “is the most common precursor of strategic innovation”. Considering the above writers point to a growing recognition of the relationship between a company’s know-how and its ability to be successful in a competitive situation. This acceptance is behind the tendency of companies today to see technology strategies as key elements of business level strategies (Herman, 1998:25-26).

A few authors, such as Fusfeld (1989), Itami and Numagami (1992), Dvir, Segev and Shenhar (1992), Winston (1998) discuss the key competitive role technology can play in competitive strategies (Herman, 1998:25).

Kotha et al (1995) analyzed 22 generic competitive methods and reported how American firms work to develop strategic positions that differentiate them from competitors. Japanese corporate strategies, by contrast, focus on establishment of comprehensive, stable and defensible position. Companies in both countries use technology extensively, (Herman, 1998:28).

An ideal hijacking-based research project gathers quantitative and qualitative information about issues in companies that can be solved by AI. However, similar to research on decision-making, it may be appropriate to gather information on task input (problem-related) and task processes (such as search or reasoning algorithms) since such information is not also pertinent for problem scenarios where involving AI is expensive or otherwise challenging. It also highlights the limitations (Krogh, 2018:407).

Digital innovation has decreased the costs of innovation in a number of ways. First, relative to many other industries, IT has reduced entry costs, which includes the expenses of creating, managing, and disseminating new knowledge. For instance, the introduction of "the cloud" eliminated significant upfront investments and made computer power available for a reasonable price. Second, DNR lowers or even eliminates the lower costs of innovation—the costs associated with creating and distributing digital technologies. Physical product manufacturers can drastically lower their marketing, branding, and other expenditures by using digital platforms to promote and distribute their items. They can access the world market without having to incur significant, lost investments. This is especially true for some of the most innovative digital information goods that may be provided directly over the Internet (without incurring shipping fees), including software and online services. Third, because digital inventions are instantly scalable and may reach an infinite number of clients, they also have cheaper scaling costs. Beyond pure digital products (such as software or pure online services), there are opportunities for "mass-free scaling," which is the production of goods and services that require significantly less labor and capital input than conventional "tangible" products because so much of the product is intangible (Guellec, 2017:15).

The danger that incumbents will lose most, if not all, of their market revenues increases as a result of the decreased cost of commercializing ideas, which enables more rapid market entry and creative destruction. Even if they simply make slight enhancements over current items, new products might be introduced and challenge established ones. Even little improvements to a product can result in considerable expenses (retooling, marketing, etc.) to reach customers in the old industrial economy. As production and marketing expenses are low or perhaps nonexistent in the digital economy, the main cost of launching a new product is the cost of creation. The expenses of invention may also

be minimal when there is little differentiation (technical similarity). Even though certain innovations have only a slight advantage over rival items, corporations with minimal manufacturing costs can nonetheless introduce them to the market and capture the entire market, as in winner-takes-all situations. This underlines the effect of cost-cutting measures on the motivation to introduce new innovations. However, depending on the overall study effort, technological progress might not occur more quickly overall (Guellec, 2017:15).

If the chosen technology is not abused, the availability of modern information technologies enhances communication or decision-making alternatives for the potential user, and the result is a long-term improvement in the quality of the user's communication. Possibly, organizational members discover which communication or decision-making technology is most likely to fulfill their goals and then embrace it through experience or observation (Huber, 1990:51).

Imagine creating a sophisticated system that can accurately forecast what buyers would want. What will happen in the end? Even if it is proprietary, rivals will eventually figure out how it operates and utilize their simulations. All rivals will immediately adopt this algorithm if it is made available to everyone at a cost in order to remain competitive. Those who don't use it risk losing their employment because of how well it anticipates customer needs. The sophisticated algorithm won't be particularly useful because it will be necessary to compete in order to continue running. Big data, according to Schonberger & Cukier (2014), presents a chance to create effective algorithms that can help business decision-makers comprehend what their customers want. The problem is that everyone has access to both the data and the methods for analyzing it, making their advice essential for staying competitive. Therefore, Jankel (2015) is correct when he asserts that "computers will never create disruptive innovations" or guidance on the three key characteristics of the largest digital organizations of table 4: managing people, selecting the proper technologies, and making the right acquisitions (Makridakis, 2018:22-23).

Table 4. Technology Companies by Market Cap

Company	Market cap (\$)	Revenue (\$)	Number of employees
Apple	\$2.201 T	\$485.90 B	154,000
Microsoft	1.650 T	\$203.07 B	221,000
Google	\$1.121 T	\$282.11 B	174,014
Amazon	\$928.15 B	\$485.90 B	1,523,000
Tesla	\$645.43 B	\$74.86 B	99,290

Source: <https://companiesmarketcap.com/tech/largest-tech-companies-by-market-cap/>

Table 5 presents some examples of studies reflecting competitive strategies and technology – artificial intelligence relationship and impacts in the literature.

Table 5. A Literature Summary Showing The Link Between Competitive Strategies And Technology And Artificial Intelligence Component.

Writer	Subject	Focus Area
Clark and Hayes (1985)	Company Technology Strategy	- technology & strategic plans - emphasis on tech approach - technology Network - technology acquisition and exploitation activities
Leonard-Barton (1992)	Linkages between strategy and firm performance through technology policy	– the value of core competencies as a source of competitive advantage and the part technology can play in developing core capabilities.
Dvir, Segev and Shenhar (1992)	Technology's varying impact on the success of strategic business units with the Miles and Snow typology	- the key competitive role that technology can play in competitive strategies - monitoring technological innovation - adopting technological innovation
Winston (1998)	Configuration of marketing strategies and technology adoption strategies Do they affect profit performance?	- Porter's generic strategies - Miles and Snow typology - technology strategy - technology and firm performance
Herman (1998)	Technology strategies in the United States electronics industry An exploratory study	- relationships between a firm's strategy and management choices and its financial performance - taxonomy of technology strategy and technology management archetypes - the relationships between the archetypes and firm performance
Parker (2000)	Impact on the Organizational Performance of the Strategy–Technology Policy Interaction	- technology policies with strategy - organizational performance aligning strategy - technology choices precondition to superior performance
Milova (2001)	Exploring strategic role of IT	- perspective of Ansoff's and Porter's generic strategies

Croteau and Bergeron (2001)	An Information Technology Trilogy: Business Strategy, Technological Deployment and Organizational Performance	- relationships between business strategy, technological deployment and organizational performance
Grooms (2001)	Marketing intelligence Executive management perceptions of value	- competitive intelligence - market intelligence - business intelligence
Kim et al. (2004)	Porter Strategies in Digital Age	- usage of conventional strategies to explain strategic behaviors and firm performance for e-business
Ortega (2010)	Competitive strategies and firm performance: Technological capabilities moderating roles	- moderator role of technological capabilities on the relationship between competitive strategies and company performance.
Chen X. (2012)	Impact of business intelligence and IT infrastructure flexibility on competitive advantage	- the use of business intelligence (BI) for management decisions - relationships between business intelligence, IT infrastructure flexibility, organizational agility, and competitive advantage
Zuhdi (2012)	Strategic management in the telecom industry to create competitive advantage	- The value chain and structure of the telecom business, as well as an analysis of the issues and the current level of telcos' competitiveness - the main competitive forces affecting carriers' revenue potential and profitability - A proposed business model
Al-Sukkar et al. (2013)	The Effect of Applying Artificial Intelligence in Shaping Marketing Strategies	- cost leadership - differentiation - alliance - diversification
Summers (2018)	Intelligence on Competitive Advantage	- business intelligence - decision making - competitive advantage - organizational performance

Source: Prepared by author

6.4 IMPACT OF COMPATITIVE STRATEGIES ON COMPANY PERFORMANCE

By employing a control system to track results and make required adjustments, a company develops a plan to meet its long-term objectives. The association between company strategy and performance metrics along many dimensions is supported by empirical investigations. (Teeratansirikool et al., (2012:70). The key to a company's long-term success and an improvement in the company's performance is its sustainable competitive advantage, as previously stated by (Porter, 1985). A business that releases new inventions and capabilities ahead of its rivals enjoys a competitive advantage in the market, at least until those rivals acquire the same skills (Porter, 1985). According to

Evans & Smith (2004), a competitive edge improves business success (Hsu, 2007:34). According to Spanos, Zaralis, and Lioukas (2004), competitive strategies and strategies have a significant impact and influence on the success of businesses (Hançerlioğulları et al., 2016:41).

The impact of strategy and competitive advantage on corporate performance is a major area of research. The links between general overall strategies, competitive advantage, and organizational performance in various contexts were the focus of Yamin et al (1999)'s research. They argued that when various broad strategies and types are used, there are noticeable variances. Additionally, in certain circumstances, firms that focus on a single strategy perform better than combination strategies. Hoque (2004) examined and evaluated the effects of two elements on performance: strategy and environmental uncertainty using 52 manufacturing samples using a path analytical model. His finding demonstrates a positive relationship between management's strategy selection and performance (Wen et al., 2008:150).

Each strategy is distinct and needs a particular set of performance indicators. According to Miles and Snow, there are two types of competitive strategies: prospector and defender firms (1978). Prospector firms desire to employ non-financial criteria, while Defender firms prefer to use financial metrics. A survivor that prioritizes keeping their current clientele while concentrating on manufacturing current designs more effectively through competitive pricing is referred to as a "defender." In order to achieve rapid growth, a prospector company investigates and seizes new goods or market prospects. Prospector firms frequently pursue a differentiation strategy, whereas defensive firms are more likely to pursue cost leadership. As a result, companies with differentiation strategies may prefer to use non-financial metrics, whereas companies with cost leadership strategies may prefer to use financial metrics (Teeratansirikool et al., 2012:171).

The effectiveness of generic strategies on performance is dependent on the strategy's alignment with additional factors, such as industry maturity by Louri and Anagnostaki (1995), Murray (1988), and market dynamism by Parker and Helms (1992). Murray (1988) suggests that a cost-leadership strategy does not work in mature industries, while Miller (1988) and Ward, Bickford, and Leong (1996) report that it works best under

stable environmental conditions; they find that a differentiation strategy works best in uncertain environments. Hill (1988) argues that Louri and Anagnostaki (1995) confirm that a dual strategy is more suitable in mature sectors, and Hall (1980) demonstrates that combining differentiation and low cost enables companies to succeed in hostile environments. Regarding global environments, Kim, Nam, and Stimpert (2004) argue that businesses must adopt flexible combination strategies in order to adapt to dynamic global markets. The current literature views general competitive strategies as crucial sources of superior financial performance in both industrialized and emerging markets (Bingxin Li & Juan Li, 2008:3).

Companies with a cost-leadership strategy attempt to provide customers with a standard, unadorned, and high-volume product at the most affordable price. The cost-leadership strategy emphasized by Aulakh, Kotabe, and Teegeen (2000) is more likely to generate superior financial performance for firms operating in emerging economies such as China, due to the comparative advantage gained from lower labor and production costs. Also, from the customer's perspective, a cost-based marketing strategy is effective because low-income customers in emerging economies are attracted to lower-priced offers, as reported by People's Daily (2006) (Bingxin Li & Juan Li, 2008:4).

Differentiation strategy, innovative products, high quality and technology, differentiated brand image, good service, etc., that distinguish the firm from its competitors, creates customer value with the aid of tools described by Frambach, Prabhu, and Verhallen (2003), Hutchinson et al. (2007), and Porter (2005). (1980). It is an external focus designed to increase customer satisfaction and foster customer loyalty by satisfying a particular need. As supported by Hill (1988), Vorhies (1993), Knight and Cavusgil (2004), and Mittal et al. (2005), the differentiation strategy provides a permanent performance advantage once it has been established (Bingxin Li & Juan Li, 2008:4).

In the literature on strategic management, innovation is important in terms of providing competitive advantage with new products and services that add value to businesses in a world of business that is rapidly changing and becoming increasingly complex. According to Montes et al., firms with a high innovation capability are adept at developing new competencies to adapt to changing conditions, and as a result, exhibit

superior performance. (2004), As supported by Prajago (2007), Khalili, Nejadhussein, and Fazel, it has been observed that the differentiation strategy is closely related to the innovation capabilities of enterprises, that is, to process and product innovations (2013). In addition, the literature review revealed that there is a strong correlation between differentiation strategy and financial performance (Karaboğa, 2015:45).

In numerous studies, the ability to formulate a strategy has been linked to the performance of a company. Literature indicates that innovation results in higher rates of return by increasing productivity or market acceptance. The relationship between industrial research and product differentiation is documented by Comanor (1967). According to Porter (1980), the combination of reduced costs and enhanced differentiation is a potent driver of above-average profitability. The high rates of return attributed to innovation by Griliches (1980) and Mansfield et al. (1977) lend empirical support to this argument (Miller, 1988:242). According to Mintzberg (1976), the intended and realized strategy approach investigated the relationships between the performance of the strategies that emerged at the conclusion of the process of strategy formation (Zehir, 2016:55).

Phillips et al. (1983) discovered a significant and positive correlation between differentiation and market share in their study of the profit impact of a marketing strategy (PIMS). To establish and defend their desired strategic positioning against rivals, companies choose between two business-level strategies. Past research has demonstrated that firms favor cost leadership as a competitive strategy to enhance firm performance. Several studies demonstrate that firms that choose differentiation as their competitive strategy outperform their rivals (Teeratansirikool et al., 2012:170).

According to Porter (1980, 1985), companies with a strategy are more successful than companies without one. This discovery is the most important aspect of Porter's introduction to competitive strategies. (Karaboğa, 2015:40-41). According to Porter, firms with a clear strategy perform better than those without. This argument also serves as the foundation for his proposed competitive strategies. The strategy literature identifies three conditions that must be met to achieve a competitive position that will result in improved and sustainable financial performance (Porter, 1991). The first

requirement for success is the formulation of objectives and operational policies that define the market position of the company. The second condition is congruence between the organization's strengths and weaknesses and market opportunities and threats; the third condition is the firm's distinctive capabilities (Eraslan, 2014:48-49). According to Porter (1985), competitive sustainability is assured when the challenger closes the leader's market share before the leader can respond. According to Veliyath and Fitzgerald (2000), a company's ability to create defensible niches led to a sustainable competitive advantage. Schermerhorn, Cattaneo, and Templer (1995) added that strategic positioning companies choose and implement strategies that can offer a sustainable competitive advantage (Hsu, 2007:34). Porter (1980, 1985) suggests that firms seeking a strategy in a large market segment can choose from one of three generic strategies: (1) cost leadership, (2) differentiation, or (3) — in a narrow market segment — a focus strategy (i.e., cost-oriented versus differentiation-oriented) to achieve both advantages. Any company that cannot choose and implement one of these three strategies is considered "stuck in the middle." The key to this advantage, according to Porter (1990), is the ability to achieve cost leadership without compromising differentiation. In accordance with Dess and Davis (1984), Coeurderoy and Durand (1990), the cost leader should produce comparable products at a lower price than their competitors (2004). In contrast to the differentiation strategy, the industry-specific strategy seeks to capitalize on buyer preferences that are widespread (Porter, 1985: 14). Unsurprisingly, brand identity, innovation in marketing techniques, distribution channel control, and advertising all contribute to a differentiation strategy (Dess and Davis, 1984). As before, the differentiator must establish its position such that the earned premium exceeds the cost of the strategy. Within the context of a narrower market segment, the focus strategy has two components: cost leadership and differentiation. In contrast, the differentiation focus is on specific market segments (such as Cray or SGI in high-performance computers) (Ortega, 2008:1274-1275).

Supporting Porter's finding, Dess and Davis (1984) also found that firms with either of the generic strategies outperformed those without (Karaboğa, 2015:41). Dess & Davis (1984) found that both differentiation and cost leadership strategies point to higher performance potential. Furthermore, higher performance has been found to be associated with a combination of various strategy and industry structural conditions, including

broad-based strategies pursued in early-stage sectors by Sandberg (1986), Sandberg (1992) (Giguere, 2004:26). Similarly, the cost focuser competes to serve a narrow market segment at lower costs as mentioned previously by Dess and Davis (1984). Aside from being "stuck in the middle," pursuing a differentiation or cost leadership strategy can result in favorable performance outcomes, where the differentiation strategy is characterized by a strong marketing and/or quality orientation and the cost leadership strategy by a strong cost and/or process improvement orientation (Ortega, 2008:1275). Dess and Davis (1984) sought to enhance previous strategic group research using the Porter (1980) typology, as they argued that this framework "provides a potentially valuable research tool". As a part of their research, Dess and Davis (1984) developed the first research tool designed to evaluate the various strategy component features identified by Porter (1980) (Hudson, 2001:35). The findings of Dess & Davis' (1984) research are almost consistent with Porter's view that adherence to at least one of the three general strategies will result in higher performance than the firm's failure to develop an overall strategy (Hudson, 2001:36).

Also using a strategic profile similar as Porter (1980), Strickland and Thompson (1995), Hall (1980) compared firms that emphasize differentiation through their product or service offerings to firms that focus on low delivery costs. The results led Hall (1980) to conclude that generic strategies are viable approaches because firms in his sample, firms that lead both industry and financial performance, chose cost leadership or differentiation strategies. While Hall (1980) acknowledged that most of these firms chose only one strategy, he also noted that three firms using combined strategies produced financial results that were described as a "spectacular success" (Hudson, 2001:60).

Hrebiniak and Snow (1980) suggested in their study that functional areas such as general management, production and marketing might be distinctive competencies and found a high level of correlation between job-level strategies-specific distinguishing features and performance (Eraslan, 2014:49).

While Karnani (1984) infers in their study that a better cost or differentiation position leads to a larger market share and therefore higher profitability, Jones and Butler (1988), who look at firm performance from a profitability perspective, also examined the relative

advantages of the cost leadership strategy over the differentiation strategy. In the developed theory, it is emphasized that two strategies should be combined in order for a firm to outperform other firms in terms of performance (Eraslan, 2014:49).

White (1986) analyzed the strategy-structure-performance structure according to Porter's strategy typology and explained that business units adopting the cost-only strategy bring higher return on investment at a lower autonomy and strong coordination for the core functions under the responsibility of the business unit manager for the differentiation strategy. concluded that it would cause growth. In addition, according to the findings, it was stated that the strategy-structure performance paradigm would be appropriate on the basis of business level in companies with multiple business units (Eraslan, 2014:49).

Barney (1991) is of the opinion that for a firm to gain competitive advantage, it must develop the ability to create an effective strategy. However, in order to turn this strategy into an advantage, they stipulated that it should be a valuable, rare and difficult to imitate strategy (Zehir, 2016:55).

Smith et al. (1991) defined competitive action as a specific and identifiable competitive act, such as a price reduction or new product introduction, initiated by a firm to defend or improve its relative competitive position; competitive race was similarly defined. A response as a distinct countermeasure taken by a competing firm to defend or improve its position in relation to one or more competitors (Sandra, 2010:18).

Additionally, O'Farrell, Hitchens, and Moffat (1992) investigated Porter's (1980) generic strategies. First, the results are consistent with Porter's (1980) assertion that at least one of the three generic strategies will result in superior performance compared to other companies deemed to be mired in the middle. Second, empirical evidence supported Porter's (1980) assertion that there is a relationship between strategy selection and firm performance (Hudson, 2001:37).

Miller (1993) suggests that firms employ competitive strategies to enhance relative performance. According to Vilcassim, Kadiyali, and Pradeep's (1999) studies, such strategies include price cuts and advertising campaigns, new product development, new

market entry, and competitive differentiation. Banbury and Mitchell's (1995) work mentions new product development and new market entry (Sandra, 2010:).

Similarly, Partridge and Perren (1994) argued that a firm that uses only one strategy, such as cost leadership, puts the firm at risk of achieving superior financial performance. A focus on reducing costs can be a “precarious strategy” that results in a commodity market where in the end no one benefits. Against the single strategy contention made by Porter (1980), Partridge and Perren (1994) argued that firms can occupy binary competitive positions that achieve sufficient differentiation cost effectively to guarantee superior profits (Hudson, 2001:57).

Chandler and Hanks (1994) observed that resource capabilities increase the performance of manufacturing firms as long as the cost leadership strategy is possible (Eraslan, 2014:50).

McGee et al. (1995) examined the competitive strategy-performance relationship on the basis of new projects and determined a positive relationship between marketing cooperation arrangements and average sales performance in firms that engage in marketing differentiation. (Eraslan, 2014:50).

Kaplan and Norton (1996) argue that performance measurement plays a critical role in turning strategy into action (Teeratansirikool et al., 2012:170).

Hitt et al. (1997) examined the effect of international diversification on innovation and firm performance. As a result of the study, it has been understood that international diversification contributes to firm innovation. It has been understood that international diversification is important in order to increase investments in innovative products, supported by business strategies such as differentiation strategy in order to encourage innovation, especially in markets where product life cycles are getting shorter (Karaboğa, 2015:45).

Gatignon and Xuereb (1997), in their study in the USA, examined the effect of the firm's strategic aspects (customer, competitor and technology orientation, and inter-functional

coordination) on the firm's new product performance. They considered innovation as a result of the firm's resources and strategic focus. According to the conclusion of this study, the radicality of innovation and product differentiation strategy are key factors for successful marketing of new products (Akman, 2003:81).

Yamin et al. (1999) investigated the relationship between the dimensions of competitive advantages and organizational performance factors. In this research, the sample was selected from low, medium and high-performance businesses operating in Australia. Mid- and high-ranking cost leaders achieved significantly higher levels of organizational performance than low-ranking cost leaders. High-ranking cost-leader firms outperformed mid- and low-ranking firms in terms of financial performance, financial management, financial leverage, and market efficiency. These findings show that high-ranking cost leaders care about all aspects of organizational performance. High-ranking cost leaders also achieved higher overall performance. Medium-level cost leaders give more importance to financial performance than low-level cost leaders. Firms with a high and moderate differentiation strategy achieved higher average performance on all factors of organizational performance than firms with low differentiation strategies. Firms with high differentiation achieved higher scores in financial performance, financial management, financial leverage and market efficiency than firms with medium and low differentiation. It has been observed that highly differentiated processes give more importance to organizational performance in all aspects. While highly differentiated firms scored high in overall performance, moderately differentiated firms scored higher in financial performance, financial management and market efficiency than lowly differentiated firms. Moderately differentiated businesses also scored high in their overall organizational performance (Zehir, 2016:54-55).

Pelham (2000) examined the companies producing in the USA by using Porter's strategy typology in his study. In the study, in which market/sales effectiveness and profitability are used as performance criteria, customer retention rate, product quality, sales growth rate, new product success, sales level, target market rate are used in the measurement of market/sales effectiveness, while return on equity, gross profit share and return on investment are used for profitability. used. In the study, a positive correlation was observed between market orientation and growth/differentiation strategy combination

and company performance for small firms. In addition, a strong positive relationship was seen between performance criteria and strategy selection, firm size and industry characteristics (Eraslan, 2014:50).

Baum, Locke & Smith (2001) found that differentiation strategies are positively linked to growth (Giguere, 2004:26).

Ferrier (2001) has suggested that companies take competitive action in their execution steps to enhance relative firm performance (Sandra, 2010:18).

David et al. (2002) analyzed the contingency effect between product competitive strategy and organizational design in the light of data obtained from 194 companies from 20 different industries. According to the results, a contingency relationship has been determined between product competition strategies, purchasing design features and the firm's financial performance (on the basis of return on assets) (Eraslan, 2014:50).

McAdam and Bailie (2002) found that strategy related performance measures are more effective (Teeratansirikool et al., 2012:170).

According to Maltz et al. (2003), the ultimate set of performance measures will depend on the company's strategy. Tapinos et al. (2005) noted that performance measurement also supports strategic planning. A company's business strategy must be aligned with its management control system for it to be effective. Otherwise, managers will not know whether the company is making progress toward its objectives (Teeratansirikool et al., 2012:170).

Barth (2003) examined the effect of the harmony between generic competitive strategies and organizational structure on firm performance in firms operating in new and mature industries; He concluded that managerial skills are effective on firm performance, especially for manufacturing firms (Eraslan, 2014:50).

Tehrani (2003) examines the influence of five types of competitive strategies (product differentiation, low cost, marketing differentiation, focus on product differentiation, and

focus on low cost) on superior performance in sixteen segments of high-tech industries in the United States and the European Union. In the United States, firms adopting product differentiation, low cost, and focused product differentiation outperformed others, while in Europe, only low-cost firms outperformed others (Yaşar, 2010:312).

Banker et al. (2006) examined the relationship between the strategic positioning of publicly traded firms and the sustainability of their financial performance. As a result, they realized that firms with differentiation strategies have sustainable financial performance and have a higher price earnings ratio in the eyes of capital market participants (Eraslan, 2014:49).

Allen and Helms (2006) showed a cost leadership strategy related to organizational performance. (Teeratansirikool et al., 2012:170).

Prajogo et al. (2007) is one of the researchers who studied the relationship between strategy and innovation performance. According to the results of their research, the effectiveness of technology and R&D management affects the innovation performance of enterprises (Karaboğa, 2015:27).

Banker et al. (2014) revealed in their study that companies with a differentiation strategy increase their long-term sustainable financial performance compared to companies that implement cost leadership. Therefore, it has been understood that businesses that implement a differentiation strategy can achieve sustainable high performance (Karaboğa, 2015:45).

Table 6 presents examples of studies reflecting the generic competitive strategy-performance relationship available in the strategic management literature.

Table 6. A Literature Summary Showing The Link Between Competitive Strategies And Company Performance.

Writer	Subject	Focus Area
Porter (1980)	Generic Strategies and Value Chain	Cost leadership strategies, differentiation strategies, focus strategies and company performance
Dess and Davis (1984)	An Empirical Examination of Porter (1980) Generic Strategies: Porter's generic	- strategy, growth, profitability

	strategies as determinants of strategic group membership and organizational performance	
Miller and Friesen (1986)	Porter's (1980) Generic strategies and Performance: An Empirical Examination with American Data. Part I: Testing Porter	- differentiation and cost leadership strategy on growth and ROI performance
White (1986)	Generic Business Strategies, Organizational Context and Performance: An Empirical Investigation	- transaction cost theory review - the relationship between competitive strategies, the general state of the organization and performance
Jones, Buttler (1988)	Costs, Revenue, and Business-Level Strategy	- adoption of low cost and differentiation strategy in hybrid structure
Vorhies (1993)	Strategy, implementation, and performance in marketing	- differentiation - cost leadership
Mosakowski (1993)	A Resource-Based Perspective on the Dynamic Strategy Performance Relationship: An Empirical Examination of the Focus and Differentiation Strategies in Entrepreneurial Firms	- the impact of focus and differentiation strategies on the economic performance of entrepreneurial firms
Pelham, Wilson (1996)	A Study of Impact of market structure, firm strategy on Dimensions of Firm Performance	- firm culture - firm strategy - market structure - firm performance
Hudson (2001)	The search for competitive advantage through simultaneous execution of cost leadership and differentiation strategies	- cost leadership - differentiation - hybrid strategies
Frambach et al. (2003)	The influence of competitive strategy on new product activity	- customer orientation - competitor orientation
Banker et al. (2006)	Generic Strategies and Sustainability of Financial Performance	- strategic positioning and sustainability of their financial performance
Li B. (2008)	Achieving Superior Financial Performance in China: Differentiation, Cost Leadership, or Both?	- cost leadership - differentiation - financial performance
Snedegar (2009)	Capabilities and strategies as determinants of firm performance U.S. telecommunications industry	- strategy - competitive advantage - capabilities - resources
Pertusa-Ortega (2010)	Competitive strategy, structure and firm performance	- cost leadership - differentiation
Karaboğa (2015)	Relation between Enterprise Orientation and Differentiation Strategy and Performance	- differentiation - entrepreneurship
Bayraktar, Haçerlioğulları (2016)	Competitive strategies, innovation, and firm performance: an empirical study in a developing economy environment	- technology analysis - strategy management

Zehir (2016)	Relationship between market orientation, learning orientation, competitive strategies and firm performance	- company strategies - competitive strategies - market orientation, learning orientation - business performance relationship
Kurt and Zehir (2016)	Cost Leadership Strategy, Total Quality Management and Financial Performance	- cost leadership

Source: Prepared by author

6.5 IMPACT OF ARTIFICIAL INTELLIGENCE ON COMPANY PERFORMANCE

The performance of the organization is directly proportional to the strategic alignments. As explained by Kurien (2013), it is a simple concept to adjust external threats and internal weaknesses consistently or internal strengths and external opportunities consistently. Strategies are to change the current scenario of the state. Be it organizational culture, renewal or decision-making procedures, strategies are always there to bring about a change, often a welcome and ambitious change. This change can also be called a productive change. It should also note that this positive change that organizations expect from an IT system can serve fully and efficiently when the integration of the system operated by the organization and the IT system itself, adapts from hardware to hardware (Kurien, 2013:31). This will help any organization grow internally and externally, face and combat threats from the external environment, and above all externally maintain its brand image and market share in the eyes of its customers or local business (Kurien, 2013:32).

It should be evident that technology determines strategy in multiple significant aspects. Insofar as strategy is linked to performance (a fundamental tenet of strategic management), technology is anticipated to impact firm performance (Miller, 1988:242). This relationship between strategy and financial performance is not unexpected and is consistent with their work on strategy planning. As the rate of digital-related change continues to quicken, businesses must place larger wagers and reallocate capital and personnel more rapidly. These strategical changes to the creation, execution, and ongoing modification of digital strategy enable businesses to adopt a "fail fast" mentality and become more adept at identifying emerging opportunities and reducing losses on

obsolete ones, resulting in increased profitability and revenue growth (McKinsey Report, 2019:2).

Literature has emphasized the necessity of integrating technology and R&D into the organizational context in terms of strategy, process, structure, and culture, as opposed to addressing it separately. Iansiti (1998) confirms that technology only provides value when it is incorporated into a system (Prajogo & Sohal, 2005:298). The role of technology in the evolution of business has been an essential component of innovation, as it plays a crucial role in creating a new product or process not only on an evolutionary level, but also on a fundamental level by altering the rules of competition or destroying an existing market and establishing a new one. Additionally, R&D has played a significant role in innovation as the organization's technological gatekeeper (Prajogo & Sohal, 2005:298). R&D is increasingly focused on generating additional product value that has the potential to expand existing businesses or even create new ones. R&D can specifically be used as an aggressive strategy to attack competitors, increase market share, or enter new markets, all of which are strongly associated with innovation (Prajogo & Sohal, 2005:299).

Traditional approaches to examining the impact of IT on performance can be grouped into two main categories: cost-benefit analysis and efficiency assessment. In both, information technology expenditures are justified against different types of returns, which generally represent an assessment of improved performance (Galal, 1997:57). The research reveals that most growing high-tech companies compete in markets and technologies that are closely related to the technology expertise of their incubators compared to low-growth high-tech firms. The reason “technical entrepreneurs often start businesses closely related to their previous employment” is that primary knowledge in high technology is critical to the market, resources, and technologies as determined by Cooper (1986), Feeser & Willard (1990) As a result, the relevant business technology strategy performs the best (Giguere, 2004:46).

Examining the connection between technology use and performance has been the subject of numerous empirical investigations in the past. Even rarer is empirical evidence of a correlation between AI applications and marketing performance (Chen, 2019 / 2:49).

Numerous technology researchers have highlighted product complexity as a determinant of strategic management. Liebler provides the clearest expression of product complexity (1976). Liebler found that technologies that produce 'experience' goods (relatively simple, every day, perishable products that are constantly consumed by the masses, such as food), are associated with strategies aimed at minimizing costs to the consumer. Strategies that emphasize product differentiation and consumer education are associated with the production of 'search' goods (complex products, such as automobiles, that are purchased infrequently). Technologies that produce 'safe' products (highly complex, infrequently purchased items, such as prescription drugs) are linked to strategies that emphasize product quality and performance. Ansoff and Stewart (1967) argued that the production of increasingly complex products that are closer to the "state of the art" reduces the predictability of performance and the ability of management to rely on standard operating procedures. In addition, they argued that the necessity for downstream coupling increases as product complexity rises. Additionally, C. Freeman (1974) acknowledges the need to educate downstream users of more advanced technology (Miller, 1988:241-242). ISs have the potential to fundamentally alter the structure of an industry by altering its products, services, markets, and production economies. Parsons uses Porter's five competitive strengths to identify overall opportunity categories for competitive advantage at the firm level. Additionally, Parsons demonstrates how ISs can support each of Porter's three competitive strategies at the strategy level. Computer-aided design and computer-aided engineering systems, for instance, can be used to support a low-cost strategy by reducing the cost of design and engineering processes (Zhang, 1998:12-13).

Based on empirical research conducted by Hambrick (1983), White (1986), and Porter's Profit Impact of Market Strategy (PIMS) database, firms emphasizing differentiation strategies in technology-intensive industries will be more profitable and experience greater sales growth. Sandberg's (1986) study of 17 startups revealed the existence of differentiation strategies for competing firms, particularly in the early stages of an industry's evolution (Dowling & McGee, 1994:1666).

Cooper (1985) discovered that companies with high-impact new product programs have a strong technological emphasis and strategy (Akman, 2003:57).

The findings of Kunkel's (1991) study of 87 startups and Covin and Slevin's (1990) examination of the differences between high-tech and low-tech small manufacturing firms indicate that, in general, high growth, high technology firms place a greater emphasis on differentiation strategies than high growth, low technology firms. Again, under the conditions of architectural innovation, Dowling & McGee (1994) would anticipate that this type of innovation would serve as the foundation of a differentiation strategy whose objective is to reengineer technology to provide distinctive customer value (1994:1666).

Numerous authors have analyzed the application of neural networks in business, finance, or management from a variety of perspectives. Wong et al. (1997) focused on the business applications of neural networks and reviewed 203 articles published between 1988 and 1995. The presented literature, publication year, field of application, development tools, etc., have been divided into 12 categories. Wong and Selvi (1998) focused on financial applications and reviewed 64 articles published between 1990 and 1996, concluding that bankruptcy forecast and stock performance forecast have the most applications. Vellido et al. (1999) avoided financial uses such as derivatives, stock markets, bond ratings, and macroeconomic forecasting in favor of applications related to management, marketing, and decision making. Smith and Gupta (2000) presented intriguing advancements in the application of artificial intelligence to problems in operations research. They described several neural network models that can be utilized to solve business problems. Wong et al. (2000) reviewed neural network application research in business from 1994 to 1998, noting that due to the accessibility and overall complexity of raw data, financial applications may become one of the most prevalent neural network research areas in the future (Tkac & Verner, 2016:789).

Brown et al. (1995) also used published SISs cases as examples to analyze the relationship between SISs and long-term firm performance. Sample firms using SISs for competitive advantage were compared with their respective firms or industries in terms of growth (year-over-year percent change in sales), productivity (e.g., revenue per employee and inventory turnover) and profitability (return on assets and return on sales), 6 years before year zero and 6 years after year zero over a 13-year period that includes the year SISs were first used (year zero). In addition, abnormal (excess) returns

(measured by the average changes in stock prices over the day and the day before a firm announces that it employs or is about to use SISs) is used to assess the market's response to the expected impact of SISs. The results of the study showed, among other things, that the stock market (as reflected in excess returns) responded positively to announcements that firms were using SISs, and that these firms tended to be more productive and profitable than their industry in subsequent years. However, further analysis of whether the SISs contribute to superior performance through their impact on strategic moves (differentiation, innovation, alliance, growth and cost control) revealed that firms only using SISs to support growth outperform their peers and industries (Zhang, 1998:24).

According to Alavi and Leidner (2001), a strategic advantage is not the quantity of knowledge capital, but rather the organization's capacity to effectively apply existing knowledge to generate new knowledge (Sharma & Djiaw, 2011:115). Massey and Montaya-Weiss (2002) highlights that requirements drive process requirements, which in turn determine information requirements, and business intelligence initiatives will be successful when they are aligned with the performance objectives and requirements of an organization's processes, its people, and its requirements (Sharma & Djiaw, 2011:115).

Business intelligence, according to Davenport and Probst (2001), is also about creating synergy in organizations and will increase business performance by aligning individual goals with organizational goals. Consequently, the connection between business intelligence and enterprise performance management has existed for a considerable amount of time (Sharma & Djiaw, 2011:115).

Through the lens of competitive dynamics, interpretive research has been utilized to comprehend the relationship between information systems and firm performance. Sandra's (2010) research strategy enabled managers of a dominant firm to identify and discuss the specific competitive actions or responses taken by the firm, the role of information systems in understanding, enacting, and executing these actions, or responses, and the impact of these response actions on firm performance. These bodies of literature, which investigate the relationship between information systems and firm

performance, competitive dynamics and firm performance, are organizational in scope (Sandra, 2010:23).

As organizations engage in activities to maintain competitive advantage, their IS infrastructure must be able to respond to changes in environmental conditions, neutralize threats to their position, and address any internal weaknesses, as explained by Guarda et al. (2013), Ahmad (2015), Knable & Olbbs (2015), and Knable & Olbbs (2016). (2013). According to Guarda et al. (2013), information systems are advocated as a necessary resource that organizations can use to gain a competitive advantage (Summers, 2018:40).

Wu and Chiu (2015) developed a scale for measuring competitive advantage, specifically an organization's IT innovation capabilities and its competitive performance. Wu and Chiu (2015) developed scales to measure the following five dimensions of competitive performance: technology – which includes relative advantage, compatibility, and complexity; task, which includes task structure, autonomy, and uncertainty; and uncertainty (Summers, 2018:38).

As stated by Al-Aqrabi et al. (2015) and Chang, V., cloud-based information systems provide small and medium-sized enterprises (SMEs) with access to technology traditionally utilized by much larger organizations due to the low cost of implementation (2014). Business intelligence applications use an organization's current IS infrastructure to provide data that can be used to optimize operations, improve decision-making, and boost operational efficiency, as explained by numerous authors, e.g., Antoniadis, Tsiakiris, and Tsopogloy (2015), Tanev, Liotta, and Kleismantas (2015), Henry (1999). In addition to Guarda et al. (2013), Ahmad (2015) added that these factors enable managers to increase their income and gain a competitive advantage over rivals. Moreover Yardi (2015) added that existing cloud-based BI applications are device-agnostic, enabling administrators to view data on desktops or mobile devices (Summers, 2018:40).

Teece et al. (1997) first introduced the concept of dynamic capability as "a company's capacity to integrate, build, and reconfigure internal and external resources in response to a rapidly changing environment." Eisenhardt and Martin (2000) proposed that, in order

to highlight the dynamic feature from a process perspective, dynamic capabilities should be specified through a series of distinct activities, such as product development, sales, strategic decision making, and resource structuring. From an action standpoint, Helfat et al. (2009) asserted that dynamic capabilities should include three components: identifying the need for change, responding to recognized opportunities, and implementing actions to address these opportunities. Chen's (2019) research integrates these three perspectives and applies them to the AI context using Li and Liu's (2014) definition of dynamic capabilities as a firm's potential to systematically solve problems, which includes the firm's disposition to perceive opportunities and threats, make timely decisions, and implement strategic decisions and changes efficiently to provide the right direction. AI tools based on advanced time algorithms and massive amounts of data can be implemented within the framework of dynamic capabilities using three mechanisms: 1) AI can improve the firm's strategic sense-making; 2) AI can improve the firm's ability to make timely decisions; and 3) AI can improve the firm's ability to implement change (Chen, 2019:50).

BI systems are IS infrastructure components, as described by Pan, Pan, and Lim (2015). Consequently, Hou (2015) stated that BI systems access multiple company resources to distribute data to various internal and external users of the overall IS infrastructure (Fraj-Andres, Martinez Salinas, and Matute-Vallejo (2009) classified organizational performance measures as economic, commercial, and operational). Pan, Pan, and Lim (2015) expanded the extent to which IS infrastructure positively impacts organizational performance (Summers, 2018:42).

McFarlan (1984) and Feeny and Ives (1990) contend that the development of technological resources and knowledge can distinguish an innovative organization. In the literature on strategic management and innovation, the authors Cool and Schendel (1987), Douglas and Rhee (1989), and others use a company's research and development (R&D) expenditures as a proxy for its innovative technological resources (Pierce, 2002:95).

Other studies use a measure of capital invested relative to sales for the operationalization e.g., Chakravarthy (1986), Fiegenbaum, et al (1990), Hatten, et al. (1978). These

variables have been consistently found to be important determinants of firm profitability in industries that consistently compete based on technological superiority by Cool and Schendel (1987), Fiegenbaum, et al (1990), Beasley (1990). The basis of these operationalizations is that companies with more comprehensive and advanced technological resources are expected to allocate relatively more financial resources to development and technology investments compared to other sector participants. (Pierce, 2002:96). The richness and content of the firm's knowledge base have been seen as a contributor to competitive advantage as stated by King, et al (1988). Feeny and Ives (1990) indicated a rich database can transform into the development of complex analytical tools to improve the service and implementation of strategic systems (Walton, 1992). The extent to which intelligence is embedded in the company's current databases, decision support systems, and expert systems can explain a firm's ability to take advantage of opportunities as concluded by Sabherwal and King (1991). Ghemawat (1986) also stated that the mere presence or the ability to access this information reflects the benefits of scale or experience. (Pierce, 2002:96).

AI advancements have the potential to increase total factor productivity in addition to reducing labor costs. Numerous large-scale industrial facilities have room for improvement in terms of energy efficiency and material utilization. For instance, a Google DeepMind team trained neural networks to optimize data center power consumption. The system learned how to adjust its operating parameters by carefully monitoring data already collected from thousands of sensors that monitor temperatures, electricity consumption, and pump speeds. The AI was subsequently able to reduce the amount of energy used for cooling by 40% compared to human experts. The algorithm was a general-purpose framework designed to account for complex dynamics, so it is easy to see how such a system could be applied to other Google data centers or to other data centers around the globe. U.S. data center electricity costs are approximately \$6 billion annually, with cooling costs accounting for approximately \$2 billion (Brynjolfsson et al., 2017:18).

During the investigated period, the authors applied artificial neural networks to a variety of problems, such as credit scoring, financial analysis, and stock performance forecasting. Financial distress and bankruptcy, corporate securities, decision support, and

credit scoring have been the primary focus of research. In contrast, there are a paucity of studies that examine inflation, cost tracking, and sales analysis (Tkac & Verner, 2016:790).

Figure 11 shows the distribution of articles by field of application (Tkac & Verner, 2016:790).

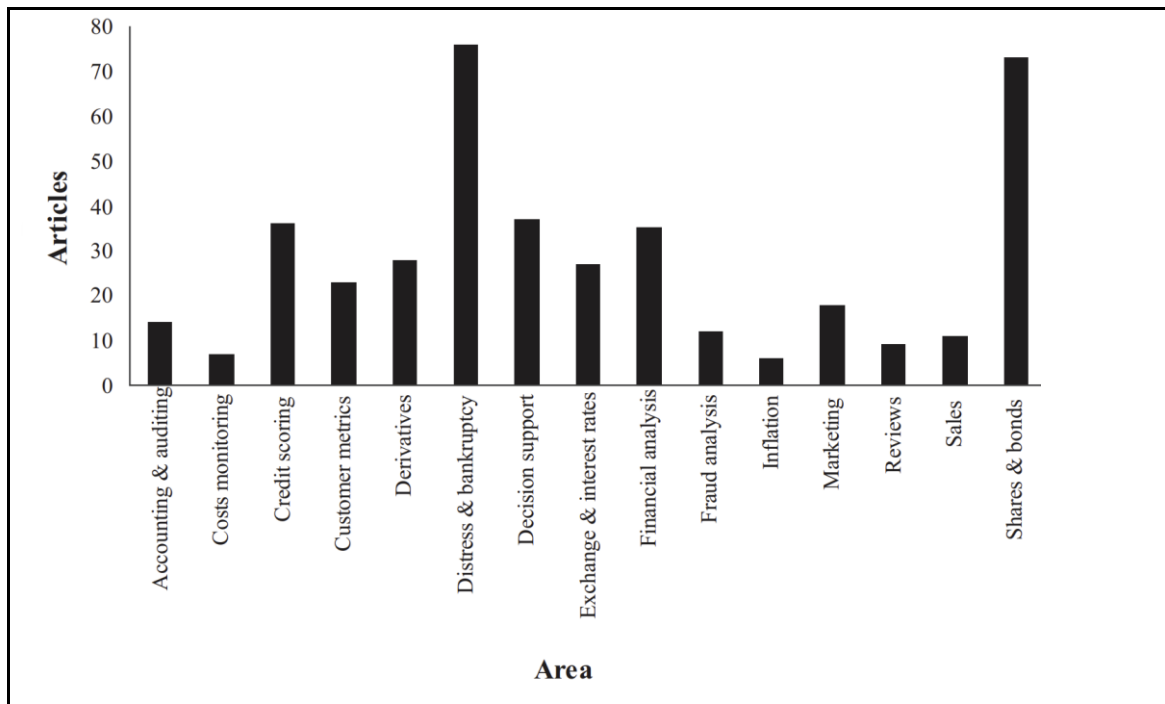


Figure 11. The Distribution Of Articles About Artificial Intelligence Usage In Financial Areas
Source: (Tkac & Verner, 2016)

Table 7 presents examples of studies reflecting the artificial intelligence and performance relationship available in the strategic management literature.

Table 7. A Literature Summary Showing The Link Between Artificial Intelligence And Company Performance

Writer	Subject	Focus Area
Miller (1988)	A Taxonomy of Technological Settings- Strategic Orientation of Business Enterprises	- establishing a link between technology and firm performance
Nguyen et al. (1990)	It is concluded that the degree of technological diversification is positively related to firm performance.	- technology-related differentiation strategy and measuring firm performance

Beasley (1990)	The role of intelligent systems in managerial problem formulation: An empirical investigation of statistical support systems	- decision making - information processing - intelligent systems
Galal (1997)	Assessing the impact of choices in technology, structure, and strategy on productivity: An empirical study in the United States life insurance industry	- impact of the interaction between IT and structure on productivity contingent on strategy choices
Ernest (1998)	Information strategy: A model for integrating competitive strategy, organizational structure and information systems	- information systems strategic planning
Zhang (1998)	Information systems, organizational competencies and firm performance	
Wilson (1999)	The influence of technology strategy on initial public offering performance (IPO), post-IPO enterprise performance	- technology management - firm performance
Henry (1999)	IT Investment Opportunities and Their Returns	- competitive necessity - transformational IT - strategic application
Sandra (2010)	Role of Information Systems in Competitive Actions and Firm Performance	- the effect of information systems upon firm performance through the competitive dynamics
Bahrammirzaee (2010)	A comparative survey of artificial intelligence applications in finance	- usage areas in finance and performance measurement
Pierce (2002)	The effect of business and information technology strategic alignment on information technology investment returns and corporate performance	- the dimensions of information technology business decision information systems for business executives in developing strategic alignment of business goals
Schoenecker, Swanson (2002)	Indicators of firm technological capability: validity and performance implications	- technological capabilities influence on firm performance
Giguere (2004)	High-growth strategies of entrepreneurial firms in technology industries	- high-growth entrepreneurial firms and the strategies - venture strategies
Strassmann, P. A. (1990)	Does information technology provide banks with profit?	- banking industry and productive in innovation regarding informatic systems and technologies
Nordlander (2011)	Survey AI in Business	- case studies for companies in different companies after AI implementations
Hilovska and Koncz (2012)	Application of Artificial Intelligence and Data - literature	- comparison of financial profitability with AI techs
Stalidis, G., et al. (2015).	Marketing Decision Support Using Artificial Intelligence and Knowledge Modeling	- Technologies such as data mining/analytics, predictive modeling, and big data rapidly advance - become authoritative tools in contemporary marketing and banking

Aydiner (2016)	Measuring the Impact of Information System Capabilities on Firm Performance	- information systems capabilities - decision making performance and business performance
Tkáč (2016)	Artificial neural networks in business Two decades of research	- usage areas in business article collection
Obinkyereh (2017)	Cloud Computing Adoption: A Quantitative Study Based on Technology Acceptance Model (TAM)	- cloud computing - technology acceptance
Villard et al. (2018)	Big Data Analytics, Machine Learning, and Artificial Intelligence in Next-Generation Wireless Networks	
Choi (2018)	Predicting Customer Complaints in Telco	- churn management - predictive analysis with machine learning models
Doğan (2018)	The Application of Artificial Intelligence in New Age of Marketing: An Analysis on AI Mobile Banking Apps	- research on AI mobile banking apps and their effects on mobile adoption using an updated version of the TAM model and TAM2 model
Chen H. (2019)	Success Factors Impacting Artificial Intelligence Adoption Perspective from the Telecom Industry in China	- factors regarding the external environment, organizational capabilities - innovation attributes of AI
Chen J. (2019)	The Augmenting Effects of Artificial Intelligence on Marketing Performance	- artificial intelligence acceptance - marketing performance
Öztürk (2019)	Transfer of Banking Operations to Artificial Intelligence Applications	- artificial intelligence in banking from customer perspective
Patil, Kulkarni (2019)	Artificial Intelligence in Financial Services: Customer Chatbot Advisor Adoption	-usefulness of chatbot services in banking
Belanche, et al. (2019)	Artificial Intelligence in FinTech: understanding robo-advisors adoption among customers	- AI impact on customers - managerial impact
Patil and Kulkarni (2019)	Artificial Intelligence in Financial Services Customer Chatbot Advisor Adoption	- customer satisfaction impacts from performance perspective
Richards, et al. (2019)	Business Intelligence Effectiveness and Corporate Performance Management An Empirical Analysis	

Source: Prepared by author

6.6 MEASURING BUSINESS AND IT STRATEGIES CORPORATE PERFORMANCE

IT has really challenged the world's economic systems to do business quickly and in a flat world where nations, companies, and business applications are so integrated through Internet and electronic highways, through the design of IT governance structures for all IT activities and the integration for economic viability for any initiative matters as argued

by Patel (2002). Therefore, it is important to know the impact of good IT governance practices in terms of return on investment (ROI), return on assets, and the value of organizational assets (VOA) as mentioned by Weill & Ross (2004) (Kurien:5). Despite a few research studies since the late 80's that have focused on measuring the fit gap between business and IT strategies, few attempts have been made to measure the extent to which an information system supports or fits with company strategy as pointed out by Chan (1992) (Pierce, 2002:9).

Venkatraman (1985) developed a scale to measure business strategy named Strategic Orientation of Business Enterprises (STROBE) as a tool to give meaning to business strategy, which is the theoretical variable. It takes a comparative approach to defining difference across a set of features that collectively define the firms' business strategy structure. The focus of the work is on consistency in the decision-making model to achieve the goals of the business unit. Venkatraman concludes that, to be competitive, firms must integrate their business and IT plans to ensure that IT supports their business objectives, which include accounting, manufacturing, finance, marketing, research and development and the like (Pierce, 2002:9). Venkatraman (1985) first proposes eight features as criteria for business strategy. These are:

- 1) Aggressiveness – an effort to improve competitive position.
- 2) Analysis – to delve deeper into the roots of problems.
- 3) Aggression - emphasizing cost reduction and efficiency.
- 4) Future - emphasizing the longer term rather than the short-term profitability of the organization.
- 5) Innovation - in adopting new technology for a firm's own use and trying new solutions to problems.
- 6) Pro-activity - taking initiative in opening new markets, producing new products, and introducing new ways of serving customers.
- 7) Risky - willingness to fund and experiment with innovative approaches. and
- 8) Uniqueness – to differentiate the firm from its competitors. Because it was dropped as several refined indicators were not obtained for the last feature (Pierce, 2002:53).

STROIS Model; in this thesis Chan (1992) repeats Venkatraman's work and develops a tool called STRategic Orientation of ISs (STROIS) to describe IS strategy modeled after STROBE. She developed STROIS as a parallel tool to Venkatrman's STROBE (1985, 1989) and reused many of the same dimensions, but expressed them in terms of ISs. "For each STROBE item measuring company strategy, a parallel STROIS item was created to determine whether information systems were being used by company personnel to facilitate that particular aspect of business strategic orientation." Chan, Huff, Barclay and Copeland (1997) found a positive relationship between IS strategic alignment and business performance. The research was based on surveys of pharmaceuticals, manufacturing, banking, and insurance industries. The business performance model included market performance (sales growth, market share gain), financial performance (cash flow, profitability, ROI and net margin), products and service innovation and reputation (product/service development, technological development, frequency of new product/service launch, reputation among key customer segments) (Pierce, 2002:54).

Chan (1992, 1997) uses both STROBE and STROIS in their research covering 164 business units in pharmaceutical, manufacturing, auto parts manufacturing, banking, and insurance in the U.S. and Canada. For alignment, they use and measure eight relevant dimensions of business and IT strategies. They use product-service innovation, financial performance, market growth, and company reputation for results. They found that the fit between business and IT strategy was strongly associated with more product-service innovation, weakly correlated with market growth and financial performance, and this alignment was negatively associated with company reputation. They also find positive correlation between greater alignment of business and IT strategies and the effectiveness of information systems as written in Iansiti and West's (1997) work (Pierce, 2002:10-11).

Strategic Alignment Model (SAM) is an additional model developed by Henderson and Venkatraman (1993) to conceptualize and guide the emerging field of strategic choice: business strategy, information technology strategy, organizational infrastructure and process, and information technology infrastructure and process - each with its own unique characteristics. The authors argue that the failure to realize value from IT investments is due to misalignment between the business and IT strategies of

organizations (Pierce, 2002:10). The SAM model was developed on the basis of two hypotheses. First, economic performance is directly related to the ability of management to create a strategic alignment between an organization's position in the competitive product-market space and the design of an appropriate administrative structure to support its practices. Second, strategic alignment is a continuous process of adaptation and change, not an event (Pierce, 2002:57).

Henderson and Venkatramn's (1993) strategic alignment model (SAM) explored and provided a framework for aligning IT and business by identifying four dominant alignment perspectives (Kurien, 2013:5). The first two perspectives view business strategy as the driving force, and the third and the fourth perspective view IT strategy as the facilitator and enabler (Pierce, 2002:58). These are:

1) Executing strategies derived from top management (177 – Kurien, 2013:5): Strategy execution - a traditional, hierarchical perspective of strategic management that reflects a top-down approach in which top management is the strategy creator and IT management is the strategy executor. The evaluation of IT functions is based on monetary criteria that reflect a cost center orientation (Pierce, 2002:58). This perspective relies on the notion that a business strategy has been articulated and is the driving force behind organizational design decisions and the design of IS infrastructure. Specifically, we argue that the IS manager's role should be that of the strategy implementor, who designs and implements the necessary IS infrastructure and processes to support the selected business strategy. In this context, the performance criteria for evaluating the IS function are based on financial parameters that reflect a cost center orientation (Venkatraman & Henderson, 1993:477).

2) Technology and competitive potential where business strategy is the driving force that determines IT strategies (Kurien, 2013:5): Technology transformation - the chosen business strategy is implemented through an appropriate IT strategy and the definition of the required IT infrastructure and processes. This viewpoint emphasizes the influence of business strategy on IT strategy (Pierce, 2002:58). This alignment perspective entails evaluating the implementation of the selected business strategy by articulating the appropriate IT strategy and IS infrastructure and processes (Venkatraman & Henderson, 1999:477). These perspectives highlight the influence of business strategy (particularly

distinctive competency) on IT strategy and the repercussions for IS infrastructure and processes. In order to aid managers in the development of this strategy, technology forecasting and various architectural planning techniques are employed. In this view, the role of executive leadership is to provide support for the selected business strategy (Venkatraman & Henderson, 1993:478).

3) Coordinating IS structures and processes with organizational infrastructure and processes (Kurien, 2013:5): Competitive potential - emphasizing the use of emerging technology to influence new products and services (business scope), influencing key strategy attributes (distinctive competencies), and developing new forms of relationships (business governance). This perspective enables the customization of business strategy to identify the optimal set of strategic options for business strategy and the pertinent set of enterprise infrastructure and processes decisions (Pierce, 2002:58-59).

4) Service level agreements decided by the compliance model to deliver and continuously improve services that provide competitive advantage (Kurien, 2013:5): Service level - concentrates on constructing a global IS services organization. This requires knowledge of both the external aspects of IT strategy and the internal design of IT infrastructure and processes (Pierce, 2002:59).

Venkatraman (1993) states, "We consider strategy to involve both formulation (decisions regarding competitive, product-market choices) and execution" (choices that pertain to the structure and capabilities of the firm to execute its product-market choices). Our conception of strategic alignment is predicated on two fundamental tenets: The ability of management to create a strategic fit between an organization's position in a competitive product market and the design of an appropriate administrative structure to support its execution is directly related to economic performance (Venkatraman & Henderson, 1993:472). Thus, they propose three group options for the organization's position on the IT market:

1. Information technology scope – particular information technologies (e.g., electronic imaging, local and wide-area networks, expert systems, and robotics) that support existing business strategy initiatives or can shape new business strategy initiatives for the

organization. This is comparable to the business scope that addresses product-market offerings in the output market (Venkatraman & Henderson, 1993:474).

2. System competencies – Attributes of the IT strategy (e.g., system reliability, cost-performance levels, interconnectivity, and flexibility) that can positively contribute to the development of new business strategies or better support existing business strategies. This is comparable to the concept of a business's distinctive competencies, which deal with those strategic attributes (price, quality, value-added service, and superior distribution channels) that contribute to a company's unique, comparative advantage over its rivals (Venkatraman & Henderson, 1993:474).

3. IT governance – selection and utilization of various partnerships, such as joint ventures with vendors, strategic alliances, joint research and development for new technology capabilities, in order to acquire the necessary competencies. This relates to corporate governance, which involves corporate strategy.

The Strategic Alignment Model requires the identification of two types of business and IT/domain integration. The first component, known as strategic integration, is the connection between business strategy and IT strategy that reflects the external components. It focuses specifically on the capacity of IT functionality to both influence and support business strategy. IT is emerging as a major source of competitive advantage for businesses, making this ability an especially vital strategic asset (Venkatraman & Henderson, 1993:476).

The Strategic Alignment Model requires a fundamental shift in the focus of the IS function from an internal orientation to one of strategic relevance within the IT field, the recognition of the external IT market in terms of the breadth of technologies, towards the desired level of competencies, and the concentration on governance (Venkatraman & Henderson, 1993:480).

"Measures and performance information should be linked to strategic management processes." says Gao (1998) They released many questions to identify how IT contributes to achieving improved program outcomes. However, it is understood that measures such

as machine hours are easy, but how to measure the business value of applications is difficult (Pierce, 2002:12). Measuring IT ROI remains challenging because there are no simple answers to questions about how IT should be measured and managed. There is still no consistency in what is being measured, and a single measure for evaluating IT performance cannot be upon. And because of the complex environments that affect IT performance measurement, there is no best approach to IT management as written in GAO (1998). IT is an enabler and therefore corporate business processes affect the roles of IT with different emphasis on a particular industry (Pierce, 2002:13).



7 MEDIATOR ROLE OF ARTIFICIAL INTELLIGENCE IN THE IMPACT OF CORPORATE STRATEGIES AND COMPETITIVE STRATEGIES ON COMPANY PERFORMANCES

7.1 RESEARCH PURPOSE

The business environment in today's economy is highly dynamic. Many businesses are starting to use technology more intensively due to reasons such as the rapid change and increase in product and service options, the shift of power to the customer, time-based competition, and the emergence of alternatives to owning from different channels with more competitive costs. As a result, the world is moving towards incorporation of robots and artificial intelligence in various industries.

As noted in the preceding sections, companies in a competitive environment attempt to develop two distinct competitive strategies. One of them is adopting the cost leadership strategy and processing the value chain in the most efficient manner in order to produce the product or service at the lowest possible price without sacrificing quality. The second objective is to distinguish the company from its rivals by employing the differentiation strategy to produce a unique product or service, to be creative and innovative, and to offer superior quality, improved appearance, and simpler processes and working methods. Artificial Intelligence refers to information technology systems that perceive, comprehend, act, and learn in tandem with the development of information technologies. Artificial Intelligence is comprised of a variety of technologies, such as sound processing and sensor processing, that enable computers to perceive the world, analyze and comprehend collected data, such as natural language processing or information presentation, make informed decisions or suggest actions, and learn from experience. Artificial intelligence enables new work patterns in fields such as health, agriculture, education, finance, telecommunications, and transportation by providing ground-breaking innovations.

Artificial intelligence is being adopted on a larger scale across industries, value chains, and ecosystems, as observed. Artificial Intelligence technology is rapidly approaching a tipping point where cross-industry company strategies are essential for increasing revenue and profits and remaining competitive. According to surveys conducted by various research firms, the emphasis on Artificial Intelligence has a direct effect on

management strategies to gain a competitive advantage, resulting in product-service differentiation or cost reduction. Companies typically expect to utilize AI at four key points. These areas are optimizing operations, attracting customers, enabling the transformation of products and services, and empowering employees. Each domain depends on fundamental AI capabilities. Aligning company strategies to apply AI to these domains has the effect of transforming the business and, ultimately, the business itself as well as its operating industries and ecosystems.

However, it is observed that its technological potential cannot be fully evaluated, there are hesitations about how it can create value or how to start, and many Artificial Intelligence applications are unsuccessful. Rather than developing an Artificial Intelligence strategy for companies, it is anticipated that their corporate strategies will be supported and transformed by Artificial Intelligence systems.

Despite the fact that the success of AI sectoral applications from manufacturing to information services indicates a growing impact on the economy, there is disagreement regarding the precise nature of this impact and how to differentiate the impacts of AI technologies.

AI is becoming increasingly popular, but AI academic research is still in its infancy. Existing AI research focuses primarily on the technical aspects of AI in engineering departments, searching for the benefits, differentiating characteristics, and application areas of AI algorithms. In the business section, the emphasis is primarily on definition, case studies of AI best practices in leading organizations, critical success factors, and maturity and adoption models. The researchers of private research organizations conducted informative empirical studies that measure the attitude towards AI integration in business environments and processes.

Because of this, the relationship between business strategies and AI technologies, as well as the significance and critical business values of AI, and the impact on business impacts from the perspective of company strategies is ambiguous. In addition, those studies were conducted outside of Turkey, where the markets and working conditions are distinct from

those in Turkey, and a similar study has not been conducted within the context of Turkish conditions.

This research aims to evaluate the mediator role of artificial intelligence in the impact of corporate strategies and competitive strategies on company performances. A further objective of this study is to contribute to both the local and international research communities by means of an empirical and informative study involving managers and decision-makers in Turkey regarding the use of artificial intelligence.

7.2 RESEARCH IMPORTANCE

Currently, a number of studies examine the application of AI technologies in particular fields based on engineering research capabilities. As depicted in literature reviews, some studies investigate the theoretical basis for AI and its applications, while others investigate AI adoption, particularly at the organizational level.

Concurrently, strategic management concepts are prevalent in Turkey. This paper adds to the current understanding of corporate and competitive strategies and their effects on company performance. Existing research has not examined concurrently the relationships between competitive strategies and firm performance in the context of digital technologies in Turkey's developing economy. This paper seeks to address this deficiency and contribute not only to the literature on strategy implementation but also to the literature on information technology frameworks by focusing on the strategy and digital technologies such as artificial intelligence and performance paradigm. In this study, we investigate the interrelationships between corporate and competitive strategies in the developing economy of Turkey, as well as the effect of these strategies on firm performance as measured by the usage of artificial intelligence.

Despite the prevalence of technology, managers and developers have limited knowledge of the practical aspects of AI, management, and the interaction between organizations. This is an important topic because the success of an AI system is contingent upon the resolution of a variety of technical, strategical, managerial, and organizational problems; however, academic research is limited. There are at least two reasons why there are fewer studies on AI, management, and organizational interaction than on other information

systems. First, compared to conventional information systems, the majority of AI applications are relatively new, which limits our collective understanding of their organizational implications. Second, from the early to mid-1980s, technical development issues (such as knowledge acquisition, programming, and system validation) dominated non-technical organizational issues of a broader scope. Consequently, the relationship between AI, management, and organizations is a young field of study (Duchessi et al., 1993:151).

This study's emphasis is not only empirical, but also informative and exhaustive. This dissertation's theoretical section is comprised of a literature review and sectoral interpretations for the finance and telecommunications industries. The motivations and analyses discussed are intended to increase awareness of the significance of adopting cognitive computing technologies and AI systems in general. By examining the perspectives of managers in Turkey, the interpretations of the findings of this survey-based research were conducted to help provide recommendations for businesses. Due to the dearth of empirical academic research that investigates the current or potential effects of AI integration in business environments, this research can make a significant contribution to the academic research community. In addition, the findings of this research suggest avenues for future research.

7.3 RESEARCH MODEL AND VARIABLES

According to Webster and Watson (2002), the research framework and hypotheses must be supported by a theoretical explanation, previous empirical findings, and empirical findings from related research fields (Alsheibani et al., 2018:5). Numerous models were used to examine variables influencing the adoption or rejection of information technology within the corpus of information systems literature (IT). Commonly used models in IS research include:

- Ajzen and Fishbein's (1969, 1980) theory of reasoned action (TRA),
- Davis' (1989) technology acceptance model (TAM),
- Chakrabarti, Tornatzky, and Fleischer's (1990) technology organization environment (TOE),
- Ajzen's (1991) theory of planned behavior (TOPB),

- Rogers' (1995) diffusion of innovation theory (DOI),
- Venkatesh et al.'s (2003) unified theory of acceptance and use of technology (UTAUT), and.

These models have been validated and applied to the investigation of the impact or influence of variables on user adoption activities (Summers, 2018:52).

The Technology Acceptance Model is one of the most widely used models (TAM). TAM is one of the most effective frameworks for comprehending users' responses to technological innovations, as it can explain consumer adoption of numerous innovations in great detail. According to Venkatesh and Davis (2000), Venkatesh et al. (2003), and others, this model has been widely used in the prior literature, both in the finance and online environments (Belanche et al., 2019:4). Davis's (1989) Technology Acceptance Model (TAM) is a two-part theory that describes the process by which a leader decides when and how to implement a new technology when presented with it. The theory asserts that technology is more likely to be accepted if it is perceived to be both useful and simple to use. The first component of the theory, perceived usefulness, refers to the extent to which a leader believes that technology will be advantageous to the organization. The second component of the theory, perceived ease-of-use, refers to the degree of simplicity a leader believes is required to obtain value from technology (Castillo, 2014:22). Davis proposed the TAM model in 1989 to explain how human behavior can adopt accepted technology and be prepared to use it. TAM described the adoption and utilization of innovations supported by technology. TAM has been expanded and modified for various technology-related adoptions as an option for utilizing the technology and user interface characteristics (Patil & Kulkarni, 2019:2).

At the organizational level, Tornatzky and Fleischer (1990) propose the technology-organizational environment (TOE) framework to explain how technological and environmental factors influence the adoption of technological innovation by organizations (Chen, 2019:42). Tornatzky and Fleisher (1990) created the TOE framework by identifying the factors influencing technology adoption. The TOE framework identifies three context factors that influence the technological innovation process within a company: the technological context, the organizational context, and the

environmental context (Tornatzky & Fleischer, 1990). The technological context comprises internal and external technologies pertinent to the organization. The organizational context comprises the company's characteristics and resources. The environmental context consists of market factors, competitors, and the regulatory setting. According to Yang, Kankanhalli, Ng, and Lim (2013), TOE is a more comprehensive lens for examining the adoption of IT innovations at the organizational level (Chen, 2019:44-45).

In the early nineties, Henderson and Venkatraman (1993) developed their own Strategic Alignment Model (SAM), differentiating between strategic alignment and operational alignment. Several authors have since added commentary and additional information to this concept (e.g. Avison et al. (2004), Bum and Szeto (2000), Croteau and Bergeron (2001), Feurer et al. (2000), Luftman (2000), Luftman and Brier (1999), Patel (2003), Smaczny (2001) and Teo and Ang (1996)) (De Haes, 2007:22). Henderson and Venkatraman's (1993) strategic alignment model (SAM) explored and provided a framework for aligning IT and business by identifying four dominant alignment perspectives. These are:

- 1) execution of strategies derived from top management.
- 2) technology and competitive potential, where business strategy is the driving force that determines IT strategies.
- 3) coordinating Information systems architectures and processes with organizational infrastructure and processes.
- 4) service level agreements agreed by the compliance model to fulfill and continuously improve services that provide competitive advantage by Henderson & Venkatraman (1993) (Kurien, 2013:5)

DOI is another framework widely used in IT adoption research at the organizational level, as concluded by a number of authors, including Chong, Ooi, Lin, and Raman (2009) and Oliveira and Martins (2011) (Chen, 2019:43). DOI Theory (Rogers, 1995) suggests that the diffusion of a technological innovation depends on innovation characteristics such as relative advantage, complexity, compatibility, observability, and trialability, as supported by Rogers (1995), Oliveira & Martins (2011), and that these five

factors have varying impact ratings across the five adopter categories. Individual and organizational characteristics are highlighted as predictors of organizational innovation (Chen, 2019:44). DOI theory identifies five innovation characteristics that may be required for innovation adoption: relative advantage, compatibility, complexity, trialability, and observability (Alsheibani et al., 2018:4). Relative advantage refers to the degree of added benefits in comparison to an existing innovation (Alsheibani et al., 2018:4). As described by Rogers (1995), Hasheela, Smolander, and Mufeti (2016), a relative advantage is the extent to which a technology is more useful or advantageous to an organization than existing offerings (Summers, 2018:60). Compatibility/Compliance refers to how well a new product or service integrates with the organization's current offerings. Complexity is the difficulty of comprehending and implementing innovation (Alsheibani et al., 2018:4). Complexity is the degree of difficulty encountered when utilizing a technology or, in the context of the Digital Object Identifier (DOI), the perceived ease of use (PEOU) (Summers, 2018:60). Trialability refers to innovation's ease of use and testing. Rogers (1995) defines observability as the degree to which potential innovation is detectable (Alsheibani et al., 2018:4). According to Hasheela, Smolander, and Mufeti, trialability is the opportunity for users to use or experience the technology during a trial period prior to actual business use (2016). According to Moore & Benbasat (1999) and Rogers (1995), compatibility/conformity refers to the degree to which the use of technology meets the current organizational needs (Summers, 2018:60). According to Wu and Chiu (2015), the ability to be observable is the extent to which users realize the positive benefits of technology (Summers, 2018:60).

Several IS studies have investigated firm-level DOI in various areas, including e-business adoption (Zhu et al., 2006), enterprise resource planning (Bradford and Florin, 2003), and cloud computing (Yang et al., 2015) (Alsheibani et al., 2018:4).

Researchers continue to employ TAM in numerous disciplines to explain the technology adoption behavior of end users. Additional research would examine the variables that influence how market orientation and internet use affect the dynamic capabilities of small and medium-sized businesses, as stated by Caniels, Lenaerts, and Gelderman (2015), teleconferencing technology by Park et al. (2014), small and medium-sized enterprise

ecommerce adoption by Awa, Ojiabo, and Emecheta (2015), as well as the use of cloud computing technologies by college students by Quan et al. (2013) (Summers, 2018:63).

Tornatzky & Fleischer's (1990) technology-organization-environment (TOE) framework, Scott's (1987) institutional theory, and Wernerfelt's (1984) resource-based view of the firm have all contributed to a large body of literature on disruptive technology acceptance. They provide solid theoretical foundations for the application of an AI acceptance model (Chen, 2019:15).

In theory, knowledge is the connecting factor between AI tools and business performance. A more compelling question, however, is how new techniques are used to build this knowledge and in what marketing activities they can be implemented. The framework by Martnez-López and Casillas (2013) provides examples of how AI-based systems and machine learning techniques can be implemented in a variety of marketing activities and strategies (Chen, 2019:15).

Based on these framework literature and Artificial intelligence innovations concept, the following attributes of Artificial intelligence have been used in this research.

7.3.1 Attributes of Artificial Intelligence Based on Research Model

In terms of the technological context, AI's innovation characteristics reveal the most important factors for AI adoption. In the available literature, researchers such as Chau & Tam (1997), Kwon & Zmud have investigated the impact of innovation characteristics on the innovation process (1987). Although Rogers (1995) identified five innovation characteristics in DOI theory, namely compatibility, relative advantage, complexity, trialability, and observability, only the first three were consistently related to innovation adoption at the enterprise level, as stated by Tornatzky & Fleischer (1990), Wu et al. (2007), and Tornatzky & Fleischer (1995) (Chen, 2019:51).

7.3.1.1 Compatibility

According to numerous authors (Azadegan & Teich, 2010; Chong & Bauer, 2000; Dedrick & West, 2004; Oliveira et al., 2014), compatibility/compliance is a crucial factor in innovation adoption (2014). As described by Rogers (1995), it refers to the extent to

which an innovation provides value and experience while being consistent with the needs of potential adopters (Chen, 2019:51).

According to Igarria et al., perceived usefulness has received extensive attention in adoption research (1996). In the Technology Acceptance Model (TAM) field, it is referred to as the subjective probability that the use of technology will improve a user's performance on a specific task. In the consumer domain, Zeithaml (1988) argued that the concept of usefulness is conceptually similar to product quality as the customer's cognitive evaluation of the excellence or superiority of a product (Young, 2010:13).

Rogers (1962) defined compatibility as the extent to which an innovation is perceived to be consistent with current values, prior experiences, and the needs of prospective adopters (Young, 2010:14).

Numerous studies, such as Ifinedo (2005), Yang (2015), Yan (2009), and Zahi (2007), have demonstrated a positive correlation between compatibility and innovation adoption intent (2010). Rogers (1995) defines compatibility as the innovation's scope and its capacity to provide value and experience while meeting the needs of anticipated adopters. Successful AI transformations, according to Chui (2017), require a solid AI business rationale and must be aligned with existing strategies (Alsheibani et al., 2018:6).

7.3.1.2 Relative advantage

Relative advantage is the extent to which an innovation is viewed as superior to the method it replaces (Yang et al., 2013). Rogers (2003) notes that the perceived benefit of innovation influences a company's decision to adopt innovative technology. According to Greenhalgh, Robert, Macfarlane, Bate, and Kyriakidou (2004), new technologies that have clear and unambiguous advantages in creating strategic and operational effectiveness are more likely to be adopted (Chen, 2019:52)

Firms are compelled to adopt the most up-to-date information technologies to enhance their business operations due to fierce market competition and a rapidly changing business environment. The combination of AI technologies and vast amounts of data will bring innovation and competitive advantages to businesses inevitably. These applications reduce the operational costs of businesses, improve their service quality and customer experience, and boost their productivity (Chen, 2019:52).

Relative advantage refers to the perceived benefit of a company adopting AI. In the context of this study, perceived AI benefits refers to the extent to which AI is perceived to be superior to other competing technologies (Zahi, 2010). Rogers (2003) concluded that the perceived usefulness of an innovation has a substantial impact on a company's intent to adopt innovative technology. In addition, previous research such as Aboelmaged (2014), Kumar et al. (2016), Hung (2016), Ifinedo (2005), and Zhai has been conducted (2015). Yang (2015) discovered a correlation between the relative advantage of a new technology and its acceptance. AI enables an organization to gain a competitive advantage, reduce costs as stated by (Press, 2016) and business opportunities to transfer into new businesses as stated by Ransbotham (2017), increase top-line profits, boost productivity, and enhance human intelligence as stated by Curran & Purcel (2005). When companies adopt AI, technologies such as deep learning (DL), natural language generation (NLG), and machine learning (ML) provide a competitive advantage, as noted by Curran & Purcel (2017) (Alsheibani et al., 2018:4).

7.3.1.3 Complexity

The complexity, according to Yang et al. (2013), is the degree to which the innovation is perceived to be relatively difficult to understand and use. In other words, complexity creates adoption barriers for AI. AI is difficult due to its immaturity, lack of technological expertise and IT specialists, high cost, and lengthy development time. Previous research has shown that the level of IT maturity has a significant impact on the strategic decisions of businesses regarding the acquisition and deployment of IT/IS. If a new technology has reached maturity, businesses are more knowledgeable about its implementation. According to Huang & Palvia, firms are more likely to adopt a new technology if they can collaborate effectively with vendors (2001). AI is still in its infancy, and many businesses do not fully comprehend AI technologies. Given that AI technologies are still evolving and changing, it is currently difficult to calculate the ROI of AI. Expensive and resource-intensive AI initiatives and pilot testing cannot guarantee that they will bring the anticipated benefits (Chen, 2019:53).

Complexity (Ease of Use) (Ease of Use) Complexity is the degree to which an innovation is perceived to be difficult to comprehend and employ. According to Rogers, some innovations are easily understood by the majority of members of a social system, while others are more complex and adopted more slowly (1962). In the TAM field, Davis et al.

(1989) defined ease of use as the capacity of users to independently employ a given technology without difficulty (Young, 2010:18).

In consequence, the research model has been defined in Figure 12.

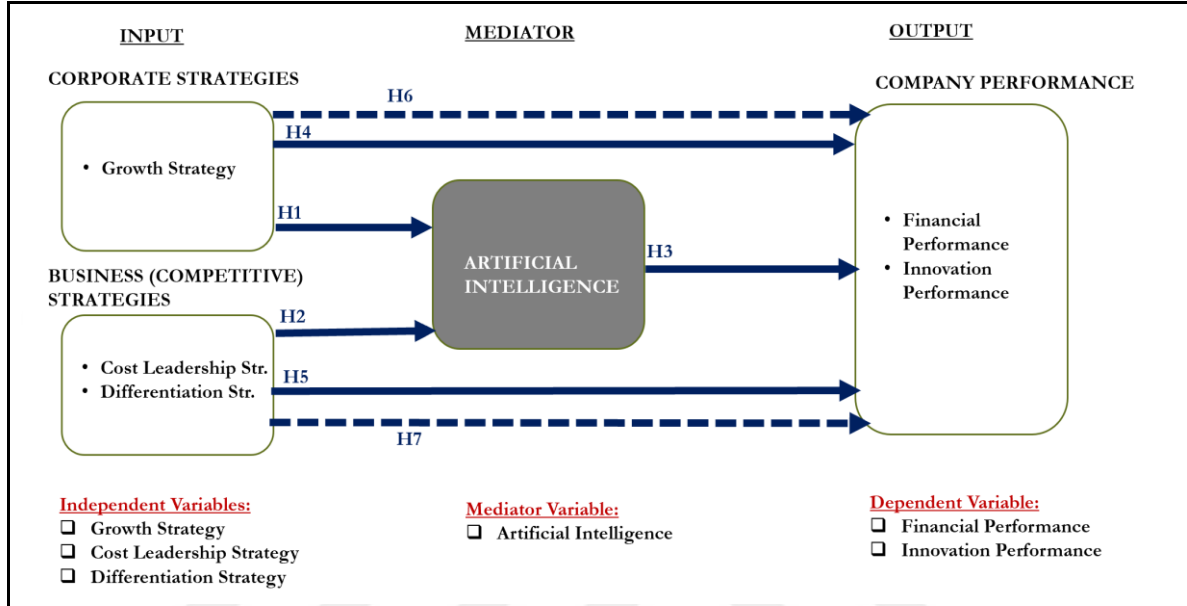


Figure 12. The research model

In the study, the independent variables are the growth strategy component of corporate strategies and the cost leadership and differentiation strategies of competitive strategies as input. And the dependent variables are the financial and the innovation performance metrics of company performance. Artificial intelligence is the mediator variable of which will be measured as the mediator impact.

7.4 RESEARCH HYPOTHESES

Numerous studies have examined Porter's overall strategies in various industries. Numerous studies indicate a positive correlation between Porter's overall strategies and firm performance. As supported by Yang, Xun, and He, it has been observed that firms employing cost leadership and/or differentiation strategies can achieve superior market share and profit performance (2015). Hoque (2004) discovered a correlation between the organization's choice of strategy and its non-financial performance. In this study, both financial and nonfinancial aspects of firm performance are considered. Banker, Mashruwala, and Tripathy (2014), Ruiz Ortega and Garca-Villaverde (2008), and Voola and O'Cass (2010), among others, have examined the relationship between cost-

leadership and differentiation strategies and firm performance in numerous industries and countries (Hançerlioğulları et al., 2016:41).

According to Frambach, Prabhu, and Verhallen (2003), cost leadership and differentiation strategies have a positive and significant direct effect on new product development activity. According to Porter (1980), the cost-leadership strategy can result in a certain amount of process innovation. To implement cost leadership requires cost minimization and cost reductions based on experience, tight cost and overall control in various areas such as services, advertising, and R&D; to minimize these costs, it is necessary to either eliminate expenditures (e.g., no more advertising, reducing R&D budgets, etc.) or suggest innovative improvements. Similarly, Frohwein and Hansjürgens (2005) suggested that for a company to gain a cost-leadership advantage, it should engage in innovative activities and prioritize cost reduction. Qin (2007) argues that innovation enables an organization to achieve economies of scale, lower costs, and increase market share. According to Gunday et al (2011) 's research, innovation aids the company in reducing production and delivery costs and enhancing quality characteristics. Hilman and Kaliappen (2014) demonstrated that a cost-leadership strategy has a substantial impact on process innovation, which has a substantial impact on organizational performance. Li and Calantone (1998) support the notion that organizations must be innovative in order to survive in a fiercely competitive environment and gain a competitive advantage (Hançerlioğulları et al., 2016:41-42).

According to Lippert & Govindarajulu (2006) and Sumner (2000), the adoption of new technology is frequently a strategic necessity for market competition (Chen, 2019:62). According to Damanpour (1991), the adoption of innovation typically aims to improve the company's performance (Hançerlioğulları et al., 2016:6). Porter and Millar (1985) state that IT innovation can alter industry structure, alter the rules of competition, exploit new ways to outperform rivals, and alter the competitive landscape. Mansfield et al. (1977) discovered that intense market competition promotes the rapid spread of IT innovations. As explained by Gibbs & Kraemer (2004) and Kuan & Chau (2001), competitive pressure is a key factor in IT adoption (Chen, 2019:62). Companies that are aware of environmental changes are likely to exert pressure for change. It is expected that technologically opportunistic companies will be aware of technological

advancements and invest more resources to adopt new technologies. Dutton and Duncan (1987) theorized that strategy research suggests that when an organization's decision makers perceive a strategic issue as an opportunity (as opposed to a threat), they view it positively and believe they have more control over the outcomes (Chen, 2019:43).

According to Oliveira and Martins (2008), the adoption of new technologies is frequently a necessary competitive strategy for businesses. When competitors adopt new technologies, firms experience pressure. In order to maintain their competitiveness, they tend to adopt these technologies immediately (Chen, 2019:43). According to Oh, Cho, and Kim (2015), a firm's strategic innovation decisions have a positive effect on its market performance in mid- to high-technology industries. Calantone, Cavusgil, and Zhao (2002) proposed and confirmed that greater innovation performance results in greater firm performance (Hançerlioğulları et al., 2016:42). In these situations, managers are likely to take proactive action. Technologically opportunistic firms will perceive technology developments as potential sources of growth for the firm, have the ability to perceive and respond to radical technology, and consequently have a more positive attitude toward adopting it (Chen, 2019:44).

The vast data cloud can now be comprehended in a completely novel manner thanks to artificial intelligence. Therefore, a comprehensive strategic vision and strategic plan for Artificial intelligence is the prerequisite and guarantee for its adoption. Armstrong & Sambamurthy (2002), Angeles, Corritore, Basu, & Nath (2001), and others concur that a lack of strategic planning and vision can impede IT innovation (1999). An excellent management team can formulate appropriate marketing strategies, promoting resource sharing, and enhancing organizational effectiveness. Garrison et al. (2015) explain that managerial capability enables businesses to anticipate emerging technologies and leverage them effectively to coordinate business processes with their goals (Chen, 2019:57).

A high level of managerial ability increases the perception of the utility and benefits (relative advantage and compatibility) of new technology and decreases the perception of its risks (complexity). As a result, the company can rapidly adopt AI technologies and applications, improve its performance, and gain a competitive edge (Chen, 2019:58).

Companies that successfully implement new AI technologies to enhance their products and services will gain a competitive advantage. Consequently, competitive pressure compels firms to adopt AI technologies and applications (Chen, 2019:62). AI initiatives are now an integral part of the strategic planning process for the majority of organizations. As senior management plays a central role in shaping organizational strategies, Kohli & Jaworski (1990), Malek, Sarin & Jaworski (2018) add that senior management's role in the context of AI will likely be significant (Chen, 2019:44).

In consequence, the following hypotheses have been proposed:

H1: Corporate Strategies have an impact on Artificial Intelligence.

H1a: Growth Strategy Organic Growth Dimension has an impact on Artificial Intelligence.

H1b: The Growth Strategy Internationalization Dimension has an impact on Artificial Intelligence.

H2: Business (Competitive) Strategies have an impact on Artificial Intelligence.

H2a: The Cost Leadership strategy has an impact on Artificial Intelligence.

H2b: Differentiation strategy has an impact on Artificial Intelligence.

H3: Artificial Intelligence has an impact on company performance.

H3a: Artificial Intelligence has an impact on business financial performance.

H3b: Artificial Intelligence has an impact on business innovative performance.

H4: Growth Strategies have an impact on company performance.

H4a: Growth strategy the Organic Growth Dimension has an impact on business financial performance.

H4b: Growth strategy The Organic Growth Dimension has an impact on business innovative performance.

H4c: Growth strategy The Internationalization Dimension has an impact on business financial performance.

H4d: Growth strategy The Internationalization Dimension has an impact on firm innovative performance.

H5: Business (Competitive) Strategies have an impact on company performance.

H5a: Cost leadership strategy has an impact on business financial performance.

H5b: Cost leadership strategy has an impact on business innovative performance.

H5c: The differentiation strategy has an impact on the firm's financial performance.

H5d: Differentiation strategy has an impact on firm innovative performance.

H6: Artificial intelligence has a mediator role in the effect of the corporate strategies on the company performance.

H6a: Artificial intelligence has a mediator role in the effect of the Organic Growth Dimension of the growth strategy on the financial performance of the business.

H6b: Artificial intelligence has a mediator role in the effect of the Organic Growth Dimension of the growth strategy on the innovative performance of the business.

H6c: Artificial intelligence has a mediator role in the effect of the Internationalization dimension of the growth strategy on the financial performance of the business.

H6d: Artificial intelligence has a mediator role in the effect of the Internationalization dimension of the growth strategy on the innovative performance of the business.

H7: Artificial intelligence has a mediator role in the effect of business (competitor) strategies on company performance.

H7a: Artificial intelligence has a mediator role in the effect of cost leadership strategy on business financial performance.

H7b: Artificial intelligence has a mediator role in the impact of cost leadership strategy on business innovative performance.

H7c: Artificial intelligence has a mediator role in the effect of differentiation strategy on business financial performance.

H7d: Artificial intelligence has a mediator role in the impact of differentiation strategy on business innovative performance.

7.5 RESEARCH DATA AND SAMPLES

The telecommunication and finance industries are an ideal setting to research and to test the strategy and technology relationship and impact. These industries are in a continuous change which is driven by both strategy and technology. That's why that has capability to provide an important area to search.

In the study, managers and/or decision-making personnel in finance, and telecom sectors are discussed as the theoretical main mass. Based on the reports of TMOBB (Association of Chambers of Turkish Engineers and Architects) and TUBISAD (Information Industrialists' Association), there are an estimated 140,525 employees. In this context, the minimum sample quato was calculated as 384 according to 95% reliability and $\pm 5\%$ sampling error.

As Manager definition, it is assumed who are employees engaged in direct or indirect team management has been taken as a basis (example: Manager, manager, team leader..). As decision maker definition, who are employees who are effective in making strategic and/or technological decisions has been taken as a basis (example: Business strategy, analysis, risk management, digital transformation, innovation, corporate architecture teams).

Between January.2021 and February.2021, the 1st PILOT study was conducted with 99 people working in the finance, telecom sectors in Turkey. Between March.2021 and 10.June.2021, the 2nd PILOT study was conducted with 319 people working in finance, telecom and informatics sectors in Turkey. Between 17.June.2021-August.2021, FIELD study was conducted with 574 people working in finance, and telecom sectors in Turkey.

The surveys prepared on Surveymonkey.com were shared with customer contacts as online, and their participation was ensured by informing them about the study. In addition, a call for participation was made by sharing on the LinkedIn job portal with groups created by professional groups specific to telecom and finance. In addition, telephone interviews were made with certain contacts and questionnaires were filled.

7.6 RESEARCH MEASUREMENTS

Each of the scales used in this search has been used in international studies before and has high validity. Likert scale is used to measure the items in each of the scales.

7.6.1 Growth Strategy Measures

Strategic tools associated with different strategies are examined to better understand the strategic directions determined by high growth businesses. The tools were categorized as growth tools and product market tools. To examine growth means, McCann's (1991) measures were used mainly to measure growth means. Growth tools are strategic actions related to expansion, technology strategies, partnerships, and integration of the firm. McCann's (1991) strategic tool metrics to achieve growth were used and proved to be very useful. McCann's different growth tools are strategic actions related to expansion, technology strategies, partnerships, and integration of the firm (Giguere, 2004:58). Chen (2009) has studied and classified McCann's measurements to search for the relationship between growth strategies, firm capabilities, and firm performance. In this study, the final version of Chen (2009) measurement has been used.

7.6.2 Business (Competitive) Strategies Measures

Cost leadership and differentiation strategies are the focus of this research. In literature review, it is observed that most of the measurements for these area have been derived from the basic measurements of Dess & Davies (1984), and (Porter 1980). In our search, Songül (2016) measurement has been used as Turkish version, which has been verified and tested based on the cost leadership and differentiation strategy concept.

7.6.3 Artificial Intelligence Measurement

As mentioned in research model and measurement of strategy and technology strategies literature review sections, there are TAM (technology acceptance) theory by Davis (1989) and other extended frameworks exits such as DOI theory by Roger (1995). Chen (2019) has used and verified these frameworks to measure Artificial intelligence in his search, and this validated measurement has been used in our search to define the artificial intelligence attributes from the technology acceptance dimensions.

7.6.4 Company performance

Most researchers use, on average, a combination of different metrics as financial metrics, such as annual sales growth, annual employment growth, asset growth and annual profit growth (Giguere, 2004:71). Pelham and Wilson (1996) have studied the impact of

strategy on firm financial performance, and it is one of the basic searches for many other studies. These financial metrics have been used in our search. For innovation performance, we used Prajogo (2006) study, which has measured the innovation performance based on technology concept.

7.7 RESEARCH LIMITATIONS

There are two primary causes of delay between recognizing the potential of a new technology and measuring its effects. One is that it takes time to accumulate sufficient quantities of the new technology to have an aggregate effect. The second is that complementary investments are required to obtain the full benefits of the new technology, and it takes time to identify, develop, and implement these complements. Although there are various studies in the national and international literature on cost leadership and business performance of differentiation strategies, there is a limitation due to the lack of studies on artificial intelligence and digitization technologies and approaches, both in the world and in Turkey, for academics. Since there are different perceptions based on businesses and users about the definition, use, prevalence, and measurable level and duration of artificial intelligence, the possibility of providing insufficient and erroneous information constitutes a constraint on the low consistency and reliability in the evaluations made.

7.8 DATA ANALYSIS AND RESULTS

Our analyzes were performed with SPSS 21.0 and AMOS 21.0 program and were studied at 95% confidence level. Based on the responses and answers, the descriptive statics of survey attendances and frequency distribution statistics of variables have been identified at first. Skewness and kurtosis values were checked a for normality test to verify if the distribution is in acceptable ranges. This study works with multivariate analysis to examine factor analysis and variable impacts. Exploratory Factor Analysis is used to make variables more controllable, that is, to reduce and summarize data for each measurement scale. KMO and Bartlett tests were performed in order to understand whether the scale was suitable for factor analysis. Then Confirmatory Factor Analysis (CFA) has been processed, fit indices have been used to determine the adequacy of the model and Cronbach's alpha coefficients have been controlled to verify the reliability level of the scales. The impacts between the variables have been analyzed with the

Pearson correlation test and the correlation coefficient power levels has been determined. Then, mediator variable analysis has been performed, which is a statistical method used to evaluate the findings obtained from studies designed to test hypotheses about how the effect of the independent variable on the dependent variable is transferred with a third variable. Statistical evaluations have been investigated within 95%-99% confidence interval and statistical significance level has been determined as $p < 0.05$, $p < 0.01$.

7.8.1 Descriptive Statistics

Demographic characteristics of research participants summarized is shown in Table 8.

Table 8. Demographic Characteristics Of Research Participants

		n	%
Industry in which your business operates	Telecom	158	27,5
	Finance	226	39,4
	Information Technologies (IT)	188	32,8
	Other	2	,3
Field of activity of the enterprise	National	340	59,2
	International	183	31,9
	Global	51	8,9
Number of employees	0-49	114	19,9
	50-249	204	35,6
	250-1000	107	18,7
	1001 and more	148	25,8
Your Unit	Sales	79	13,8
	Marketing	66	11,5
	Purchasing	26	4,5
	Finance	144	25,1
	IT-Software	27	4,7
	IT-Infrastructure	5	,9
	IT-Data	17	3,0
	IT-Security	20	3,5
	Enterprise Architecture	10	1,7
	Strategy - Innovation	7	1,2
	R&D	45	7,8
	Program/Project Mng	62	10,8
	Human Resources	53	9,2
	Logistic	13	2,3
Your Status	Company Owner	34	5,9

	High Level Manager	101	17,6
	Mid Level Manager	263	45,8
	Subject Matter Expert	176	30,7
Working duration in this company	0-2 years	80	14,0
	3-5 years	236	41,2
	6-10 years	207	36,1
	11 yıl ve daha fazla	50	8,7
Education Status	Üniversite	349	60,9
	Yüksek lisans	209	36,5
	Doktora	15	2,6

The survey is mostly applied to the national branded companies, which produces products and services to the finance and telecommunication sectors, with the ratio of %59.2 and the employees have responded from finance, sales and marketing areas with %25.1, %13.8 and %11.5 for each one. Then program management, service and product development and human resources departments followed with the values %10.8, %7.8, %9.2.

Statistics of artificial intelligence technologies used in the company where the participants work are given in Table 9.

Table 9. Statistics Of Artificial Intelligence Technologies Used In The Company.

		n	%
Artificial intelligence technologies used in your business	Machine Learning	249	43,4
	Smart Robotics	383	66,7
	Neural networks and deep learning	268	46,7
	Text analysis	361	62,9
	Natural Language Processing	334	58,2
	Virtual Asssistants	349	60,8
	Speech recognition	380	66,2
	Image recognition	354	61,7
	Smart mobile	456	79,4
	Blockchain	57	9,9
	Cybersecurity	406	70,7
	AR/VR	237	41,3

	Internet of Things - IOT	15	2,6
	Other	5	,9

Results show that the most applied artificial intelligence technologies the smart mobile applications as %79.4, cybersecurity as %70.7, robo-advisors and automations %66,7, speech and image recognitions with %66.2 and %61.7 and virtual assistants as %60.8 The advanced technologies such as blockchain and Internet of Things technologies have less usage areas with the ratio %9.9 and %2.6, respectively.

Statistics regarding the usage areas of artificial intelligence and digital technologies in the companies where the participants work are given in Table 10.

Table 10. Statistics Regarding The Usage Areas Of Artificial Intelligence And Digital Technologies In Companies

		n	%
Artificial intelligence and digital in your business usage areas of technologies	Customer service (product-service customization, customer and supplier access channels, responsiveness, adding emotion, creating experiences, identifying expectations and needs, etc.)	49 2	85, 7
	Process optimization (Automating processes, monitoring results, predicting trends, generating recommendations, etc.)	45 7	79, 6
	Product-service transformation (Adding data services, creating new business models, expanding access, etc.)	37 9	66, 0
	Employee development (Increasing productivity, enabling innovation, new talent discovery, training, etc.)	36 1	62, 9

The study statistics resulted that companies use artificial intelligence technologies mostly to serve better customer services by customizing and to differentiating the customer requirements and customer experiences, to make predictive analysis and forecasting with the value of %85.7. And then process optimizations such as business flow automation, monitoring and analysis are followed the ratio of %79.6

7.8.2 Frequency Distribution Statistics of Variables

Frequency distributions of Growth Strategies Expressions are given in Table 11.

Table 11. Frequency Distributions Of Growth Strategies Expressions

	1,0		2,0		3,0		4,0		5,0		Ort	ss
	n	%	n	%	n	%	n	%	n	%		
New products/services development via R&D	14	2,4	22	3,8	20	3,5	283	49,3	235	40,9	4,22	0,88
Licensing technology from other firms	8	1,4	37	6,4	33	5,7	314	54,7	182	31,7	4,09	0,87
Partnering with other technologically advanced firms	10	1,7	35	6,1	42	7,3	238	41,5	249	43,4	4,19	0,94
Acquiring firms in related businesses	14	2,4	50	8,7	47	8,2	240	41,8	223	38,9	4,06	1,02
Acquiring firms in unrelated businesses	57	9,9	57	9,9	61	10,6	189	32,9	210	36,6	3,76	1,31
We have differentiated and customized products/services.	5	,9	10	1,7	32	5,6	259	45,1	268	46,7	4,35	0,74
We have a broad range of products to serve a large customer base	7	1,2	20	3,5	37	6,4	253	44,1	257	44,8	4,28	0,83
Internationalized to increase the revenue from overseas markets	44	7,7	45	7,8	51	8,9	232	40,4	202	35,2	3,88	1,20
Internationalized to work with firms in overseas markets	46	8,0	52	9,1	54	9,4	210	36,6	212	36,9	3,85	1,24

Most of the participants responded that they prefer to make partnerships based on technology licensing approaches as % 54.7 and to make research and developments and innovations with the internal company resources %49.3 for growth. Additionally, prefers purchasing of other related companies in their focused business areas as % 41.8. However, internationalization is less chosen with the ratio of %36.6.

Frequency distributions of Cost Leadership Strategies Statements are given in Table 12.

Table 12. Frequency Distributions Of Cost Leadership Strategies Statements

	1,0		2,0		3,0		4,0		5,0		Ort	ss
	n	%	n	%	n	%	n	%	n	%		
To make production-development with lower in-house costs compared to our competitors.	10	1,7	11	1,9	37	6,4	313	54,5	203	35,4	4,20	0,78
To modernize our production-development processes with new technologies to increase production efficiency.	2	,3	15	2,6	28	4,9	247	43,0	282	49,1	4,38	0,73
Subjecting all our activities to strict cost control.	5	,9	12	2,1	46	8,0	247	43,0	264	46,0	4,31	0,78
To minimize our purchasing (outsourcing etc.) costs.	4	,7	13	2,3	49	8,5	263	45,8	245	42,7	4,28	0,77
To minimize our marketing costs.	1	,2	9	1,6	59	10,3	265	46,2	240	41,8	4,28	0,72
Minimizing idle production/development capacity.	10	1,7	16	2,8	53	9,2	243	42,3	252	43,9	4,24	0,86
To minimize wastage, maintenance, repair and similar costs.	7	1,2	8	1,4	48	8,4	259	45,1	252	43,9	4,29	0,78

To maximize efficiency in all units and activities.	5	,9	10	1,7	25	4,4	276	48,1	258	44,9	4,34	0,72
To enter into fierce price competition with competitors when necessary	5	,9	26	4,5	52	9,1	243	42,3	248	43,2	4,22	0,86
Investing in cost-reducing technologies.	3	,5	6	1,0	39	6,8	276	48,1	250	43,6	4,33	0,70
Emphasis on efficiency.	2	,3	11	1,9	32	5,6	265	46,2	264	46,0	4,36	0,71
Redesigning products/services in a cost-reducing way.	2	,3	12	2,1	40	7,0	288	50,2	232	40,4	4,28	0,71
Keeping all costs as low as possible in order to offer a low price.	7	1,2	7	1,2	63	11,0	255	44,4	242	42,2	4,25	0,79
To use sales and distribution channels cost-effectively.	6	1,0	5	,9	66	11,5	265	46,2	232	40,4	4,24	0,77

The study results presented that companies are choosing the producing their services with less cost regarding to competitors as %54.5 and re-designing the products/services in a cost-reducing way with the ratio %50.2 while applying the cost leadership strategies. It is also important that the results show that increasing efficiency and investing the cost-reducing technologies are the next most chosen items for cost leadership strategy statements with the value %48.1 for each one.

Frequency distributions of Differentiation Strategies Statements are given in Table 13.

Table 13. Frequency Distributions Of Differentiation Strategies Statements

	1,0		2,0		3,0		4,0		5,0		Ort	ss
	n	%	n	%	n	%	n	%	n	%		
Developing new products or services.	1	,2	8	1,4	25	4,4	287	50,0	253	44,1	4,36	0,65
To provide products for the special needs of our customers.	2	,3	10	1,7	30	5,2	254	44,3	278	48,4	4,39	0,70
To provide better quality products than our competitors.	1	,2	5	,9	51	8,9	257	44,8	260	45,3	4,34	0,69
To present our products with differentiating features from our competitors.	1	,2	10	1,7	49	8,5	249	43,4	265	46,2	4,34	0,72
Recruiting qualified and creative people to achieve strategic goals.	5	,9	24	4,2	36	6,3	267	46,5	242	42,2	4,25	0,82
To establish a strong coordination between our R&D, product development and marketing functions.	6	1,0	18	3,1	41	7,1	281	49,0	228	39,7	4,23	0,80
To be the first company to introduce new products/brands to our customers.	7	1,2	25	4,4	53	9,2	246	42,9	243	42,3	4,21	0,87
Presence of differentiated products belonging to our company in the market.	7	1,2	17	3,0	42	7,3	275	47,9	233	40,6	4,24	0,81
Developing additional models and dimensions on our existing products.	5	,9	9	1,6	31	5,4	305	53,1	224	39,0	4,28	0,71

Reducing new product development and time to market.	4	,7	4	,7	45	7,8	289	50,3	232	40,4	4,29	0,70
To continuously improve and develop our existing products in the market.	3	,5	1	,2	34	5,9	296	51,6	240	41,8	4,34	0,65
Benefiting from identified new business and market opportunities	4	,7	11	1,9	36	6,3	294	51,2	229	39,9	4,28	0,72
Responding to different customer needs in different markets.	4	,7	12	2,1	50	8,7	281	49,0	227	39,5	4,25	0,75
To expand our production line to produce different products.	4	,7	21	3,7	67	11,7	262	45,6	220	38,3	4,17	0,82

Participants apply differentiation strategies to develop additional models and dimensions on existing products as %53.1 and to develop new products and services with %50.0 and to reduce the time to market with %50.3 ratio. It is also seen that to establish a good collaboration between R&D, product development and marketing functions are another critical statement for differentiation strategies with the agreed participation ratio %49.

Frequency distributions of Artificial Intelligence Applications and Approach Statements are given in Table 14.

Table 14. Frequency Distributions Of Artificial Intelligence Applications And Approach Statements

	1,0		2,0		3,0		4,0		5,0		6,0		7,0		Ort	ss
	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
AI application is compatible with our current communication/network environment.	3	,5	1	3,9	1	2,5	5	10,8	98	17,1	21	37,5	16	28,6	5,68	1,29
AI application is compatible with our current software environment.	1	,2	2	3,0	1	2,5	5	9,6	80	13,9	23	41,6	16	28,4	5,73	1,25
AI application is compatible with our current hardware environment	1	,2	1	2,1	2	3,0	4	8,2	90	15,7	25	45,1	14	25,5	5,74	1,17
AI application is compatible with our infrastructure.	3	,5	9	1,6	2	3,0	3	6,6	81	14,1	24	42,3	18	31,0	5,85	1,18
AI application is compatible with computerized data resources.	3	,5	1	1,7	7	1,2	4	8,4	80	13,9	25	43,9	17	30,4	5,86	1,13
AI application can increase revenues and profitability.	1	,2	1	,2	1	1,1	6	11,7	92	16,0	21	37,4	18	32,8	5,86	1,09

AI application can get higher employee productivity.	1	,2	3	,5	1 6	2, 8	6 1	10, 6	84	14, 6	20 6	35, 9	20 3	35, 4	5,8 8	1,1 4
AI application can improve customer service.	1	,2	7	1, 2	1 2	2, 1	5 8	10, 1	73	12, 7	24 5	42, 7	17 8	31, 0	5,8 6	1,1 2
AI application can better utilize IT resources.	3	,5	2	,3	4	,7	6 5	11, 3	75	13, 1	25 2	43, 9	17 3	30, 1	5,8 8	1,0 6
AI application can promote flexibility and integration.	1	,2	3	,5	5	,9	6 1	10, 6	79	13, 8	24 3	42, 3	18 2	31, 7	5,9 1	1,0 4
Adopting AI innovation lacks application maturity.	3	,5	1 4	2, 4	4 5	7, 8	8 3	14, 5	11 7	20, 4	18 1	31, 5	13 1	22, 8	5,3 8	1,3 6
There has been a high cost for AI application and migration.	2	,3	1 2	2, 1	1 0	1, 7	7 5	13, 1	12 0	20, 9	21 6	37, 6	13 9	24, 2	5,6 2	1,1 9
Adopting AI innovation is time consuming.	4	,7	4	,7	4	,7	7 0	12, 2	11 0	19, 2	22 0	38, 3	16 2	28, 2	5,7 6	1,1 2
Inappropriate staffing and personnel shortfalls are a big issue for adopting AI innovation.	1	,2	1	,2	1 8	3, 1	4 5	7,8	11 5	20, 0	23 4	40, 8	16 0	27, 9	5,8 1	1,0 5

Most of the participants responded that their infrastructures and data resources are aligned and incorporate with artificial intelligence as %42.3 and %43.9. Results also pointed out the participants with the ratio % 43.9 agree with AI applications, IT resources can be used more and with the ratio %42.3 of them believe that AI applications can support flexibility and integration.

Frequency distributions of Company Financial Performance Statements are given in Table 15.

Table 15. Frequency Distributions Of Company Financial Performance Statements

	1,0		2,0		3,0		4,0		5,0		6,0		7,0		Ort	ss
	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
New product/service development	8	1,4	9	1,6	43	7,5	109	19,0	104	18,1	170	29,6	131	22,8	5,31	1,40
Market development	7	1,2	13	2,3	40	7,0	100	17,4	107	18,6	182	31,7	125	21,8	5,32	1,39
Sales growth rate	5	,9	9	1,6	52	9,1	104	18,1	170	29,6	154	26,8	80	13,9	5,10	1,28
Employment growth rate	4	,7	6	1,0	47	8,2	110	19,2	131	22,8	151	26,3	125	21,8	5,28	1,33

Market share	2	,3	6	1,0	58	10,1	90	15,7	121	21,1	188	32,8	109	19,0	5,30	1,31
Operating profits	0	0,0	9	1,6	54	9,4	92	16,0	130	22,6	185	32,2	104	18,1	5,29	1,28
Profit to sales ratio	2	,3	5	,9	58	10,1	90	15,7	138	24,0	167	29,1	114	19,9	5,29	1,30
Cash flow from operations	5	,9	9	1,6	26	4,5	115	20,0	162	28,2	150	26,1	107	18,6	5,26	1,27
Return on investment	2	,3	5	,9	45	7,8	102	17,8	118	20,6	197	34,3	105	18,3	5,33	1,26
Return on assets	0	0,0	7	1,2	43	7,5	96	16,7	123	21,4	190	33,1	115	20,0	5,38	1,25

This study presented that participant chose the return on investment with the value %34.3 and active profitability with %33.1 as the important positive results for their financial performance and then selected the market share as %32.8.

Frequency distributions of Company Innovation Performance Statements are given in Table 16.

Table 16. Frequency Distributions Of Company Innovation Performance Statements

	1,0		2,0		3,0		4,0		5,0		Ort	ss
	n	%	n	%	n	%	n	%	n	%		
The level of newness (novelty) of our firm's new products.	4	,7	12	2,1	119	20,7	257	44,8	182	31,7	4,05	0,82
The use of latest technological innovations in our new products.	4	,7	29	5,1	114	19,9	234	40,8	193	33,6	4,02	0,89
The speed of our new product development.	3	,5	38	6,6	123	21,4	213	37,1	197	34,3	3,98	0,93
The number of new products our firm has introduced to the market.	8	1,4	25	4,4	113	19,7	229	39,9	199	34,7	4,02	0,92
The number of our new products that is first-to-market (early market entrants).	14	2,4	36	6,3	95	16,6	226	39,4	203	35,4	3,99	1,00
The technological competitiveness of our company.	8	1,4	21	3,7	106	18,5	227	39,5	212	36,9	4,07	0,91
The speed with which we adopt the latest technological innovations in our processes.	7	1,2	18	3,1	106	18,5	247	43,0	196	34,1	4,06	0,87
The updated-ness or novelty of the technology used in our processes.	12	2,1	21	3,7	95	16,6	243	42,3	203	35,4	4,05	0,92
The rate of change in our processes, techniques and technology.	14	2,4	21	3,7	96	16,7	258	44,9	185	32,2	4,01	0,93

According to %44.9 of participants the rate of change in their processes, techniques and technologies is an important statement for their innovation performance results and according to %44.8 of them the innovation level of their company products is another

critical result for their innovation performance. %43.0 believe that the speed with which the latest technological innovations are acquired in their processes and %42.3 agrees on the impact to use the up-to-date technologies in their processes.

7.8.3 Normality Test

Skewness and kurtosis values were checked for normality test given in Table 17.

Table 17. Normality Test

	n	Minimum	Maximum	Mean	ss	Skewness	Kurtosis
Growth Str – Dimension 1	574	1,43	5,00	4,18	0,61	-1,540	2,723
Growth Str – Dimension 2	574	1,00	5,00	3,79	1,24	-1,163	,102
Growth Str	574	2,00	5,00	4,10	0,66	-1,130	,657
Cost Leadership Str	574	2,86	5,00	4,31	0,42	-,959	,730
Differentiation Str	574	2,93	5,00	4,32	0,39	-1,177	1,454
AI – Diemension 1	574	2,20	7,00	6,00	0,91	-1,712	2,799
AI – Diemension 2	574	3,00	7,00	6,03	0,89	-1,399	1,130
AI – Dimension 3	574	1,67	7,00	5,71	1,00	-1,242	1,916
AI	574	3,00	7,00	5,94	0,81	-1,381	1,400
Financial Performance	574	2,90	7,00	5,54	1,11	-,935	-,546
Innovation Performance	574	2,00	5,00	4,14	0,63	-1,204	,537

The values of kurtosis and skewness gathered from the intra-item scales are between +3 and -3, which is considered sufficient for the normal distribution (Hopkins, K.D. and Weeks, D.L. 1990:717-729). It was concluded that the data were in accordance with the normal distribution.

7.8.4 Exploratory Factor Analysis & KMO – Barlett Tests

The study combines multivariate analysis to analyze factor analysis and variable impacts. Exploratory Factor Analysis is used to make many latent variables more controllable, that is, to reduce and summarize data. KMO and Bartlett tests were performed to understand whether the scale was suitable for factor analysis. While the KMO coefficient is calculated to test the sample size, the Bartlett test is used to examine the normal distribution condition. In this context, the KMO test measurement result must be greater than .50, and the Bartlett sphericity test result must be statistically significant. Sharma (1996) stated that in the case that KMO rate above 0.90 is “excellent”, KMO rate 0.80 is

“very good”, 0.70 is “good”, 0.60 is “moderate” and below 0.60 is unacceptable (Sharma, 1996:116).

7.8.4.1 Growth Strategies Measurement Factor Analysis & KMO – Barlett Test

KMO and Barlett Test results for growth strategies measurements are shown in Table 18.

Table 18. KMO And Barlett Test Results For Growth Strategies Measurements

KMO		,753
Bartlett	Ki-kare	408,701
	sd	36
	p	,000

In the factor analysis for Growth Strategies, the KMO value was calculated as 0.753. Accordingly, the sample size is suitable for factor analysis ($KMO > 0.500$). Within the scope of Bartlett test, X^2 value was 408,701 and it was statistically significant ($p < 0.05$). According to the results of the KMO and Bartlett test, it was concluded that the data were suitable for factor analysis.

Factor analysis for growth strategies measurements is shown in Table 19.

Table 19. Factor Analysis For Growth Strategies Measurements

Dimension	Item	Factor Load	Variance explanation rate
Dimension-1 (Organic growth)	BY3	,804	43,383
	BY1	,799	
	BY6	,791	
	BY7	,791	
	BY4	,751	
	BY2	,634	
	BY5	,606	
Dimension-2 (Internationalizm)	BY8	,963	22,311
	BY9	,940	
Growth Strategies			65,694

The total variance explanation rate of the scale is 65,694%. The first dimension of the scale consists of 7 items with factor loads ranging from 0.606 to 0.804. The total variance explanation rate of the dimension is 43,383%. The second dimension of the scale consists

of 2 items with factor loads of 0.940 and 0.963. The total variance explanation rate of the dimension is 22,311%.

7.8.4.2 Cost Leadership Strategies Measurement Factor Analysis & KMO – Barlett Test

KMO and Barlett Test results for cost leadership strategies measurements are shown in Table 20.

Table 20. KMO And Barlett Test Results For Cost Leadership Strategies Measurements

KMO		,895
Bartlett	Ki-kare	812,217
	sd	91
	p	,000

In the factor analysis for Cost Leadership Strategies, the KMO value was calculated as 0.895. Accordingly, the sample size is suitable for factor analysis ($KMO > 0.500$). Within the scope of Bartlett test, X^2 value was 812.217 and statistically significant ($p < 0.05$). According to the results of the KMO and Bartlett test, it was concluded that the data were suitable for factor analysis.

Factor analysis for cost leadership strategies measurements is shown in Table 21.

Table 21. Factor Analysis For Cost Leadership Strategies Measurements

Dimension	Item	Factor Load	Variance explanation rate
Cost Leadership Str	MLS5	,833	56,723
	MLS14	,821	
	MLS12	,817	
	MLS10	,812	
	MLS3	,793	
	MLS6	,765	
	MLS11	,744	
	MLS1	,736	
	MLS9	,735	
	MLS4	,729	
	MLS13	,705	
	MLS7	,686	
	MLS2	,683	
	MLS8	,655	

According to the factor analysis results, it was determined that the scale consisted of 14 items and a single factor with factor loads ranging from 0.655 to 0.833. The total variance explanation rate of the scale is 56,723%.

7.8.4.3 Differentiation Strategies Measurement Factor Analysis & KMO – Barlett Test

KMO and Barlett Test results for differentiation strategies measurements are shown in Table 22.

Table 22. KMO And Barlett Test Results For Differentiation Strategies Measurements

KMO		,912
Bartlett	Ki-kare	846,941
	sd	91
	p	,000

In the factor analysis for Differentiation Strategies, the KMO value was calculated as 0.912. Accordingly, the sample size is suitable for factor analysis ($KMO > 0.500$). Within the scope of Bartlett test, X^2 value was found to be 846,941 and statistically significant ($p < 0.05$). According to the results of the KMO and Bartlett test, it was concluded that the data were suitable for factor analysis. Factor analysis for differentiation strategies measurements is shown in Table 23.

Table 23. Factor Analysis For Differentiation Strategies Measurements

Dimension	Item	Factor Load	Variance explanation rate
Differentiation Str.	FS10	,821	58,989
	FS11	,815	
	FS4	,811	
	FS6	,808	
	FS5	,793	
	FS3	,789	
	FS8	,779	
	FS1	,771	
	FS7	,767	
	FS2	,751	
	FS9	,744	
	FS14	,713	

	FS12	,699	
	FS13	,672	

According to the factor analysis results, it was determined that the scale consisted of 14 items and a single factor with factor loads ranging from 0.672 to 0.821. The total variance explanation rate of the scale is 58,989%.

7.8.4.4 Artificial Intelligence Applications and Approach Measurement Factor Analysis & KMO – Barlett Test

KMO and Barlett Test results for artificial intelligence measurements are shown in Table 24.

Table 24. KMO And Barlett Test Results For Artificial Intelligence Measurements

KMO		,899
Bartlett	Ki-kare	1109,179
	sd	78
	p	,000

In the factor analysis for Artificial Intelligence Applications and Approach, the KMO value was calculated as 0.899. Accordingly, the sample size is suitable for factor analysis (KMO>0.500). Within the scope of Bartlett test, X² value was 1109,179 and it was statistically significant (p<0.05). According to the results of the KMO and Bartlett test, it was concluded that the data were suitable for factor analysis. Factor analysis for artificial intelligence measurements is shown in Table 25.

Table 25. Factor Analysis For Artificial Intelligence Measurements

Dimension	Item	Factor Load	Variance explanation rate
Dimension 1 - Compatibility	YZ4	,915	35,275
	YZ3	,908	
	YZ2	,904	
	YZ1	,859	
	YZ5	,848	
Dimension 2 - Advantage	YZ7	,829	27,736
	YZ6	,822	
	YZ9	,770	
	YZ8	,763	
	YZ10	,685	
Dimension 3 – Risk and complexity	YZ13	,899	20,856
	YZ12	,877	
	YZ11	,713	

AI Approach			83,867
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According to the result of the factor analysis, it was determined that the scale consisted of 3 factors. The total variance explanation rate of the scale is 83,867%. The first dimension of the scale consists of 5 items with factor loads ranging from 0.848 to 0.915. The total variance explanation rate of the dimension is 35,275%. The second dimension of the scale consists of 5 items with factor loads ranging from 0.685 to 0.829. The total variance explanation rate of the dimension is 27,736%. The third dimension of the scale consists of 3 items with factor loads ranging from 0.713 to 0.899. The total variance explanation rate of the dimension is 20,856%.

7.8.4.5 Financial Performance Measurement Factor Analysis & KMO – Barlett Test

KMO and Barlett Test results for financial performance measurements are shown in Table 26.

Table 26. KMO And Barlett Test Results For Financial Performance Measurements

KMO		,939
Bartlett	Ki-kare	883,474
	sd	45
	p	,000

In the factor analysis for Financial Performance, the KMO value was calculated as 0.939. Accordingly, the sample size is suitable for factor analysis ($KMO > 0.500$). Within the scope of Bartlett test, X^2 value was 883,474 and statistically significant ($p < 0.05$). According to the results of the KMO and Bartlett test, it was concluded that the data were suitable for factor analysis. Factor analysis for financial performance measurements is shown in Table 27.

Table 27. Factor Analysis For Financial Performance Measurements

Dimension	Item	Factor Load	Variance explanation rate
Financial Performance	FS7	,933	76,558
	FS10	,920	
	FS9	,899	
	FS5	,884	
	FS6	,879	
	FS2	,868	

	FS8	,861	
	FS3	,851	
	FS4	,848	
	FS1	,799	

According to the factor analysis results, it was determined that the scale consisted of 10 items and a single factor with factor loads ranging from 0.799 to 0.933. The total variance explanation rate of the scale is 76,558%.

7.8.4.6 Innovation Performance Measurement Factor Analysis & KMO – Barlett Test

KMO and Barlett Test results for innovation performance measurements are shown in Table 28.

Table 28. KMO And Barlett Test Results For Innovation Performance Measurements

KMO		,893
Bartlett	Ki-kare	574,723
	sd	36
	p	,000

In the factor analysis for Innovative Performance, the KMO value was calculated as 0.893. Accordingly, the sample size is suitable for factor analysis ($KMO > 0.500$). Within the scope of Bartlett test, X^2 value was found to be 574.723 and statistically significant ($p < 0.05$). According to the results of the KMO and Bartlett test, it was concluded that the data were suitable for factor analysis. Factor analysis for innovation performance measurements is shown in Table 29.

Table 29. Factor Analysis For Innovation Performance Measurements

Dimension	Item	Factor Load	Variance explanation rate
Innovation Performance	YP7	,889	67,769
	YP5	,852	
	YP3	,848	
	YP6	,820	
	YP9	,812	
	YP8	,811	
	YP2	,806	
	YP1	,787	
	YP4	,777	

According to the results of the factor analysis, it was determined that the factor loadings of the scale ranged from 0.777 to 0.889 and consisted of 9 items and a single factor. The total variance explanation rate of the scale is 67,769%.

7.8.5 Confirmatory Factor Analysis (CFA) & Reliability Tests

Cronbach's alpha coefficient shows the reliability level of the scale. The coefficient ranges are between 0 to 1. Based on the alpha (α) coefficient, the reliability of the scale is explained as following (Hair, Tatham, Anderson, & Black, 2010:680):

- If $.00 \leq \alpha < .40$, the scale is not reliable,
- If $.40 \leq \alpha < .60$, the reliability of the scale is low,
- If $.60 \leq \alpha < .80$, the scale is quite reliable,
- If $.80 \leq \alpha < 1.00$, the scale is highly reliable.

After determining the structure of the factors, confirmatory factor analysis was performed, the factor structure was tested, and the fit indices were calculated.

Confirmatory factor analysis (CFA), supported by a theoretical basis, is an analysis to evaluate the extent to which the factors formed from many variables agree with the real data.

In CFA, fit indices are used to determine the adequacy of the model. Given that fit indices have advantages and disadvantages when evaluating the fit between the theoretical model and real data, it is recommended to use multiple fit index values to reveal the model's fit. The most used and acceptable levels are (Fornell, C. & Larcker, D. F. (1981):39-50, Bagozzi, R.P., Yi, Y. & Philips L.W. (1991: 421-458):

- Chi-Square Goodness Test (Chi-Square Goodness),
- Goodness of Fit Index (GFI),
- Adjusted Goodness of Fit Index (AGFI),
- Comparative Fit Index (CFI),
- Normed Fit Index (NFI),
- Root Mean Errors (RMR or RMS)

- Root Mean Square Error (RMSEA) of Approximate Errors.

Acceptable levels are shown in Table 30.

Table 30. Fit Expressions And Indexes

Fit Expression	Good Fit	Acceptable Fit
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,08$

Fornell and Larcker (1981) emphasize the importance of the AVE value created for each factor for convergent and divergent validity in order to examine the construct validity, and they state that the AVE value should be greater than 0.5 for convergent validity.

Bagozzi et al. (1991) states that convergent validity is achieved when all items that make up the construct, that is, the factor, are statistically significant. It is also suggested that if the CR value exceeds 0.7, the convergent validity will be accepted even if the AVE value remains below 0.5.

7.8.5.1 Growth Strategies CFA and Reliability Test

Confirmatory factor analysis (CFA) for growth strategies is shown in Table 31.

Table 31. CFA For Growth Strategies

Factor	Factor Item	B	Standartize B	Std hata	P	AVE	CR	Cronbach's Alpha
Growth Str Dimension 1	BS1	1	0,670			0,40	0,82	0,809
	BS2	1,090	0,739	0,074	***			
	BS3	1,131	0,710	0,079	***			
	BS4	1,176	0,678	0,086	***			
	BS5	0,796	0,357	0,105	***			
	BS6	0,727	0,576	0,061	***			
	BS7	0,881	0,625	0,069	***			
Growth Str Dimension 2	BS8	1	0,886			0,81	0,90	0,895
	BS9	1,065	0,914	0,049	***			

It can be said that all items belonging to the Growth Strategies Dimension1 sub-dimension are statistically significant ($p < 0.01$). The AVE value for the Growth Strategies Dimension1 sub-dimension is 0.40; It can be said to be quite reliable since its CR value is 0.82 and Cronbach's Alpha value is 0.809.

It can be said that all items belonging to the Growth Strategies Dimension2 sub-dimension are statistically significant ($p < 0.01$). The AVE value of the Growth Strategies Dimension2 sub-dimension is 0.81; It can be said that it is quite reliable since its CR value is 0.90 and Cronbach's Alpha value is 0.814. Fit Indexes for growth strategies are shown in Table 32.

Table 32. Fit Indexes For Growth Strategies

Fit Expression	Good Fit	Acceptable Fit	Model
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5	3,467
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$	0,969
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$	0,941
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$	0,066
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,08$	0,038

It is seen that all fit indices calculated in the CFA analysis provide acceptable fit indices.

Roadmap for growth strategies is shown in Picture 13.

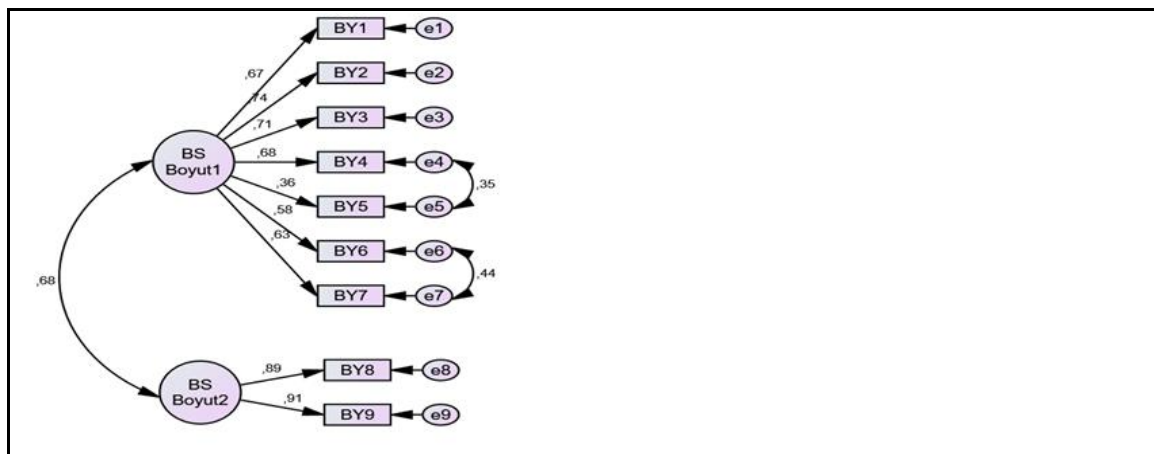


Figure 13. Roadmap For Growth Strategies

7.8.5.2 Cost Leadership Strategies CFA and Reliability Test

Confirmatory factor analysis (CFA) for cost leadership strategy is shown in Table 33.

Table 33. CFA For Cost Leadership Strategy

Factor	Factor Item	B	Standartize B	Std hata	P	AVE	CR	Cronbach's Alpha
Cost Leadership Str.	MLS1	1,000	,493			0,34	0,88	0,876
	MLS2	1,059	,561	,110	***			
	MLS3	1,356	,673	,127	***			
	MLS4	,995	,500	,111	***			
	MLS5	1,014	,542	,107	***			
	MLS6	1,408	,631	,137	***			
	MLS7	1,108	,550	,116	***			
	MLS8	1,173	,626	,115	***			
	MLS9	1,451	,654	,138	***			
	MLS10	1,004	,558	,104	***			
	MLS11	,835	,457	,099	***			
	MLS12	1,034	,559	,107	***			
	MLS13	1,237	,603	,123	***			
	MLS14	1,310	,658	,124	***			

It can be said that all items belonging to Cost Leadership Strategies are statistically significant ($p < 0.01$). AVE value of 0.34; Since its CR value is 0.88 and its Cronbach's Alpha value is 0.876, it can be said to be quite reliable.

Fit Indexes for cost leadership strategy are shown in Table 34.

Table 34. Fit Indexes For Cost Leadership Strategy

Fit Expression	Good Fit	Acceptable Fit	Model
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5	3,013
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$	0,948
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$	0,938
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$	0,023
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,08$	0,059

It is seen that all fit indices calculated in the CFA analysis provide acceptable fit indices.

Roadmap for cost leadership strategy is shown in Picture 14.

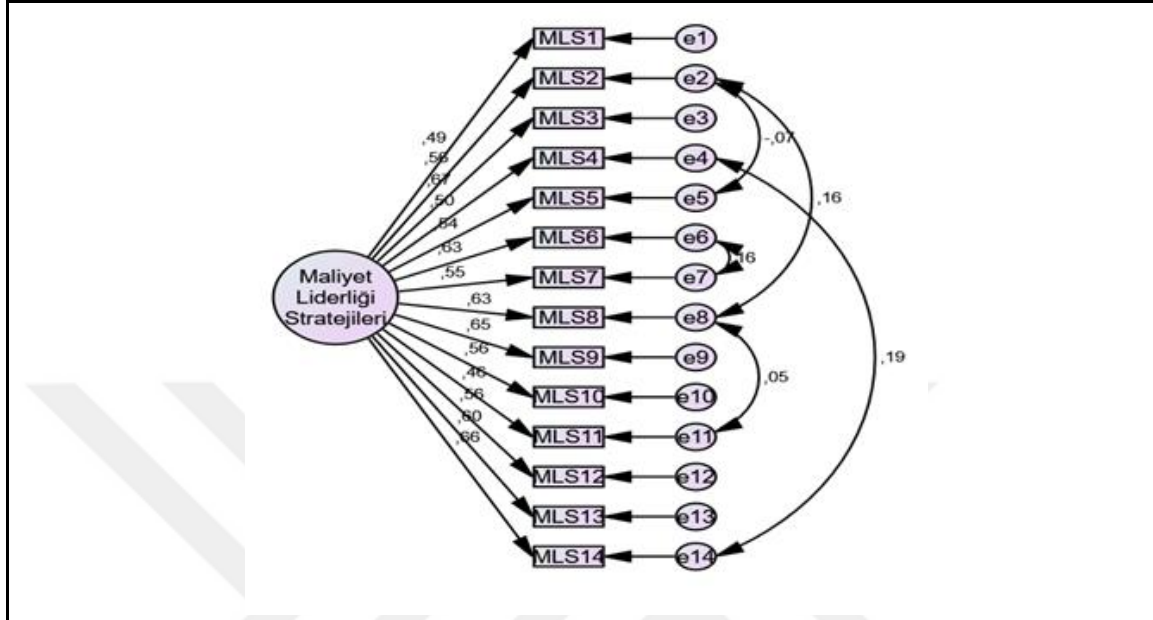


Figure 14. Roadmap For Cost Leadership Strategy

7.8.5.3 Differentiation Strategies CFA and Reliability Test

Confirmatory factor analysis (CFA) for differentiation strategy is shown in Table 35.

Table 35. CFA For Differentiation Strategy

Factor	Factor Item	B	Standartize B	Std hata	P	AVE	CR	Cronbach's Alpha
Differentiation Str.	MLS1	1,000	,493			0,34	0,88	0,876
	MLS2	1,059	,561	,110	***			
	MLS3	1,356	,673	,127	***			
	MLS4	,995	,500	,111	***			
	MLS5	1,014	,542	,107	***			
	MLS6	1,408	,631	,137	***			
	MLS7	1,108	,550	,116	***			
	MLS8	1,173	,626	,115	***			
	MLS9	1,451	,654	,138	***			
	MLS10	1,004	,558	,104	***			
	MLS11	,835	,457	,099	***			
	MLS12	1,034	,559	,107	***			
	MLS13	1,237	,603	,123	***			
	MLS14	1,310	,658	,124	***			

It can be said that all items belonging to Differentiation Strategies are statistically significant ($p < 0.01$). AVE value of 0.36; Since its CR value is 0.88 and its Cronbach's Alpha value is 0.887, it can be said to be quite reliable. Fit Indexes for differentiation strategy are shown in Table 36.

Table 36. Fit Indexes For Differentiation Strategy

Fit Expression	Good Fit	Acceptable Fit	Model
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5	3,366
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$	0,944
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$	0,943
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$	0,024
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,08$	0,064

It is seen that all fit indices calculated in the CFA analysis provide acceptable fit indices. Roadmap for differentiation strategy is shown in Picture 15.

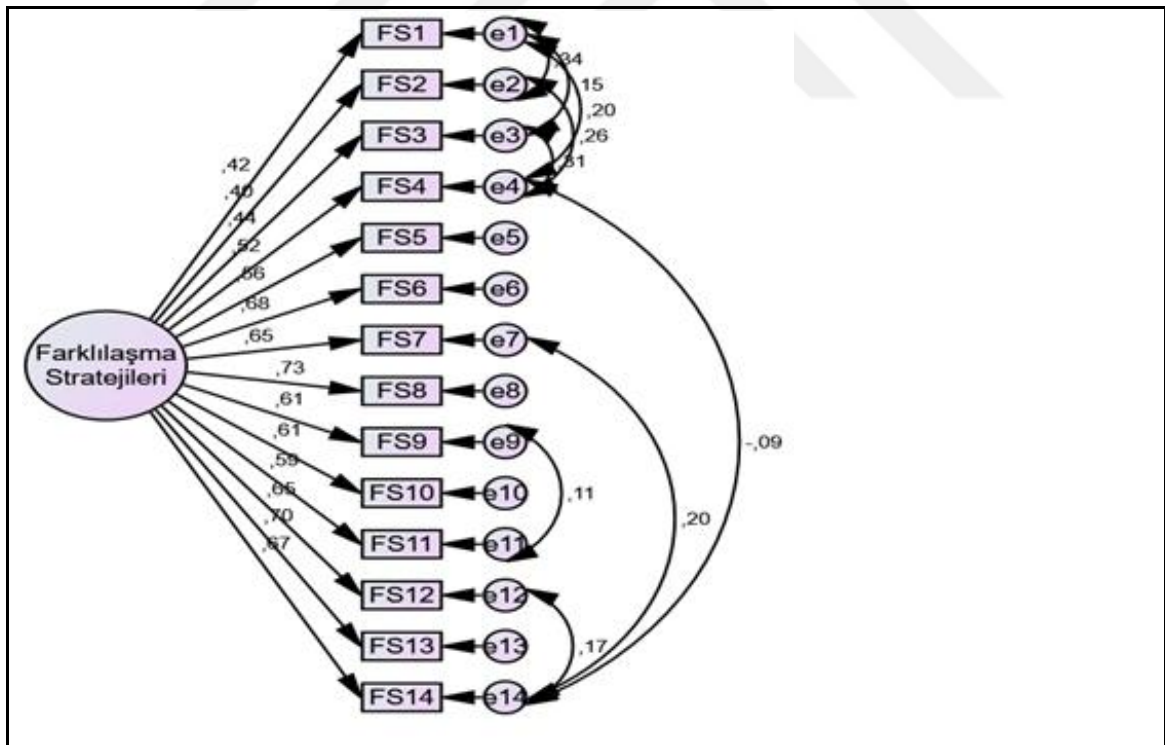


Figure 15. Roadmap For Differentiation Strategy

7.8.5.4 Artificial Intelligence Applications and Approach CFA and Reliability Test

Confirmatory factor analysis (CFA) for artificial intelligence applications and approach is shown in Table 37.

Table 37. CFA For Artificial Intelligence

Factor	Factor Item	B	Standartize B	Std hata	P	AVE	CR	Cronbach's Alpha
AI Dimension 1	YZ1	1,000	,911			0,76	0,94	0,941
	YZ2	,955	,894	,028	***			
	YZ3	,899	,904	,026	***			
	YZ4	,878	,873	,028	***			
	YZ5	,751	,779	,030	***			
AI Dimension 2	YZ6	1,000	,842			0,70	0,92	0,921
	YZ7	1,054	,849	,042	***			
	YZ8	,988	,809	,042	***			
	YZ9	,954	,824	,039	***			
	YZ10	,981	,864	,038	***			
AI Dimension 3	YZ11	1,000	,563			0,59	0,81	0,779
	YZ12	1,346	,869	,098	***			
	YZ13	1,218	,832	,090	***			

It can be said that all items belonging to Artificial Intelligence Applications and Approaches Dimension1 are statistically significant ($p < 0.01$). AVE value of 0.76; Since its CR value is 0.94 and its Cronbach's Alpha value is 0.941, it can be said to be quite reliable.

It can be said that all items belonging to Artificial Intelligence Applications and Approaches Dimension2 are statistically significant ($p < 0.01$). AVE value of 0.70; It can be said to be quite reliable since its CR value is 0.92 and Cronbach's Apha value is 0.921.

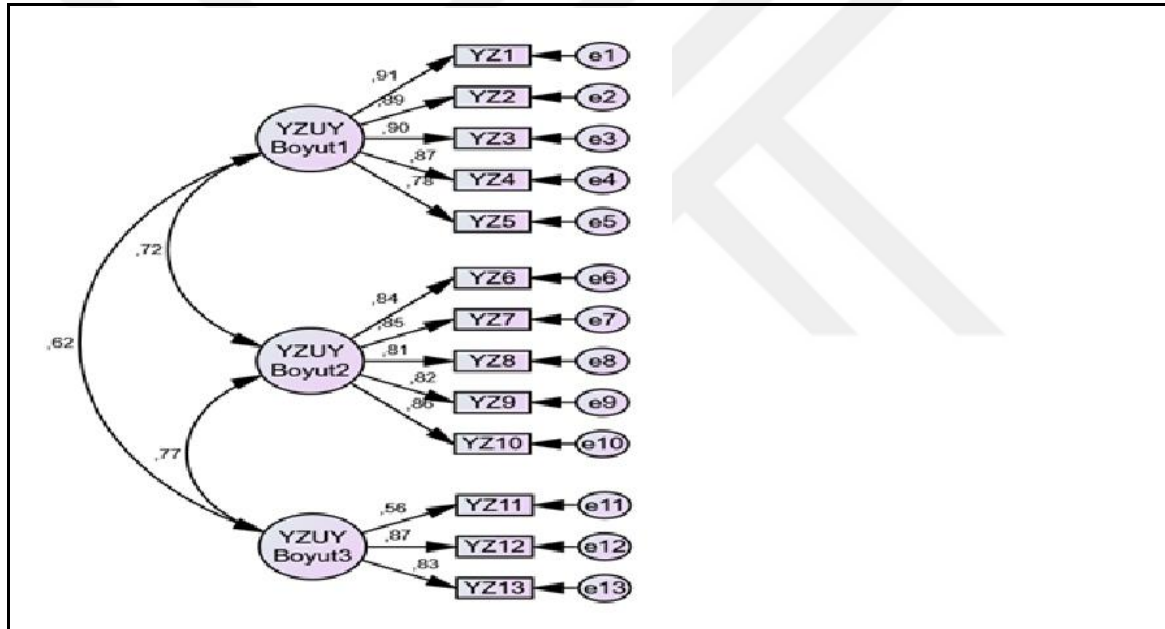
It can be said that all items belonging to Artificial Intelligence Applications and Approaches Dimension 3 are statistically significant ($p < 0.01$). AVE value of 0.59; Since its CR value is 0.81 and its Cronbach's Apha value is 0.779, it can be said to be quite reliable.

Fit Indexes for artificial intelligence is shown in Table 38.

Table 38. Fit Indexes For Artificial Intelligence

Fit Expression	Good Fit	Acceptable Fit	Model
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5	3,518
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$	0,946
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$	0,974
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$	0,044
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,08$	0,066

It is seen that all fit indices calculated in the CFA analysis provide acceptable fit indices. A roadmap for artificial intelligence is shown in Picture 16.

**Figure 16.** Roadmap For Artificial Intelligence

7.8.5.5 Financial Performance CFA and Reliability Test

Confirmatory factor analysis (CFA) for financial performance is shown in Table 39.

Table 39. CFA For Financial Performance

Factor	Factor Item	B	Standartize B	Std hata	P	AVE	CR	Cronbach's Alpha
Financial Performance	FP1	1,000	,801			0,70	0,96	0,960
	FP2	1,035	,836	,036	***			
	FP3	,935	,820	,041	***			
	FP4	,954	,804	,043	***			

	FP5	,991	,852	,041	***			
	FP6	,961	,843	,040	***			
	FP7	1,005	,867	,041	***			
	FP8	,921	,818	,041	***			
	FP9	,995	,887	,039	***			
	FP10	,952	,855	,039	***			

It can be said that all items of Financial Performance are statistically significant ($p < 0.01$). AVE value of 0.70; Since its CR value is 0.96 and its Cronbach's Alpha value is 0.960, it can be said to be quite reliable.

Fit Indexes for financial performance are shown in Table 40.

Table 40. Fit Indexes For Financial Performance

Fit Expression	Good Fit	Acceptable Fit	Model
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5	3,486
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$	0,960
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$	0,984
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$	0,033
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,08$	0,066

It is seen that all fit indices calculated in the CFA analysis provide acceptable fit indices.

Roadmap for financial performance is shown in Picture 17.

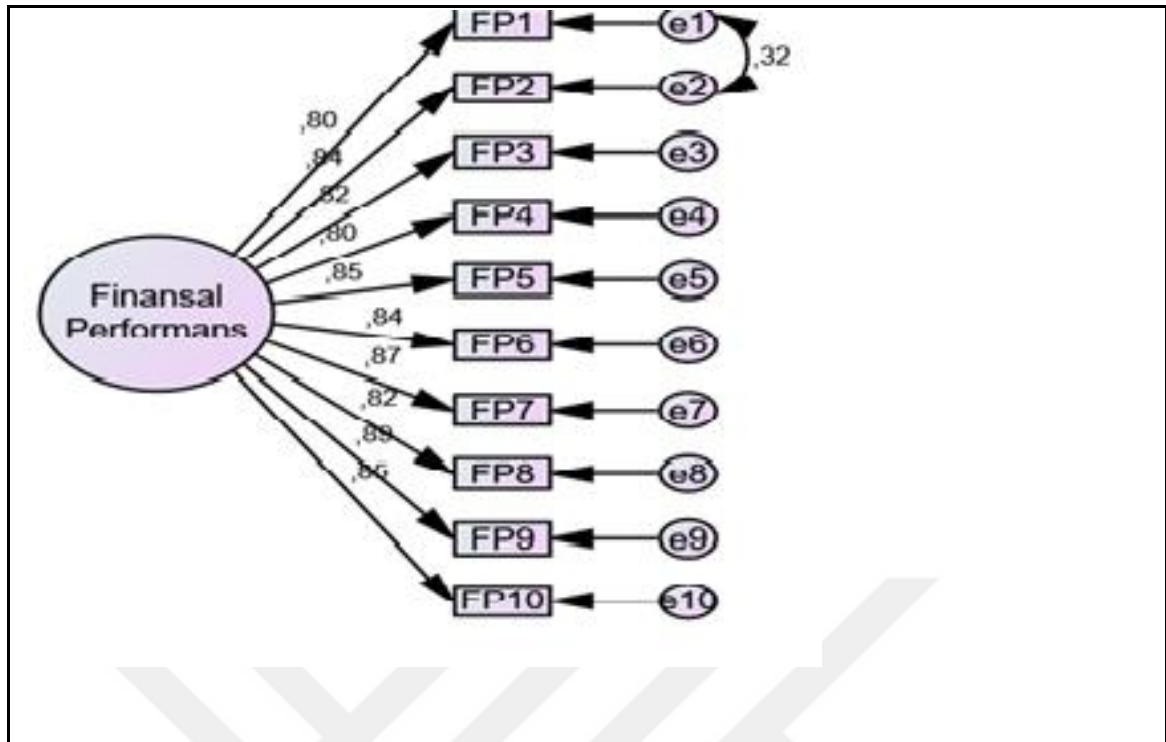


Figure 17. Roadmap For Financial Performance

7.8.5.6 Innovation Performance CFA and Reliability Test

Confirmatory factor analysis (CFA) for innovation performance is shown in Table 41.

Table 41. CFA For Innovation Performance

Factor	Factor Item	B	Standartize B	Std hata	P	AVE	CR	Cronbach's Alpha
Innnovation performance	YP1	1,000	,626			0,59	0,93	0,930
	YP2	1,255	,716	,073	***			
	YP3	1,391	,761	,081	***			
	YP4	1,406	,781	,091	***			
	YP5	1,554	,797	,100	***			
	YP6	1,432	,806	,091	***			
	YP7	1,415	,829	,088	***			
	YP8	1,412	,780	,092	***			
	YP9	1,434	,791	,093	***			

It can be said that all items of Innovative Performance are statistically significant ($p < 0.01$). AVE value of 0.59; It can be said to be quite reliable since its CR value is 0.93 and Cronbach's Alpha value is 0.930.

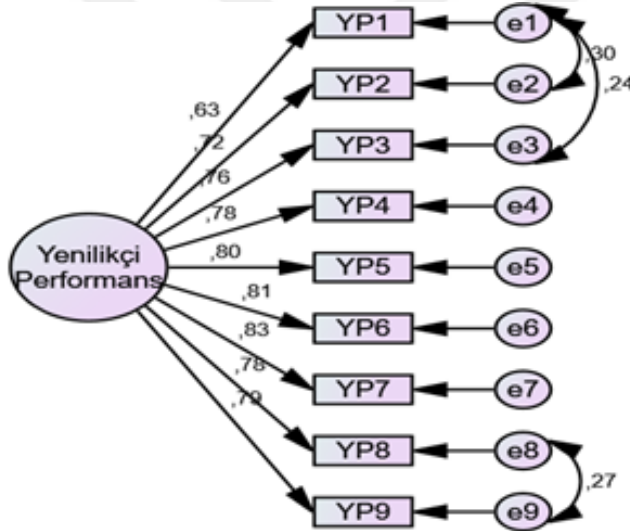
Fit Indexes for innovation performance are shown in Table 42.

Table 42. Fit Indexes For Innovation Performance

Fit Expression	Good Fit	Acceptable Fit	Model
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5	3,452
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$	0,968
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$	0,983
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$	0,020
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,08$	0,065

It is seen that all fit indices calculated in the CFA analysis provide acceptable fit indices.

Roadmap for innovation performance is shown in Picture 18.

**Figure 18.** Roadmap for innovation performance

7.8.6 Correlation Analysis

The relationship between the variables was analyzed with the Pearson correlation test.

Correlation coefficient power levels are shown (Akgül & Çevik, 2003:358):

- $0 \leq r \leq 0.25$ very weak,
- $0.26 \leq r \leq 0.49$ weak,
- $0.50 \leq r \leq 0.69$ medium,
- $0.70 \leq r \leq 0.89$ strong,

- $0.90 \leq r \leq 1$ very strong

The correlation between variables is shown in Table 43.

Table 43. The Correlation Between Variables (* $p < 0,05$; ** $p < 0,01$)

	1	2	3	4	5	6	7	8	9	10	11
1. Growth Str-dimension1	1	0,49**	0,91**	0,61**	0,55**	0,53**	0,49**	0,50**	0,57**	0,57**	0,59**
2. Growth Str-dimension 2		1	0,77**	0,43**	0,50**	0,43**	0,37**	0,37**	0,44**	0,42**	0,50**
3. Growth Str			1	0,62**	0,61**	0,57**	0,51**	0,51**	0,60**	0,58**	0,63**
4. Cost Leadership Str				1	0,65**	0,54**	0,51**	0,55**	0,60**	0,49**	0,58**
5. Differentiation Str					1	0,61**	0,51**	0,50**	0,61**	0,57**	0,67**
6. AI – dimension1						1	0,72**	0,57**	0,88**	0,55**	0,53**
7. AI – dimension 2							1	0,67**	0,92**	0,46**	0,41**
8. AI – dimension 3								1	0,81**	0,48**	0,47**
9. AI									1	0,57**	0,53**
10. Financial Perf.										1	0,73**
11. Innovation Perf.											1

The relationship between growth strategies dimension–1 (organic growth) and cost leadership strategies is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.612$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies dimension–1 (organic growth) and differentiation strategies is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.556$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between growth strategies dimension–1 (organic growth) and artificial intelligence approach dimension-1 (compatibility) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.533$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies dimension–1 (organic growth) and artificial intelligence approach dimension-2 (advantage) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.492$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies dimension–1 (organic growth) and artificial intelligence approach dimension-3 (risk and complexity) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.502$ ($0.50 \leq r \leq 0.69$ medium). The

relationship between growth strategies dimension–1 (organic growth) and artificial intelligence overall is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.578$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between growth strategies dimension–1 (organic growth) and financial performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.570$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies dimension–1 (organic growth) and innovation performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.590$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between growth strategies dimension–2 (internationalism) and cost leadership strategies is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.439$ ($0.26 \leq r \leq 0.49$ weak). The relationship between growth strategies dimension–2 (internationalism) and differentiation strategies is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.500$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between growth strategies dimension–2 (internationalism) and artificial intelligence approach dimension-1 (compatibility) is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.439$ ($0.26 \leq r \leq 0.49$ weak). The relationship between growth strategies dimension–2 (internationalism) and artificial intelligence approach dimension-2 (advantage) is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.375$ ($0.26 \leq r \leq 0.49$ weak). The relationship between growth strategies dimension–2 (internationalism) and artificial intelligence approach dimension-3 (risk and complexity) is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.374$ ($0.26 \leq r \leq 0.49$ weak). The relationship between growth strategies dimension–2 (internationalism) and artificial intelligence overall is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.447$ ($0.26 \leq r \leq 0.49$ weak).

The relationship between growth strategies dimension-2 (internationalism) and financial performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.420$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies dimension-2 (internationalism) and innovation performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.500$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between growth strategies overall and cost leadership strategies is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.627$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies overall and differentiation strategies is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.612$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between growth strategies overall and artificial intelligence approach dimension-1 (compatibility) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.570$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies overall and artificial intelligence approach dimension-2 (advantage) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.513$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies overall and artificial intelligence approach dimension-3 (risk and complexity) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.519$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies overall and artificial intelligence overall is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.605$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between growth strategies overall and financial performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.588$ ($0.50 \leq r \leq 0.69$ medium). The relationship between growth strategies overall and innovation performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.636$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between cost leadership strategies overall and artificial intelligence approach dimension-1 (compatibility) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.547$ ($0.50 \leq r \leq 0.69$ medium). The relationship between cost leadership strategies overall and artificial intelligence approach dimension-2 (advantage) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.514$ ($0.50 \leq r \leq 0.69$ medium). The relationship between cost leadership strategies and artificial intelligence approach dimension-3 (risk and complexity) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.559$ ($0.50 \leq r \leq 0.69$ medium). The relationship between cost leadership strategies and artificial intelligence overall is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.606$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between cost leadership strategies and financial performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.494$ ($0.50 \leq r \leq 0.69$ medium). The relationship between cost leadership strategies and innovation performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.580$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between differentiation strategies overall and artificial intelligence approach dimension-1 (compatibility) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.612$ ($0.50 \leq r \leq 0.69$ medium). The relationship between differentiation strategies overall and artificial intelligence approach dimension-2 (advantage) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.507$ ($0.50 \leq r \leq 0.69$ medium). The relationship between differentiation strategies and artificial intelligence approach dimension-3 (risk and complexity) is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.506$ ($0.50 \leq r \leq 0.69$ medium). The relationship between differentiation strategies and artificial intelligence overall is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.617$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between differentiation strategies and financial performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.579$ ($0.50 \leq r \leq 0.69$ medium). The relationship between differentiation strategies and innovation performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.678$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between artificial intelligence approach dimension-1 (compatibility) and financial performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.553$ ($0.50 \leq r \leq 0.69$ medium). The relationship between artificial intelligence approach dimension-1 (compatibility) and innovation performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.535$ ($0.50 \leq r \leq 0.69$ medium).

The relationship between artificial intelligence approach dimension-2 (advantage) and financial performance is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.467$ ($0.26 \leq r \leq 0.49$ weak). The relationship between artificial intelligence approach dimension-2 (advantage) and innovation performance is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.413$ ($0.26 \leq r \leq 0.49$ weak).

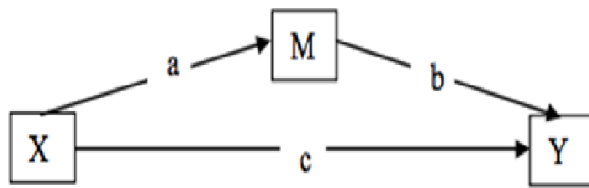
The relationship between artificial intelligence approach dimension-3 (risk and complexity) and financial performance is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.488$ ($0.26 \leq r \leq 0.49$ weak). The relationship between artificial intelligence approach dimension-3 (risk and complexity) and innovation performance is determined since $p < 0.01$. A weak positive relationship is determined between two variables since $r = 0.473$ ($0.26 \leq r \leq 0.49$ weak).

The relationship between artificial intelligence approach overall and financial performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.571$ ($0.50 \leq r \leq 0.69$ medium). The relationship between artificial intelligence approach overall and innovation performance is determined since $p < 0.01$. A moderate positive relationship is determined between two variables since $r = 0.534$ ($0.50 \leq r \leq 0.69$ medium).

7.8.7 Mediation and Structural Equation Analysis

Mediator variable analysis is a statistical method used to evaluate the findings obtained from studies designed to test hypotheses about how the effect of the independent variable on the dependent variable is transferred with a third variable (Mediator variable) (Hayes, 2017:78-79).

According to Baron and Kenny (1986) method:



The independent variable is denoted by X, the dependent variable by Y, and the mediator variable by M. In addition, path c depicts the impact between the independent and dependent variables, path a depicts the impact between the independent and mediating variables, and path b depicts the impact between the mediating and dependent variables. (Baron, R. M., Kenny, D. A., 1986:1173-1182).

Mediator variables conditions:

- 1) Independent variable and dependent variables must be related.
- 2) The independent variable and the mediating variable must be related.
- 3) Mediator variable and dependent variable must be related.

When the mediator variable is included in the analysis in the first step; if there is no significant impact between the independent variable and the dependent variable, from the full mediation effect; if there is a decrease in the impact between the independent variable and the dependent variable, from the partial mediation effect (Burmaolu, S., M. Polat, and Meydan, C. H., 2013).

7.8.7.1 Model-1: Investigation of the Effects of Independent Variables on Dependent Variables

The results of examining the effects of independent variables on dependent variables are presented in Table 44.

Table 44. Model – 1: The Effects Of Independent Variables On Dependent Variables

Road			Beta	S.E.	p
GS_DM1	→	Financial Performance FP	,263	,071	***
GS_DM1	→	Innovation Performance IP	,195	,019	***
GS_INT2	→	Financial Performance FP	,009	,034	,810
GS_INT2	→	Innovation Performans	,126	,015	***
Cost Leadership CL	→	Financial Performance FP	,036	,101	,034
Cost Leadership CL	→	Innovation Performans	,070	,041	,044
Differentiation DIFS	→	Financial Performance FP	,572	,261	***
Differentiation DIFS	→	Innovation Performans	,732	,148	***

Financial Performance R2=0,158; Innovation Performance R2=0,354

Growth strategies dimension-1 (organic growth) has a positive effect on Financial Performance (Beta=0.263 p<0.05). Growth strategies dimension-1 (organic growth) has a positive effect on Innovative Performance (Beta=0.195 p<0.05). Growth strategies dimension-2 (internationalism) does not affect financial performance (p>0.05). Growth strategies dimension-2 (internationalism) has a positive effect on Innovative Performance (Beta=0.126 p<0.05). Cost Leadership Strategies affect Financial Performance positively (Beta=.036 p<0.05). Cost Leadership Strategies affect Innovative Performance positively (Beta=.070 p<0.05). Differentiation Strategies affect Financial Performance positively (Beta=0.572 p<0.05). Differentiation Strategies affect Innovative Performance positively (Beta=0.732 p<0.05).

Fit Indexes is shown in Table 45.

Table 45. Fit Indexes For Model 1

Fit Expression	Good Fit	Acceptable Fit	Model
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5	3,212
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$	0,89
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$	0,94
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$	0,020
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,08$	0,062

χ^2/df , RMSEA, RMR values show good agreement. The CFI value is close to the limit.

7.8.7.2 Model-2: Examining the Effects of Independent Variables on Mediator Variables

The results of examining the effects of independent variables on mediator variables are presented in Table 46.

Table 46. Model 2: The Effects Of Independent Variables On Mediator Variables

Path			Beta	S.E.	p
GS_DM1	→	AI_DM3	,157	,051	,001
GS_DM1	→	AI_DM2	,081	,065	,072
GS_DM1	→	AI_DM1	,188	,070	***
GS_INT2	→	AI_DM3	,107	,027	,020
GS_INT2	→	AI_DM2	-,030	,034	,484
GS_INT2	→	AI_DM1	-,016	,036	,677
Cost Leadership CL	→	AI_DM3	,394	,106	***
Cost Leadership CL	→	AI_DM2	,275	,112	***
Cost Leadership CL	→	AI_DM1	,234	,117	***
Differentiation Str. DIFS	→	AI_DM3	,181	,115	***
Differentiation Str. DIFS	→	AI_DM2	,276	,161	***
Differentiation Str. DIFS	→	AI_DM1	,535	,241	***

Growth strategies dimension-1 (organic growth) has a positive effect on Artificial intelligence dimension-3 (risk and complexity) and dimension-1 (compatibility) (Beta=0.157; 0.188; $p<0.05$). Growth strategies dimension-1 (organic growth) does not have a positive effect on Artificial intelligence dimension-2 (advantage) since $p>0.05$.

Growth strategies dimension-2 (internationalism) has a positive effect on Artificial intelligence dimension-3 (risk and complexity) (Beta=0.107; $p<0.05$). Growth strategies dimension-2 (internationalism) does not have a positive effect on Artificial intelligence dimension-1 (advantage) and dimension-2 (risk and complexity) since $p>0.05$. Cost Leadership Strategies have a positive effect on the Artificial intelligence domain-1 (compatibility), dimension-2 (advantage), and dimension-3 (risk and complexity) (Beta=0.394;0.275;0.234; $p<0.05$). Differentiation Strategies have a positive effect on the Artificial intelligence domain-1 (compatibility), dimension-2 (advantage), and dimension-3 (risk and complexity) (Beta=0.181;0.276;0.535, $p<0.05$).

7.8.7.3 Model-3: Investigation of the Effect of Mediator Variable on the Dependent Variable

The results of examining the effects of mediator variables on the dependent variables are presented in Table 47.

Table 47. Model 3: The Effects Of Mediator Variables On The Dependent Variables

Road			Beta	S.E.	p
AI_DM3	→	Financial performance FP	,213	,078	***
AI_DM3	→	Innovation performance IP	,146	,031	***
AI_DM2	→	Financial performance FP	-,130	,047	***
AI_DM2	→	Innovation performance IP	-,263	,021	***
AI_DM1	→	Financial performance FP	,218	,047	***
AI_DM1	→	Innovation performance IP	,171	,020	***

All Artificial intelligence dimensions affect financial and innovative performance since $p < 0.05$.

The combination and the summary of mediator variable conditions based on the three models are shown in Table 48.

Table 48. The Combination And The Summary Of Mediator Variable Conditions Based On The Three Models

Road	Relation	Model 1		Model 2		Model 3	
		p	S.E	p	S.E	p	S.E
Independent Variable --> Dependent Variable	Growth Str Dimension 1 GS_DM1 --> Financial Perf FP	***	0.071				
	Growth Str Dimension 1 GS_DM1 --> Innovation Perf IP	***	0.019				
	Growth Str Dimension 2 GS_INT2 --> Financial Perf FP	0.810	0.034				
	Growth Str Dimension 2 GS_INT2 --> Innovation Perf IP	***	0.015				
	Cost Leadership Str.CL --> Financial Perf FP	0.034	0.101				
	Cost Leadership Str.CL --> Innovation Perf IP	0.044	0.041				
	Differentiation Str.DIFS --> Financial Perf FP	***	0.261				
	Differentiation Str.DIFS --> Innovation Perf IP	***	0.148				
Independent Variable	Growth Str Dimension 1 GS_DM1 --> AI Dimension 3 AI_DM3			0.001	0.051		
	Growth Str Dimension 1 GS_DM1 --> AI Dimension 2 AI_DM2			0.072	0.065		

--> Mediator Variable	Growth Str Dimension 1 GS_DM1 --> AI Dimension 1 AI_DM1			***	0.07		
	Growth Str Dimension 2 GS_INT2 --> AI Dimension 3 AI_DM3			0.020	0.027		
	Growth Str Dimension 2 GS_INT2 --> AI Dimension 2 AI_DM2			0.484	0.034		
	Growth Str Dimension 2 GS_INT2 --> AI Dimension 1 AI_DM1			0.677	0.036		
	Cost Leadership Str.CL --> AI Dimension 3 AI_DM3			***	0.106		
	Cost Leadership Str.CL --> AI Dimension 2 AI_DM2			***	0.112		
	Cost Leadership Str.CL --> AI Dimension 1 AI_DM1			***	0.117		
	Differentiation Str.DIFS --> AI Dimension 3 AI_DM3			***	0.115		
	Differentiation Str.DIFS --> AI Dimension 2 AI_DM2			***	0.161		
	Differentiation Str.DIFS --> AI Dimension 1 AI_DM1			***	0.241		
Mediator Variable --> Dependent Variable	AI Dimension 3 AI_DM3--> Financial Perf FP					***	0.078
	AI Dimension 3 AI_DM3--> Innovation Perf IP					***	0.031
	AI Dimension 2 AI_DM2--> Financial Perf FP					***	0.047
	AI Dimension 2 AI_DM2--> Innovation Perf IP					***	0.021
	AI Dimension 1 AI_DM1--> Financial Perf FP					***	0.047
	AI Dimension 1 AI_DM1--> Innovation Perf IP					***	0.02
R2		Financial p. R2=0,158 Innovation p. R2=0,354	AI_Dimension1 R2=0,142; AI_Dimension2 R2=0,025; AI_Dimension3 R2=0,050	Financial p. R2=0,218 Innovation p. R2=0,410;			

In model-1, effects of independent variables such as growth strategies, cost leadership strategies and differentiation strategies on dependent variables such as financial and innovative performances are investigated respectively. Growth strategies dimension-1 (organic growth) has a positive effect on Financial Performance (Beta=0.263 p<0.05). Growth strategies dimension-1 (organic growth) has a positive effect on Innovative Performance (Beta=0.195 p<0.05). Growth strategies dimension-2 (internationalism) does not affect financial performance (p>0.05). Growth strategies dimension-2 (internationalism) has a positive effect on Innovative Performance (Beta=0.126 p<0.05). Cost Leadership Strategies affect Financial Performance positively (Beta=.036 p<0.05).

Cost Leadership Strategies affect Innovative Performance positively (Beta=.070 $p<0.05$).
 Differentiation Strategies affect Financial Performance positively (Beta=0.572 $p<0.05$).
 Differentiation Strategies affect Innovative Performance positively (Beta=0.732 $p<0.05$).

In model-2, effects of independent variables such as growth strategies, cost leadership strategies and differentiation strategies on mediator variables such as artificial intelligence are investigated respectively. Growth strategies dimension-1 (organic growth) has a positive effect on Artificial intelligence dimension-3 (risk and complexity) and dimension-1 (compatibility) (Beta=0.157; 0.188; $p<0.05$). Growth strategies dimension-1 (organic growth) does not have a positive effect on Artificial intelligence dimension-2 (advantage) since $p>0.05$. Growth strategies dimension-2 (internationalism) has a positive effect on Artificial intelligence dimension-3 (risk and complexity) (Beta=0.107; $p<0.05$). Growth strategies dimension-2 (internationalism) does not have a positive effect on Artificial intelligence dimension-1 (compatibility) and dimension-2 (advantage) since $p>0.05$. Cost Leadership Strategies have a positive effect on the Artificial intelligence domain-1 (compatibility), dimension-2 (advantage), and dimension-3 (risk and complexity) (Beta=0.394;0.275;0.234; $p<0.05$). Differentiation Strategies have a positive effect on the Artificial intelligence domain-1 (compatibility), dimension-2 (advantage), and dimension-3 (risk and complexity) (Beta=0.181;0.276;0.535, $p<0.05$).

In model-3, effects of mediator variable artificial intelligence on dependent variables such as financial and innovative performances are investigated respectively. All Artificial intelligence dimensions affect financial and innovative performance since $p<0.05$.

7.8.7.4 The Mediator Role Investigation

The mediator role investigation results are shown in Table 49.

Table 49. The Mediator Role Consolidation

Road	Beta	p	S.E
Growth Str Dimension 1 GS_DM1 --> Financial Perf FP	0.263	***	0.071
Growth Str Dimension 1 GS_DM1 --> Innovation Perf IP	0.195	***	0.019
Growth Str Dimension 2 GS_INT2 --> Financial Perf FP	0.009	0.810	0.034
Growth Str Dimension 2 GS_INT2 --> Innovation Perf IP	0.126	***	0.015
Cost Leadership Str.CL --> Financial Perf FP	0.036	0.034	0.101
Cost Leadership Str.CL --> Innovation Perf IP	0.070	0.044	0.041

Differentiation Str.DIFS --> Financial Perf FP	0.572	***	0.261
Differentiation Str.DIFS --> Innovation Perf IP	0.732	***	0.148
Growth Str Dimension 1 GS_DM1 --> AI Dimension 3 AI_DM3	,157	,001	,051
Growth Str Dimension 1 GS_DM1 --> AI Dimension 2 AI_DM2	,081	,072	,065
Growth Str Dimension 1 GS_DM1 --> AI Dimension 1 AI_DM1	,188	***	,070
Growth Str Dimension 2 GS_INT2 --> AI Dimension 3 AI_DM3	,107	,020	,027
Growth Str Dimension 2 GS_INT2 --> AI Dimension 2 AI_DM2	-,030	,484	,034
Growth Str Dimension 2 GS_INT2 --> AI Dimension 1 AI_DM1	-,016	,677	,036
Cost Leadership Str.CL --> AI Dimension 3 AI_DM3	,394	***	,106
Cost Leadership Str.CL --> AI Dimension 2 AI_DM2	,275	***	,112
Cost Leadership Str.CL --> AI Dimension 1 AI_DM1	,234	***	,117
Differentiation Str.DIFS --> AI Dimension 3 AI_DM3	,181	***	,115
Differentiation Str.DIFS --> AI Dimension 2 AI_DM2	,276	***	,161
Differentiation Str.DIFS --> AI Dimension 1 AI_DM1	,535	***	,241
AI Dimension 3 AI_DM3--> Financial Perf FP	0.213	***	0.078
AI Dimension 3 AI_DM3--> Innovation Perf IP	0.146	***	0.031
AI Dimension 2 AI_DM2--> Financial Perf FP	-0.130	***	0.47
AI Dimension 2 AI_DM2--> Innovation Perf IP	-0.263	***	0.021
AI Dimension 1 AI_DM1--> Financial Perf FP	0.218	***	0.047
AI Dimension 1 AI_DM1--> Innovation Perf IP	0.171	***	0.02
Indirect effect: Growth Str Dimension 1--> AI--> Financial Perf FP	0.190	***	0.070
Indirect effect : Growth Str Dimension 1 GS_DM1 --> AI → Innovation Perf IP	0.146	***	0.029
Indirect effect: Growth Str Dimension 2 --> AI --> Financial Perf FP	-0.016	0.651	0.034
Indirect effect: Growth Str Dimension 2--> AI --> Innovation Perf IP	0.108	0.002	0.015
Indirect effect: Cost Leadership Str. --> AI --> Financial Perf FP	-0.053	0.022	0.121
Indirect effect: Cost Leadership Str --> AI --> Innovation Perf IP	0.043	0.028	0.05
Indirect effect: Differentiation Str.DIFS --> AI --> Financial Perf FP	0.447	***	0.246
Indirect effect: Differentiation Str.DIFS --> AI --> Innovation Perf IP	0.658	***	0.143

Analysis of Growth Strategy organic growth dimension, artificial intelligence and financial performance relation:

Related hypothesis:

H1a: Growth strategy Organic Growth Dimension has an impact on Artificial Intelligence.

H4a: Growth strategy Organic Growth Dimension has an impact on business financial performance.

H3a: Artificial Intelligence has an impact on business financial performance.

H6a: Artificial intelligence has a partial mediator role in the effect of the Organic Growth Dimension of the growth strategy on the financial performance of the business.

Growth strategy dimension-1 (organic growth) positively affects financial performance (1st model Beta=0.263 p<0.05). Growth strategy dimension-1 (organic growth) affects the mediating variables Artificial intelligence dimension-1 (compatibility) and dimension-3 (risk and complexity) (2nd model p<0.05). When the mediating variables are added, the growth strategy dimension-1 (organic growth) affects the financial performance, the effect coefficient was Beta=0.190. Since Beta value decreases, Artificial intelligence dimension-1 (compatibility) and dimension-3 (risk and complexity) have partial mediation role in the effect of growth strategies dimension-1 (organic growth) on Financial Performance.

Based on these results H1a, H4a, H3a and H6a hypothesis are confirmed.

The models created regarding this observation:

Model 1:

$$FP = \beta_0 + \beta_1 GS_DM1 + \varepsilon_i \quad (H4a)$$

Model 2:

$$AI_DM1 = \beta_0 + \beta_1 GS_DM1 + \varepsilon_i \quad (H1a)$$

$$AI_DM3 = \beta_0 + \beta_1 GS_DM1 + \varepsilon_i \quad (H1a)$$

Model 3:

$$FP = \beta_0 + \beta_1 GS_DM1 + AI_DM1 + AI_DM3 + \varepsilon_i \quad (H3a \text{ and } H6a)$$

Coefficients Regarding Model – Growth-1

Road	Model 1	Model 2	Model 3
Growth Strategy Dimension 1 GS_DM1 --> Financial Performance FP	***		
Growth Strategy Dimension 1 GS_DM1 --> Artificial Intelligence Dimension 3 AI_DM3		,001	
Growth Strategy Dimension 1 GS_DM1 --> Artificial Intelligence Dimension 1 AI_DM1		***	
Artificial Intelligence Dimension 3 AI_DM3--> Financial Performance FP			***
Artificial Intelligence Dimension 1 AI_DM1--> Financial Performance FP			***
Indirect effect : Growth Strategy Dimension 1 --> Artificial Int --> Financial Perf	p: ***; Beta= 190; SE=0.070		

*p<0,05 **p<0,01

Analysis of Growth Strategy growth dimension, artificial intelligence and innovation performance relation:

Related hypothesis:

H1a: Growth strategy Organic Growth Dimension has an impact on Artificial Intelligence.

H4b: Growth strategy Organic Growth Dimension has an impact on business innovative performance.

H3b: Artificial Intelligence has an impact on business innovative performance.

H6b: Artificial intelligence has a partial mediator role in the effect of the Organic Growth Dimension of the growth strategy on the innovative performance of the business.

Growth Strategy dimension-1 (organic growth) positively affects innovative performance (1st model Beta=0.195 p<0.05). Growth strategy dimension-1 affects the mediating variables Artificial intelligence dimension-1 (compatibility) and dimension-3 (risk and complexity) (2nd model p<0.05). When mediator variables are added, growth strategy dimension-1 affects innovative performance, the coefficient of impact was Beta=0.146. Since Beta value decreased, artificial intelligence dimension-1 and dimension-3 have a partial mediation role in the effect of growth strategies dimension-1 (compatibility) on Innovative Performance.

Based on these results H1a, H4b, H3b and H6b hypothesis are confirmed.

The models created regarding this observation:

Model 1:

$$IP = \beta_0 + \beta_1 GS_DM1 + \varepsilon_i \quad (H4b)$$

Model 2:

$$AI_DM1 = \beta_0 + \beta_1 GS_DM1 + \varepsilon_i \quad (H1a)$$

$$AI_DM3 = \beta_0 + \beta_1 GS_DM1 + \varepsilon_i \quad (H1a)$$

Model 3:

$$IP = \beta_0 + \beta_1 GS_DM1 + AI_DM1 + AI_DM3 + \varepsilon_i \quad (H3b \text{ and } H6b)$$

Coefficients Regarding Model – Growth -2

Road	Model 1	Model 2	Model 3
Growth Strategy Dimension 1 GS_DM1 --> Innovation Performance IP	***		
Growth Strategy Dimension 1 GS_DM1 --> Artificial Intelligence Dimension 3 AI_DM3		,001	
Growth Strategy Dimension 1 GS_DM1 --> Artificial Intelligence Dimension 1 AI_DM1		***	
Artificial Intelligence Dimension 3 AI_DM3-> Innovation Performance IP			***
Artificial Intelligence Dimension 1 AI_DM1--> Innovation Performance IP			***
Indirect effect: Growth Strategy Dimension1 --> AI --> Innovation Performance IP	p:***; Beta=0.146; SE=0.029		

Analysis of Growth Strategy internationalism dimension, artificial intelligence and financial performance relation:

Related hypothesis:

H1b: The Growth Strategy Internationalization Dimension has an impact on Artificial Intelligence.

H3a: Artificial Intelligence has an impact on business financial performance.

H4c: Growth strategy The Internationalization Dimension has an impact on business financial performance.

H6c: Artificial intelligence has a mediating role in the effect of the Internationalization dimension of the growth strategy on the financial performance of the business.

Growth strategy dimension-2 (internationalization) does not affect financial performance since $p > 0.05$. Therefore, it is not convenient to apply an intermediary variable impact investigation and the related model cannot be produced.

Based on these results, H1b, H4c and H6c hypothesis are rejected.

Analysis of Growth Strategy internationalism dimension, artificial intelligence and innovation performance relation:

Related hypothesis:

H1b: The Growth Strategy Internationalization Dimension has an impact on Artificial Intelligence.

H3b: Artificial Intelligence has an impact on business innovative performance.

H4d: Growth strategy The Internationalization Dimension has an impact on firm innovative performance.

H6d: Artificial intelligence has a partial mediator role in the effect of the Internationalization dimension of the growth strategy on the innovative performance of the business.

Growth strategy dimension-2 (internationalization) positively affects innovative performance (Beta=0.126 p<0.05). Growth strategy dimension-2 (internationalization) affects only the mediating variable Artificial intelligence dimension-3 (risk and complexity) (2nd model p<0.05). When mediator variables are added to the first model, Growth strategy dimension-2 (internationalization) affects innovative performance, the coefficient of influence was Beta=0.108. Since Beta value decreases, Artificial intelligence dimension-3 (risk and complexity) has a partial mediation role in the effect of growth strategies dimension-2 (internationalization) on innovative performance.

Based on these results H3b, H4d and H6d hypothesis are confirmed.

The models created regarding this observation:

Model 1:

$$IP = \beta_0 + \beta_1 GS_INT2 + \varepsilon_i \quad (H4d)$$

Model 2:

$$AI_DM3 = \beta_0 + \beta_1 GS_INT2 + \varepsilon_i \quad (H1b)$$

Model 3:

$$IP = \beta_0 + \beta_1 GS_INT2 + AI_DM3 + \varepsilon_i \quad (H3b \text{ and } H6d)$$

Coefficients Regarding Model

Road	Model 1	Model 2	Model 3
Growth Strategy Dimension 2 GS_INT2 --> Innovation Performance IP	***	***	
Growth Strategy Dimension 2 GS_INT2 --> Artificial Intelligence Dimension 3 AI_DM3		,020	
Growth Strategy Dimension 2 GS_INT2 --> Artificial Intelligence Dimension 2 AI_DM2		,484	
Growth Strategy Dimension 2 GS_INT2 --> Artificial Intelligence Dimension 1 AI_DM1		,677	
Artificial Intelligence Dimension 3 AI_DM3--> Innovation Performance IP		***	***
Artificial Intelligence Dimension 2 AI_DM2--> Innovation Performance IP		***	***

Artificial Intelligence Dimension 1 AI_DM1--> Innovation Performance IP		***	***
Indirect Impact : Growth Strategy Dimension 2 --> AI --> Innovation Performance	p:***; Beta=0.108; SE=0.015		

Analysis of Cost Leadership Strategy dimension, artificial intelligence and financial performance relation:

Related hypothesis:

H2a: The Cost Leadership strategy has an impact on Artificial Intelligence.

H3a: Artificial Intelligence has an impact on business financial performance.

H5a: Cost leadership strategy has an impact on business financial performance.

H7a: Artificial intelligence has a partial mediator role in the effect of cost leadership strategy on business financial performance.

Cost leadership strategy positively affects financial performance (1st model Beta=0.036 p<0.05). Cost leadership strategy affects all Artificial intelligence dimensions (Compatibility, Relative Advantage, Risk and Complexity) with mediating variables (2nd model p<0.05). When the mediatory variables are added, cost leadership strategy affects financial performance, the coefficient of impact was Beta=-0.053. Since beta value decreases, Artificial intelligence has a partial mediation role in the effect of cost leadership strategies on financial performance.

Based on these results H2a, H3a, H5a and H7a hypothesis are confirmed.

The models created regarding this observation:

Model 1:

$$FP = \beta_0 + \beta_1 CL + \varepsilon_i \quad (H5a)$$

Model 2:

$$AI_DM1 = \beta_0 + \beta_1 CL + \varepsilon_i \quad (H2a)$$

$$AI_DM2 = \beta_0 + \beta_1 CL + \varepsilon_i \quad (H2a)$$

$$AI_DM3 = \beta_0 + \beta_1 CL + \varepsilon_i \quad (H2a)$$

Model 3:

$$FP = \beta_0 + \beta_1 CL + AI_DM1 + AI_DM2 + AI_DM3 + \varepsilon_i \quad (H3a \text{ and } H7a)$$

Coefficients Regarding Model

Road	Model 1	Model 2	Model 3
Cost Leadership strategy CL--> Financial Performance FP	0.034		
Cost Leadership strategy CL --> Artificial Intelligence Dimension 3 AI_DM3		***	
Cost Leadership strategy CL --> Artificial Intelligence Dimension 2 AI_DM2		***	
Cost Leadership strategy CL. --> Artificial Intelligence Dimension 1 AI_DM1		***	
Artificial Intelligence Dimension 3 AI_DM3--> Financial Performance FP			***
Artificial Intelligence Dimension 2 AI_DM2--> Financial Performance FP			***
Artificial Intelligence Dimension 1 AI_DM1--> Financial Performance FP			***
Indirect effect: Cost Leadership strategy --> AI --> Financial Performance	p: ***; Beta: -0.053; SE= 0.121		

Analysis of Cost Leadership Strategy dimension, artificial intelligence and innovation performance relation:

Related hypothesis:

H2a: Cost leadership strategy has an impact on Artificial Intelligence.

H5b: Cost leadership strategy has an impact on business innovative performance.

H3b: Artificial Intelligence has an impact on business innovative performance

H7b: Artificial intelligence has a partial mediator role in the impact of cost leadership strategy on business innovative performance.

Cost leadership strategy positively affects innovative performance (1st model Beta=0.070 p<0.05). Cost leadership strategy affects all Artificial intelligence dimensions (Compatibility, Relative Advantage, Risk and Complexity) 2nd model p<0.05). Cost leadership strategy affects innovative performance when the mediating variables are added, the coefficient of impact was Beta=0.043. Since beta value decreased, Artificial intelligence has a partial mediation role in the effect of cost leadership strategies on innovative performance.

Based on these results H2b, H5b, H3b, H7b hypothesis are confirmed.

The models created regarding this observation:

Model 1:

$$IP = \beta_0 + \beta_1 CL + \varepsilon_i \quad (H5b)$$

Model 2:

$$AI_DM1 = \beta_0 + \beta_1 CL + \varepsilon_i \quad (H2a)$$

$$AI_DM2 = \beta_0 + \beta_1 CL + \varepsilon_i \quad (H2a)$$

$$AI_DM3 = \beta_0 + \beta_1 CL + \varepsilon_i \quad (H2a)$$

Model 3:

$$IP = \beta_0 + \beta_1 CL + AI_DM1 + AI_DM2 + AI_DM3 + \varepsilon_i \quad (H3a \text{ and } H7a)$$

Coefficients Regarding Model

Road	Model 1	Model 2	Model 3
Cost Leadership strategy CL --> Innovation Performance IP	0.044		
Cost Leadership strategy CL --> Artificial Intelligence Dimension 3 AI_DM3		***	
Cost Leadership strategy CL --> Artificial Intelligence Dimension 2 AI_DM2		***	
Cost Leadership strategy CL --> Artificial Intelligence Dimension 1 AI_DM1		***	
Artificial Intelligence Dimension 3 AI_DM3--> Innovation Performance IP			***
Artificial Intelligence Dimension 2 AI_DM2--> Innovation Performance IP			***
Artificial Intelligence Dimension 1 AI_DM1--> Innovation Performance IP			***
Indirect effect: Cost Leadership strategy --> AI --> Innovation Performance	p:0.028; B:0.043; SE:0.05		

Analysis of Differentiation Strategy dimension, artificial intelligence and financial performance relation:

Related hypothesis:

H2b: Differentiation strategy has an impact on Artificial Intelligence.

H3a: Artificial Intelligence has an impact on business financial performance.

H5c: The differentiation strategy has an impact on the firm's financial performance.

H7c: Artificial intelligence has a partial mediator role in the effect of differentiation strategy on business financial performance.

Differentiation strategies affect financial performance positively (Beta=0.572 p<0.05). Differentiation strategies affect all Artificial intelligence dimensions with mediating variables (2nd model p<0.05). When mediator variables are added to the first model, differentiation strategies affect financial performance, the coefficient of influence was Beta= 0.447. Since beta value decreases, Artificial intelligence has a partial mediating role in the effect of differentiation strategies on financial Performance.

Based on these results H2b, H3a, H5c, H7c hypothesis are confirmed.

The models created regarding this observation:

Model 1:

$$FP = \beta_0 + \beta_1 DIFS + \varepsilon_i \quad (H5c)$$

Model 2:

$$AI_DM1 = \beta_0 + \beta_1 DIFS + \varepsilon_i \quad (H2b)$$

$$AI_DM2 = \beta_0 + \beta_1 DIFS + \varepsilon_i \quad (H2b)$$

$$AI_DM3 = \beta_0 + \beta_1 DIFS + \varepsilon_i \quad (H2b)$$

Model 3:

$$FP = \beta_0 + \beta_1 DIFS + AI_DM1 + AI_DM2 + AI_DM3 + \varepsilon_i \quad (H3a \text{ and } H7c)$$

Coefficients Regarding Model

Road	Model 1	Model 2	Model 3
Differentiation Strategy DIFS --> Financial Performance FP	***		
Differentiation Strategy DIFS --> Artificial Intelligence Dimension 3 AI_DM3		***	
Differentiation Strategy DIFS --> Artificial Intelligence Dimension 2 AI_DM2		***	
Differentiation Strategy DIFS --> Artificial Intelligence Dimension 1 AI_DM1		***	
Artificial Intelligence Dimension 3 AI_DM3--> Financial Performance FP			***
Artificial Intelligence Dimension 2 AI_DM2--> Financial Performance FP			***
Artificial Intelligence Dimension 1 AI_DM1--> Financial Performance FP			***
Indirect effect: Differentiation Strategy --> AI --> Financial Performance FP	P:***; Beta:0.447; SE=0.246		

Analysis of Differentiation Strategy dimension, artificial intelligence and innovation performance relation:

Related hypothesis:

H2b: Differentiation strategy has an impact on Artificial Intelligence.

H5d: Differentiation strategy has an impact on firm innovative performance.

H3b: Artificial Intelligence has an impact on business innovative performance.

H7d: Artificial intelligence has a partial mediating role in the impact of differentiation strategy on business innovative performance.

Differentiation strategies positively affect innovative performance (Beta=0.732 $p < 0.05$). Differentiation strategies affect all Artificial intelligence dimensions with mediating variables (2nd model $p < 0.05$). When mediator variables are added to the first model, differentiation strategies affect innovative performance, the effect coefficient was Beta=0.658. Since beta value decreases, Artificial intelligence has a partial mediating role in the effect of differentiation strategies on innovative performance.

Based on these results H2b, H5d, H3b and H7d hypothesis are confirmed.

The models created regarding this observation:

Model 1:

$$IP = \beta_0 + \beta_1 DIFS + \varepsilon_i \quad (H5d)$$

Model 2:

$$AI_DM1 = \beta_0 + \beta_1 DIFS + \varepsilon_i \quad (H2b)$$

$$AI_DM2 = \beta_0 + \beta_1 DIFS + \varepsilon_i \quad (H2b)$$

$$AI_DM3 = \beta_0 + \beta_1 DIFS + \varepsilon_i \quad (H2b)$$

Model 3:

$$IP = \beta_0 + \beta_1 DIFS + AI_DM1 + AI_DM2 + AI_DM3 + \varepsilon_i \quad (H3b \text{ and } H7d)$$

Coefficients Regarding Model

Road	Model 1	Model 2	Model 3
Differentiation Strategy DIFS --> Innovation Performance IP	***		
Differentiation Strategy DIFS --> Artificial Intelligence Dimension 3 AI_DM3		***	
Differentiation Strategy DIFS --> Artificial Intelligence Dimension 2 AI_DM2		***	
Differentiation Strategy DIFS --> Artificial Intelligence Dimension 1 AI_DM1		***	
Artificial Intelligence Dimension 3 AI_DM3--> Innovation Performance IP			***
Artificial Intelligence Dimension 2 AI_DM2--> Innovation Performance IP			***
Artificial Intelligence Dimension 1 AI_DM1--> Innovation Performance IP			***
Indirect effect: Differentiation Strategy --> AI --> Innovation Performance	p:***; Beta:0.658; SE:0.143		

Fit Indexes are shown in Table 50.

Table 50. Fit Indexes In Total

Fit Expression	Good Fit	Acceptable Fit	Model
χ^2/df	$0 \leq \chi^2/df \leq 2$	1-5	3,02
GFI	$0,95 \leq GFI \leq 1$	$0,90 \leq GFI \leq 0,95$	0,87
CFI	$0,97 \leq CFI \leq 1$	$0,95 \leq CFI \leq 0,97$	0,89
RMR	$0 \leq RMR \leq 0,05$	$0,05 \leq RMR \leq 0,08$	0,023
RMSEA	$0 \leq RMSEA \leq 0,05$	$0,05 \leq RMSEA \leq 0,10$	0,062

χ^2/df and RMSEA, RMR values show good agreement. The CFI value is close to the limit.

The roadmap is shown in picture 19.

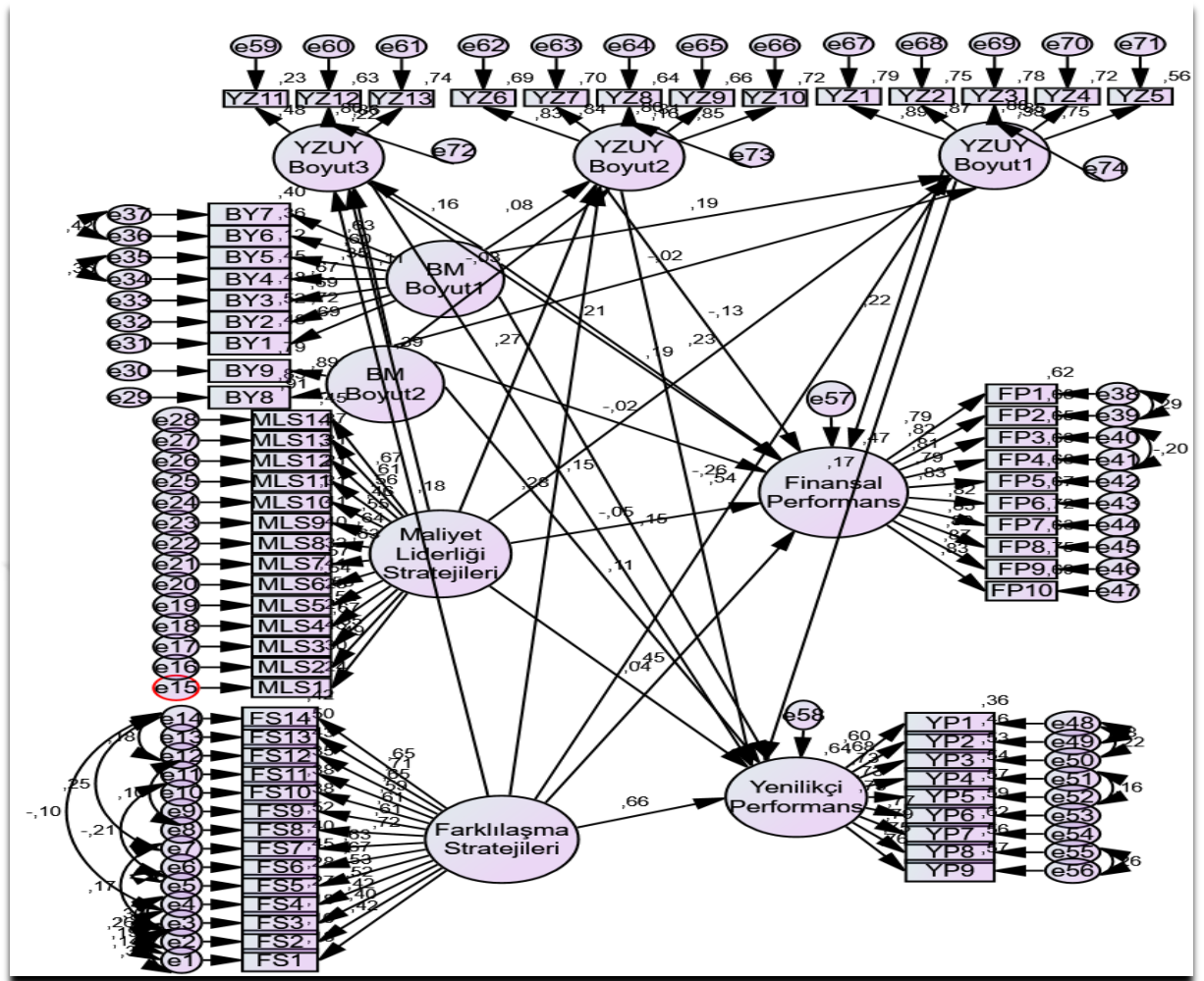


Figure 19. The Roadmap In Total

All hypothesis confirmation of this study can be summarized below Table 51:

Table 51. Hypothesis Results

Hypotheses	Approve	Reject
H1a Growth Strategy Organic Growth Dimension has an impact on Artificial Intelligence.	✓	
H1b The Growth Strategy Internationalization Dimension has an impact on Artificial Intelligence.		x
H2a The Cost Leadership strategy has an impact on Artificial Intelligence.	✓	
H2b Differentiation strategy has an impact on Artificial Intelligence.	✓	
H3a Artificial Intelligence has an impact on business financial performance.	✓	
H3b Artificial Intelligence has an impact on business innovative performance.	✓	
H4a Growth strategy the Organic Growth Dimension has an impact on business financial performance.	✓	
H4b Growth strategy The Organic Growth Dimension has an impact on business innovative performance.	✓	
H4c Growth strategy The Internationalization Dimension has an impact on business financial performance.		x

H4d	Growth strategy The Internationalization Dimension has an impact on firm innovative performance.	✓	
H5a	Cost leadership strategy has an impact on business financial performance.	✓	
H5b	Cost leadership strategy has an impact on business innovative performance.	✓	
H5c	The differentiation strategy has an impact on the firm's financial performance.	✓	
H5d	Differentiation strategy has an impact on firm innovative performance.	✓	
H6a	Artificial intelligence has a mediator role in the effect of the Organic Growth Dimension of the growth strategy on the financial performance of the business.	✓	
H6b	Artificial intelligence has a mediator role in the effect of the Organic Growth Dimension of the growth strategy on the innovative performance of the business.	✓	
H6c	Artificial intelligence has a mediator role in the effect of the Internationalization dimension of the growth strategy on the financial performance of the business.		x
H6d	Artificial intelligence has a mediator role in the effect of the Internationalization dimension of the growth strategy on the innovative performance of the business.	✓	
H7a	Artificial intelligence has a mediator role in the effect of cost leadership strategy on business financial performance.	✓	
H7b	Artificial intelligence has a mediator role in the impact of cost leadership strategy on business innovative performance.	✓	
H7c	Artificial intelligence has a mediator role in the effect of differentiation strategy on business financial performance.	✓	
H7d	Artificial intelligence has a mediator role in the impact of differentiation strategy on business innovative performance.	✓	

CONCLUSIONS

This paper examines the mediator role of artificial intelligence in the impact of corporate and competitive strategies on company performance, specifically in finance and telecommunication industry. Telecommunication and finance industries are in scope of this research since these industries are mostly driven by both strategy and technology. For these purposes, 574 people working in finance, telecom and informatics sectors in Turkey have been reached out to test the strategy and technology impact. 59.2% of the participants engage in research work in national companies, 45.8% work as mid-level managers, 41.2% work in the company for 3-5 years, and all participants are university graduates, 39%, 1 of them has a master's and doctorate.

To ensure that the scales used in the research are suitable for the sample of the study, first a pilot study was conducted. As a result of the validity and reliability study carried out in the pilot study, the measurement tools to be used in line with the purpose of the research were brought into their final form and statistical analyzes were carried out for this purpose. In the research, growth strategies measurement in two dimensions as organic growth and internationalism has been used for corporate strategies. Cost leadership measurement as one dimension and differentiation strategies measurement as one dimension have been used for competitive strategies. To measure Artificial intelligence in this search, three artificial intelligence attributes such as compatibility, relative advantage and complexity from the technology acceptance dimensions have been used. Financial performance measurement as one dimension and innovation performance measurement as one dimension have been used to scale out the company performance understanding.

H1: Growth Strategy has an impact on Artificial Intelligence.

H1a: Growth Strategy Organic Growth Dimension has an impact on Artificial Intelligence.

H1b: The Growth Strategy Internationalization Dimension has an impact on Artificial Intelligence.

A moderate positive relationship is determined between the growth strategies dimension–1 (organic growth) and artificial intelligence approach dimension-1 (compatibility). A moderate positive relationship is determined between the growth strategies dimension–1 (organic growth) and artificial intelligence approach dimension-2 (advantage). A moderate positive relationship is determined between the growth strategies dimension–1 (organic growth) and artificial intelligence approach dimension-3 (risk and complexity). A moderate positive relationship is determined between the growth strategies dimension–1 (organic growth) and artificial intelligence overall. These results indicate that organic growth strategies by focusing on expansion, technology strategies, and partnerships strategies are an enabler to trigger artificial intelligence investments and decisions at the companies.

On the other hand, a weak positive relationship is determined between the growth strategies dimension–2 (internationalism) and artificial intelligence approach dimension-1 (compatibility). A weak positive relationship is determined between the growth strategies dimension–2 (internationalism) and artificial intelligence approach dimension-2 (advantage). A weak positive relationship is determined between the growth strategies dimension–2 (internationalism) and artificial intelligence approach dimension-3 (risk and complexity). A weak positive relationship is determined between the growth strategies dimension–2 (internationalism) and artificial intelligence overall. These results indicate that internationalism strategies for growth has a weak impact and not a good enabler to trigger artificial intelligence improvements at the companies.

As a conclusion, the results show a moderate positive relationship is determined between growth strategies overall and artificial intelligence overall. These results also contribute to some research in literature. Addicott (2000) highlighted in his research that the key success element as to match the firm's trend strengths with the right type of technology implementation model. Porter (1983), Zahra and Covin (1993) are the key research to mention the need for alignment between business strategy and technology, and how the choices in strategy and technology should be linked in and compatible with each other. Ansoff and Stewart (1967), C. Freeman (1974), and Miles and Snow (1978) studies also mentioned the sense of this complexity by developing typologies of technology and strategy. Pyburn (1983) stated Information technologies strategy derives from business

strategy and that the two are so much linked. Maidique and Patch (1988) provided another example of conceptual research and proved that technology policies should be aligned with business strategy, meaning strategy has a great impact on the selected technology policies. As some works of Hosseini & Mazinani, (2006); Luftman (2005), Vivekanandan (2008) contributes to success IT efficiency and effectiveness should be the focal point of a company's attention and strategic orientation; the objective of IT investment is to complement company strategy and enable the business to achieve superior business performance and sustain competitive advantage (82-OK- Bani 2011). And as the recent research by Dederichs (2010), Kouakou (2013), Al-Sukkar (2013), Makridakis (2017) and Chen H. (2019) examines and proofs the corporate business strategies, sustainable growth strategies links with the artificial intelligence perceptions and technology decisions.

H2: Business Strategies (Competitive Strategies) have an impact on Artificial Intelligence

H2a: The Cost Leadership strategy has an impact on Artificial Intelligence.

H2b: Differentiation strategy has an impact on Artificial Intelligence.

This study results indicate a moderate positive impact between the cost leadership strategy and all dimensions of Artificial Intelligence from the compatibility, advantage and risk and complexity perspective.

In parallel, the study results also prove again a moderate positive impact between the differentiation strategy and all dimensions of Artificial Intelligence approach with the compatibility, advantage and risk and complexity understanding.

These results contribute to the literature to show how the usage of emerging and digitalization technologies are characterized and structured by intense competition in the market. Starting McFarlan's (1984) theoretical framework, which recommends the organizations to create or tailor new products according to specific customer needs based on competition basis such as cost, product differentiation and recommends operating information systems to balance accordingly, Porter (1985) highlights the firm's ability to drive technological change in its industry will provide a sustainable competitive

advantage in the long run. Milova (2001) research shows the technology use is relevant to both cost leadership and differentiation strategy. It also summarizes the importance of analyzing industry structure in terms of competitive strategy and technology use. Makridakis (2018) reminds and highlights Jankel's (2015) study to advice on the importance of main factors while characterizing four digital companies such as choosing the right technologies and making the appropriate purchasing accordingly as their competitive necessity. Summer (2018) contributes the positive links between intelligence and competitive advantages from business intelligence, decision making and organizational performance understanding. While Al-Sukkar (2013) focuses on artificial intelligence approach based on cost leadership, differentiation, alliances and diversification strategies, Chen (2012) provides similar results about the positive impacts of the use of intelligence for management decisions and positive relationships between intelligence, organizational agility and competitive advantage effects in telco industry.

H3: Artificial Intelligence has an impact on business performance.

H3a: Artificial Intelligence has an impact on business financial performance.

H3b: Artificial Intelligence has an impact on business innovative performance.

This empirical study shows a moderate positive impact between artificial intelligence approach and business financial and innovation performance. The critical result is here that a weak impact is determined between dimension-2 (advantage) and dimension-3 (risk and complexity) of artificial intelligence and the business performances.

The positive relationship and the increasing effect of technology on company performance is consistent with many studies in the literature, and artificial intelligence is even rare. Much research uses Porter's (1989) five competitive strengths to justify competitive advantage and company performances. Galal (1997) mentions the justification of information technology investments are done against different types of returns, which generally represent an assessment of improved performance. And Giguere (2004) highlights the study of Feeser and Willard (1990) and mentions the most growing high-tech companies compete in markets and technologies that are closely related to their technology expertise, and as a result, the relevant business technology strategy performs the best. Empirical study of Hambrick (1983), White (1986) suggests that firms

emphasizing differentiation strategies in technology-intensive industries will be more profitable and experience greater sales growth. Brown (1995) analyzes the relationship between information systems and long-term company performances, by resulting such companies are more profitable and productive. Sandra (2010) proves the relationship between information technology systems and company performance for competition dynamics perspectives. Chen's (2019) study integrates similar previous perspectives and applies them to the artificial intelligence concept to define dynamic capabilities to perceive opportunities and threats, make timely decisions, and implement strategic decisions and changes efficiently led to an increase in performance.

On the other hand, the weak impact between two dimensions of artificial intelligence and performance shows the market still has suspects and doubts about implementing artificial intelligence technologies. These address the challenges in complexity and adoption of the technologies, and the difficulties in measurements as depicted in other literature studies. Richards (2019) presents the positive effectiveness of business intelligence on corporate performance management; while Obinkyereh (2017), Patil and Kulkarni (2019), Belanche (2019), and Chan (2019) are focusing on the adoption and technology acceptance of artificial intelligence usage and performance links in financial and telecom sector.

H4: Growth strategy has an impact on business performance.

H4a: Growth strategy The Organic Growth Dimension has an impact on business financial performance.

H4b: Growth strategy The Organic Growth Dimension has an impact on business innovative performance.

H4c: Growth strategy The Internationalization Dimension has an impact on business financial performance.

H4d: Growth strategy The Internationalization Dimension has an impact on firm innovative performance.

This study proves a moderate positive impact between growth strategies dimension—1 (organic growth) and company performance including both financial performance and

innovation performance. Similarly, the results concludes that a moderate positive effect exists between growth strategies dimension-2 (internationalism) and company performance from both financial performance innovation performance perspectives.

These results support the literature since mostly starting with Porter's five forces framework, there are many studies that investigate the collaboration between strategy and company performance from different perspectives. Previously, Young and Selto (1991) argue that strategy ultimately affects external performance, e.g., market share, stock price. As depicted in Dederichs (2010), Rumelt (1974) explored and found the link between corporate strategy and financial performance. Additionally, Kalagnanam (1997) shows the use of nonfinancial performance measures and their relationship to strategy. McCann's (1991) results for specifically high-tech firms show that the highest performing companies focus on growth in innovation through R&D. Feeser & Willard (1990) works conclude that a focus on product-market strategy has high growth potential and Giguere (2004) adds by presenting high-growth firms are more likely to maintain their original product and market focus and to earn substantial revenues from foreign markets than low-growth firms. Giguere (2004) study is important to explain the new venture strategies associated with higher growth, while Pleshko and Soulden (2002) is another important study to examine the growth strategies on new segments from profitability measurement in financial services. Ireland & Hitt (1997) worked on high-growth businesses and identify the best high-growth strategies such as product and R&D improvements, expanding regions and areas with accusation, merging strategies, and then they found that cost leaders and high-quality strategies were positively associated to growth. Giguere (2004) mentions Covin & Slevin's (1997) research also supports these results. Hitt (1997) examined the effect of international diversification on innovation and firm performance and concluded that that international diversification contributes to firm innovation.

H5: Business strategies (competitive strategies) have an impact on company performance.

H5a: Cost leadership strategy has an impact on business financial performance.

H5b: Cost leadership strategy has an impact on business innovation performance.

H5c: The differentiation strategy has an impact on business financial performance.

H5d: Differentiation strategy has an impact on business innovation performance.

This study results point out a moderate positive impact between cost leadership strategies and financial performance and innovation performance. Additionally, results show the positive impact between differentiation strategies and financial performance and innovation performance as similar previous research in the strategy literature. Most of the studies in the strategy area highlight competitive strategies as the main sources of the highest financial performance in the economies.

It is suggested that Porter's framework of overall strategies and competitive dimensions provides a potentially valuable research tool for classifying the strategies of all industry competitors (Dess and Davis, 1984:469).

Much of the research focuses on the effects of strategies and competitive advantage on corporate performance, beginning primarily with Porter's (1980) and Dess and Davis's (1984) assertions that a company's sustainable competitive advantage is the key to its long-term success and improves its performance. Both Porter's (1980) and Dess & Davis' (1984) research demonstrates that at least one of the three general competitive strategies will result in enhanced performance. Karnani (1984) and Jones and Butler (1988) are two additional researchers who examine and demonstrate that a superior cost or differentiation strategy results in a greater market share and financial performance profitability.

Yamin (1999) investigates all the competitive strategies and organizational performance factors in low, medium and high performed business; and results are also consistent with the other findings showing the different score levels in performance regarding to different business markets. Pelham (2000) is the another researcher to observe a positive relationship between performance criteria and strategy selection. Wen (2008) points out Hoque (8) survey about the impact of two factors on performance: strategy and environmental uncertainty and the results that show management's choice of strategy is positively related to performance. Aulakh and, Kotabe, and Teegeen (2000) proves that

applying cost leadership strategy specifically in emerging markets such as China generates better financial performance due to relative advantage of low work and manufacturing costs. On the other hand, studies of Frambach, Prabhu, and Verhallen (2003) and Hutchinson (2007) present that differentiation strategy with high quality and technology generates an increase in customer satisfaction and loyalty; thus, provides better performance advantage. Prajogo (2007), Khalili, Nejadhussein and Fazel (2013) support these results by mentioning the strong relationship between the strategies and the financial performance for the firms having innovation capabilities to develop the competencies. According to the results of Prajogo and his friends (2007), the effectiveness of technology and R&D management affects innovation performance. Banker (2006 and 2014) revealed in his study differentiation strategy to increase a sustainable financial performance.

On the other hand, some studies found that, for example Partridge and Perren (1994), firms with only one strategy puts the company at risk to have superior financial performance and suggest combining the differentiation and cost effectively strategies.

H6: Artificial intelligence has a mediator role in the effect of growth strategy on business performance.

H6a: Artificial intelligence has a partial mediator role in the effect of the Organic Growth Dimension of the growth strategy on the business financial performance.

H6b: Artificial intelligence has a partial mediator role in the effect of the Organic Growth Dimension of the growth strategy on the business innovative performance.

H6c: Artificial intelligence has a mediating role in the effect of the Internationalization dimension of the growth strategy on the business financial performance.

H6d: Artificial intelligence has a partial mediator role in the effect of the Internationalization dimension of the growth strategy on the business innovative performance.

When mediator variables are added, results show that artificial intelligence compatibility and complexity dimensions have partial mediation role in the effect of organic growth dimension of growth strategy both on financial performance and innovative performance. These results mostly contribute to many of the studies in literature, which have been developed on the frameworks such as Strobe (Strategic Orientation of Business Enterprises), Sam (Strategic Alignment Model) by Venkatraman (1985). Venkatraman (1985) concluded in his research, the companies must integrate and adopt their business and technology strategies to rely on that technology supports their business objectives to be competitive. Chan (1992), Copeland (1997) also found another positive relationship between information technologies alignment and business performance in their research, which banking, and insurance industries have been surveyed on based on the model including sales growth, market share gain, financial performance, service innovation and reputation perspectives. Pierce (2002) highlights and argues these results by supporting the business strategy as the driving force and technology strategy as the facilitator and the enabler. Kurien (2013) is another research that suggests contributing to the technology should be aligned and should be designed to support the selected business strategy since the strategy is the business driver to force determining the required technology. From these approaches and based on these frameworks, this study results concluded that in enterprises where Innovation and R&D studies, partnerships and acquisitions, product diversity and privatizations are grouped as Dimension1 Growth Strategies, the strategy has an impact on the artificial intelligence projects to be implemented and structured in the enterprise and artificial intelligence has mediator role as an enabler in the effect of growth strategy impacts on company performances.

On the other hand, when the mediator variables are added, results show that only complexity dimension of artificial intelligence has a partial mediator role in the effect of internationalization dimension of growth strategy on innovative performance and no effect is found on financial performance.

The implementation of internationalization-Dimension 2 strategies, which is considered as growing into foreign markets, is not seen as a trigger for digital transformation projects, as foreign markets are not seen an urgency in the evaluations of digitalism in Turkey. For this reason, an assessment of the impact of the Artificial intelligence for

internationalism could not be measured from the growth strategy and performance relationship.

H7: Artificial intelligence has a partial mediator role in the effect of competitive strategies on business performance.

H7a: Artificial intelligence has a partial mediator role in the effect of cost leadership strategy on business financial performance.

H7b: Artificial intelligence has a partial mediator role in the impact of cost leadership strategy on business innovative performance.

H7c: Artificial intelligence has a partial mediator role in the effect of differentiation strategy on business financial performance.

H7d: Artificial intelligence has a partial mediating role in the impact of differentiation strategy on business innovative performance.

When mediator variables are included, the results indicate that artificial intelligence's compatibility, relative advantage, risk, and complexity dimensions partially mediate the impact of cost leadership strategies on both financial and innovative performance. In addition, it is discovered that artificial intelligence again plays a partial role in mediating the impact of differentiation strategy on financial and innovative performance. While cost leadership and differentiation strategies are positively correlated with firm performance, artificial intelligence moderates the positive impacts between competitive strategies and firm performance. This supports the numerous studies in the literature that demonstrate how technological capabilities have a positive effect on firm performance when they are structured according to market-competitive company strategies. Ortega's (2008) research is one of the fundamentals in this field to document the relevance of technological capabilities as a mediator of the impact of both cost leadership and differentiation strategies on firm performance, by contributing to Duysters and Hagedoorn (2000), McEvily (2004), Tsai (2004), Zahra and Covin (2007), Dess and Davis (1984), and Porter's (1990) work. In order to validate the positive impact of Information Technology capabilities on an organization's performance, the literature attempts to provide empirical evidence and asserts the multidimensionality of the capability construct (Bharadwaj, 2000; Santhanam and Hartono, 2003). The essence of

capabilities, according to Bharadwaj (2000), is the utilization of resources in conjunction with other resources and capabilities. In keeping with the spirit of the literature on Information Technology capabilities, Santhanam and Hartono (2003) provide empirical evidence that superior Information Technology capabilities result in 19 sustained competitive advantages for an organization (Jain, 2007).

In a market without borders characterized by intense competition, the vast majority of businesses are required to adopt competitive strategies. In this scenario, organizations must make more strategic decisions, as the globalizing economy necessitates greater competence and professionalism. This necessitates the constant reformulation of manufacturing processes in order to make them more competitive or sustainable in response to consumers' demands for high-quality goods at reasonable prices. Knowledge, innovation, and technology have become indispensable for businesses to survive in today's increasingly competitive marketplace (Alves de Melo 2015).

This study mainly proves and support the literature that in dynamic environments, artificial intelligence, as a critical technological capability, has a positive mediating role and a critical enabler on firm performance when aligned with the company strategies.

RECOMMENDATIONS

Technology experts and technology strategists anticipate a growing emphasis on developing human-conscious systems, i.e., systems that specifically model and design the characteristics of the individuals with whom they must interact. There is a great deal of interest in developing interactive and scalable ways to teach robots in novel and inventive ways. In addition, IoT-type systems (devices and cloud) are gaining popularity due to the social and economic effects of AI. As mentioned by many university research lab reports, new perception/object recognition capabilities and human-safe robotic platforms will expand in the coming years, as will data-driven products and their respective markets.

AI research provides models of human cognition that can aid strategic planning researchers in gaining a better understanding of the process of strategic decision-making, which could lead to improved conceptions of computer-based assistance for strategic

decision-makers. To this end, AI modeling techniques provide a computational laboratory where strategic decision making can be rigorously developed and tested (Spangler 1991). The success of AI applications is measured by the value they create for organizations that impact human lives. In this light, they should be designed to enable people to successfully comprehend AI systems, participate in their use, and develop trust in them (Stanford University, 2016). In other words, as depicted in McKinsey Report (2019) the velocity and adaptability of their digital strategy operating models is one of the most distinguishing characteristics of the top economic performers. Both are required for businesses to achieve first-mover (or very fast-follower) status, which is a known source of substantial economic advantage.

Like many technological investments, executives are concerned with the impacts and maximizing the returns from digital technologies and artificial intelligence. As technology matures, managers expect to see larger returns in short periods for greater digital transformation investments through productivity improvements or cost reduction or both. As provided in this study, many research show the benefit of the technology and the artificial intelligence on the company performance; however there are counter wise studies showing the negative impact between technology and performance as Roach (1991) mentions that, "the massive investments in technology have not improved productivity; on the contrary, they have made service organizations less profitable and less prepared to compete on other fronts" (Pierce, 2002). Other studies such as Strassman's (1990), have shown similar negative findings by utilizing statistical correlation between IT and performance measures such as profitability or stock value, researchers have reached similar negative conclusions and concluded that there was no correlation between IT spending and profitability measures, implying that IT spending is ineffective. Early research by Morrison and Bemdt (1990) reveals a statistically negative correlation between productivity growth and IT investment. In 1995, they also note that measurement issues may contribute to this negativity. In recent years, the increased availability of organizational data at the firm level has resulted in a number of studies with findings that differ from those of earlier studies at the industry level (Pierce 2002).

That is why further research is needed to understand how and why these investments affect performance and need to analyze the circumstances and conditions. At this point,

artificial intelligence and digital transformation adoption frameworks and strategies to the company organization and structure is becoming another critical item to be investigated based on industry specific requirements and situations.

Finally, digital technologies transformation and artificial intelligence effectiveness and efficiency enable and supports business strategy for a better company performance in the dynamic and competitive world.



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APPENDIXES

Appendix 1 – Survey Measurements In Turkish

Değerli Katılımcı,

Bu çalışma, **Prof. Dr. Ahu Tuğba Karabulut** danışmanlığında İstanbul Ticaret Üniversitesi, Sosyal Bilimler Enstitüsü, **İşletme (Türkçe) Doktora** programı öğrencisi tarafından yürütülen bir tez çalışmasıdır.

Çalışmanın amacı, **Kurumsal Stratejiler Ve İşletme Rekabet Stratejilerinin İşletme Performansları Üzerindeki Etkisinde Yapay Zekanın Aracı Rolünün** incelenmesidir.

Araştırmaya katılımınız tamamen gönüllülük esasına dayanmaktadır. Araştırma sırasında sizden alınan bilgiler grup halinde değerlendirileceğinden, sizden kimlik belirleyici bilgiler istenmeyecektir. Cevaplarınız gizli tutulacak ve sadece araştırmacı tarafından bilimsel çalışmalarda kullanılacaktır. Bu anlamda, araştırma sonuçlarından sağlıklı bilgiler edinilebilmesi için soruların samimi bir şekilde doldurulması ve boş bırakılmaması oldukça önemlidir. Anket genel olarak kişisel rahatsızlık teşkil edecek soruları içermemektedir. Ancak araştırma sırasında herhangi bir nedenden dolayı rahatsızlık hissederseniz, katılımınızı sonlandırabilirsiniz. Çalışma sırasında sizden istenilen, verilen **ifadelerde** boş madde bırakmamaya özen göstererek samimi bir şekilde doldurmanızdır. Çalışmaya katılım yaklaşık **8-10** dakika sürecektir. Çalışma hakkında daha fazla bilgi almak için Esra Ergün'e ulaşabilirsiniz. Katılımınız için şimdiden teşekkür ederiz.

Bu çalışmaya tamamen gönüllü olarak katılıyorum ve istediğim zaman katılımımı sonlandırabileceğimi biliyorum. Verdiğim bilgilerin bilimsel amaçlı kullanımını kabul ediyorum.

Evet () Hayır ()

Prof. Dr. Ahu Tuğba Karabulut
İstanbul Ticaret Üniversitesi
Öğrencisi

Esra Ergün
İşletme Doktora

İşletme ve Yapay Zeka Kullanımına Yönelik Genel Bilgiler:			
İşletmenizin faaliyet gösterdiği sektör	: ☐ Telekom	☐ Finans	☐ Bilişim
İşletmenin faaliyet alanı sınırları	: ☐ Ulusal	☐ Uluslararası	☐ Global Şirket
Çalışan sayısı	: ☒ 0-49	☐ 50-249	☐ 250-1000 ☐ +1001
Çalıştığınız Birim ☐ Finans ☐ IT Güvenlik Innovasyon	: ☐ Satış ☐ IT-Yazılım ☐ Kurumsal Mimari ☐ Ürün-servis geliştirme ☐ İnsan Kaynakları	☐ Pazarlama ☐ IT-Altyapı ☐ Strategy & ☐ Program/Proje Yönetim ☐ Lojistik	☐ Satınalma
Statünüz	: ☐ İşletme sahibi ☐ Orta düzey yönetici	☐ Üst düzey yönetici ☐ Uzman	
Bu şirkette çalışma süreniz yıl	: ☐ 0-2 yıl	☐ 3 - 5 yıl	☐ 6 - 10 yıl ☐ +11
Eğitim Durumunuz ☐ Doktora	: ☐ Üniversite	☐ Yüksek Lisans	
İşletmenizde kullanılan yapay zeka teknolojileri:			
robotik	☐ Machine Learning – makine öğrenimi	☐ Akıllı	
analizi	☐ Nöral ağlar ve derin öğrenme	☐ Text	
asistanlar	☐ Doğal dil işleme	☐ Sanal	
☐ Görüntü tanıma	☐ Konuşma tanıma		
☐ Blockchain	☐ Akıllı mobil		
	☐ Siber güvenlik	☐ AR/VR	
	☐ Diğer		
İşletmenizde yapay zeka ve digital teknolojilerin kullanım alanları:			
☐ Müşteri hizmetleri (ürün-servis özelleştirme, müşteri ve tedarikçi erişim kanalları, yanıt hızı, duygu katma, deneyimler oluşturma, beklenti ve ihtiyaçları belirleme vb.)			

☐ Süreç optimizasyonu (Süreçleri otomatikleştirme, sonuçları izleme, eğilimleri tahmin etme, öneri oluşturma çözümleri vb.)

☐ Ürün-servis transformasyonu (Veri hizmetleri eklemek, yeni iş modelleri oluşturmak, erişimin genişletilmesi vb.)

☐ Çalışan gelişimi (Üretkenliği artırmak, yeniliği mümkün kılmak, yeni yetenek keşfi, eğitim, vb)

Aşağıda yer alan cümlelerde şirketiniz için en uygun olduğunu düşündüğünüz seçeneği işaretleyiniz:		Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
(1)-Kesinlikle Katılmıyorum						
(2)-Katılmıyorum						
(3)-Kararsızım						
(4)-Katılıyorum						
(5)-Kesinlikle Katılıyorum		(1)	(2)	(3)	(4)	(5)
Aşağıdaki büyüme stratejileri şirketiniz tarafından ne ölçüde uygulanmaktadır?						
Organik büyüme						
1.	İnovasyon ve AR-GE yoluyla örgüt içi girişimler.	☐	☐	☐	☐	☐
2.	Diğer şirketlerden teknoloji lisanslama	☐	☐	☐	☐	☐
3.	Teknolojik olarak gelişmiş diğer şirketlerle ortaklık	☐	☐	☐	☐	☐
4.	İlgili iş alanlarındaki şirketleri satın alma.	☐	☐	☐	☐	☐
5.	İlgisiz iş alanlarındaki şirketleri satın alma.	☐	☐	☐	☐	☐
6.	Ürünlerimizi/hizmetlerimizi farklılaştırdık ve özelleştirdik.	☐	☐	☐	☐	☐
7.	Geniş bir müşteri tabanına hizmet vermek için geniş bir ürün portföyümüz var.	☐	☐	☐	☐	☐
Uluslararasılaşma						
8.	Yurtdışı pazarlardan elde edecek gelirleri artırmak için uluslararasılaştı.	☐	☐	☐	☐	☐

9.	Yurtdışı pazarlardan şirketlerle çalışmak için uluslararasılaştı.	☐	☐	☐	☐	☐
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Rekabet Stratejilerimiz:

- (1)-Hiç Önem Verilmemektedir
(2)-Önem Verilmemektedir
(3)-Ne Önemli Ne Önemsiz
(4)-Önem Verilmektedir
(5)-Çok Önem Verilmektedir

	Maliyet Liderliği Stratejilerimiz:	Hiç Önem Verilmemektedir (1)	Önem Verilmemektedir (2)	Ne Önemli Ne Önemsiz (3)	Önem Verilmektedir (4)	Çok Önem Verilmektedir (5)
1.	Rakiplerimize göre daha düşük işletme içi maliyetlerle üretim-geliştirme yapmak.	☐	☐	☐	☐	☐
2.	Üretim verimliliğini artırmak için yeni teknolojilerle üretim-geliştirme süreçlerimizi modernleştirmek.	☐	☐	☐	☐	☐
3.	Tüm faaliyetlerimizi sıkı bir şekilde maliyet kontrolüne tâbi tutmak.	☐	☐	☐	☐	☐
4.	Satın alma (outsourcing vs.) maliyetlerimizi minimum hale getirmek.	☐	☐	☐	☐	☐
5.	Pazarlama maliyetlerimizi minimum hale getirmek.	☐	☐	☐	☐	☐
6.	Atıl üretim/geliştirme kapasitesini minimum hale getirmek.	☐	☐	☐	☐	☐
7.	İsraf, bakım onarım ve benzeri maliyetleri minimum hale getirmek.	☐	☐	☐	☐	☐
8.	Tüm birim ve faaliyetlerde verimliliği maksimum hale getirmek.	☐	☐	☐	☐	☐
9.	Gerektiğinde rakipler ile sert fiyat rekabetine girmek.	☐	☐	☐	☐	☐
10.	Maliyet azaltıcı teknolojilere yatırım yapmak.	☐	☐	☐	☐	☐
11.	Verimlilik üzerinde önemle durmak.	☐	☐	☐	☐	☐
12.	Ürün/servisleri maliyet azaltıcı şekilde yeniden dizayn etmek.	☐	☐	☐	☐	☐
13.	Düşük fiyat önerebilmek için tüm maliyetleri mümkün olan en düşük seviyede tutmak.	☐	☐	☐	☐	☐
14.	Satış ve dağıtım kanallarını maliyet etkin olarak kullanmak.	☐	☐	☐	☐	☐

	Farklılaştırma Stratejilerimiz:	Hiç Önem Verilmemektedir	Önem Verilmemektedir	Ne Önemli Ne Önemsiz	Önem Verilmektedir	Çok Önem Verilmektedir
		(1)	(2)	(3)	(4)	(5)
15.	Yeni ürün veya hizmetler geliştirmek.	☐	☐	☐	☐	☐
16.	Müşterilerimizin özel ihtiyaçlarına yönelik ürünler sunmak.	☐	☐	☐	☐	☐
17.	Rakiplerimizden daha kaliteli ürünler sunmak.	☐	☐	☐	☐	☐
18.	Ürünlerimizi rakiplerimizden farklılaştırıcı özelliklerde sunmak.	☐	☐	☐	☐	☐
19.	Stratejik hedeflere ulaşabilmek için nitelikli ve yaratıcı kişilerin işe almak.	☐	☐	☐	☐	☐
20.	Ar-Ge, ürün geliştirme ve pazarlama fonksiyonlarımız arasında güçlü bir koordinasyon kurmak.	☐	☐	☐	☐	☐
21.	Müşterilerimize yeni ürünleri/markaları tanıtan ilk şirket olmak.	☐	☐	☐	☐	☐
22.	Pazarda işletmemize ait farklılaştırılmış ürünler bulunması.	☐	☐	☐	☐	☐
23.	Mevcut ürünlerimiz üzerine ilave model ve boyutlar geliştirmek.	☐	☐	☐	☐	☐
24.	Yeni ürün geliştirme ve pazara sunma süresini düşürmek.	☐	☐	☐	☐	☐
25.	Pazardaki mevcut ürünlerimizi sürekli iyileştirmek ve geliştirmek.	☐	☐	☐	☐	☐
26.	Tespit edilen yeni iş ve Pazar olanaklarından istifade etmek	☐	☐	☐	☐	☐
27.	Farklı pazarlardaki farklı müşteri ihtiyaçlarına cevap vermek.	☐	☐	☐	☐	☐
28.	Üretim hattımızı farklı ürünler üretebilecek şekilde genişletmek.	☐	☐	☐	☐	☐

Yapay Zeka uygulamalarımız ve yaklaşımımız:

- (1)- Kesinlikle katılmıyorum
 (2)- Katılmıyorum
 (3)- Kısmen katılmıyorum
 (4)- Kararsızım
 (5)- Kısmen katılıyorum
 (6)- Katılıyorum
 (7)- Kesinlikle katılıyorum

	Uyumluluk	Kesinlikle Katılmıyorum (1)	Katılmıyorum (2)	Kısmen katılmıyorum (3)	Kararsızım (4)	Kısmen katılıyorum (5)	Katılıyorum (6)	Kesinlikle Katılıyorum (7)
1.	Yapay zeka uygulamaları mevcut iletişim / ağ ortamımızla uyumludur.	☐	☐	☐	☐	☐	☐	☐
2.	Yapay zeka uygulamaları, mevcut yazılım ortamımızla uyumludur.	☐	☐	☐	☐	☐	☐	☐
3.	Yapay zeka uygulamaları, mevcut donanım ortamımızla uyumludur.	☐	☐	☐	☐	☐	☐	☐
4.	Yapay zeka uygulamaları altyapımızla uyumludur.	☐	☐	☐	☐	☐	☐	☐
5.	Yapay zeka uygulamaları, bilgisayarlı veri kaynakları ile uyumludur.	☐	☐	☐	☐	☐	☐	☐
	Göreceli avantaj:	Kesinlikle Katılmıyorum (1)	Katılmıyorum (2)	Kısmen katılmıyorum (3)	Kararsızım (4)	Kısmen katılıyorum (5)	Katılıyorum (6)	Kesinlikle Katılıyorum (7)
6.	AI uygulamaları gelirlerimizi ve kârlılığımızı artırabilir.	☐	☐	☐	☐	☐	☐	☐
7.	AI uygulamaları daha yüksek çalışan verimliliği sağlayabilir.	☐	☐	☐	☐	☐	☐	☐
8.	AI uygulamaları müşteri hizmetlerini geliştirebilir.	☐	☐	☐	☐	☐	☐	☐
9.	AI uygulamaları ile IT kaynaklarından daha fazla faydalanılabilir.	☐	☐	☐	☐	☐	☐	☐
10.	AI uygulamaları esnekliği ve entegrasyonu destekleyebilir.	☐	☐	☐	☐	☐	☐	☐
	Risk ve karmaşıklık:	Kesinlikle Katılmıyorum (1)	Katılmıyorum (2)	Kısmen katılmıyorum (3)	Kararsızım (4)	Kısmen katılıyorum (5)	Katılıyorum (6)	Kesinlikle Katılıyorum (7)
11.	AI inovasyonunun edinilmesinde uygulama olgunluğu eksiktir.	☐	☐	☐	☐	☐	☐	☐
12.	AI uygulamasının ve geçişinin yüksek maliyeti vardır.	☐	☐	☐	☐	☐	☐	☐

13.	AI inovasyonunun edinilmesi zaman alıyor.	☐	☐	☐	☐	☐	☐	☐
14.	AI inovasyonunun edinilmesinde uygun olmayan personel ve eksik personel önemli bir sorundur.	☐	☐	☐	☐	☐	☐	☐

Sektör ortalamaları doğrultusunda Firma Performansınızın değerlendirilmesi:								
Finansal Performans		Beklentilerin çok altında	Beklentilerin orta derece altında	Beklentilerin biraz altında	Beklentileri karşılıyor	Beklentilerin biraz üstünde	Beklentilerin orta derece üstünde	Beklentileri çok aşıyor
(1)- Beklentilerin çok altında (2)- Beklentilerin orta derece altında (3)- Beklentilerin biraz altında (4)- Beklentileri karşılıyor (5)- Beklentilerin biraz üstünde (6)- Beklentilerin orta derece üstünde (7)- Beklentileri çok aşıyor		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Yeni ürünlerin başarısı								
1.	Yeni ürün/hizmet geliştirme	☐	☐	☐	☐	☐	☐	☐
2.	Pazar geliştirme	☐	☐	☐	☐	☐	☐	☐
Büyüme /pay								
3.	Satış artış oranı	☐	☐	☐	☐	☐	☐	☐
4.	İstihdam artış oranı	☐	☐	☐	☐	☐	☐	☐
5.	Pazar payı	☐	☐	☐	☐	☐	☐	☐
Karlılık								
6.	İşletme karları	☐	☐	☐	☐	☐	☐	☐
7.	Karın satışa oranı	☐	☐	☐	☐	☐	☐	☐
8.	Operasyonlardan nakit akışı	☐	☐	☐	☐	☐	☐	☐
9.	Yatırım getirisi	☐	☐	☐	☐	☐	☐	☐
10.	Aktif karlılığı	☐	☐	☐	☐	☐	☐	☐

	Yenilikçi Performansı Kuruluşunuzun sektörünüzdeki başlıca rakiplere kıyasla şu ana kadar nasıl performans gösterdiğini en iyi yansıtan rakamı işaretleyin. (1)- Endüstride en kötü (2)- Endüstride biraz daha kötü (3)- Endüstride benzer (4)- Endüstride biraz daha iyi (5)- Endüstride en iyi	Endüstride en kötü	Endüstride biraz daha kötü	Endüstride benzer	Endüstride biraz daha iyi	Endüstride en iyi
		(1)	(2)	(3)	(4)	(5)
Ürün Inovasyonu						
11.	Şirketimizin yeni ürünlerinin yenilik düzeyi	☐	☐	☐	☐	☐
12.	Yeni ürünlerimizde en yeni teknolojik inovasyonların kullanılması.	☐	☐	☐	☐	☐
13.	Yeni ürün geliştirme hızımız.	☐	☐	☐	☐	☐
14.	Şirketimizin pazara sunduğu yeni ürün sayısı.	☐	☐	☐	☐	☐
15.	Pazarda ilk olan yeni ürün sayımız (pazara erken giriş).	☐	☐	☐	☐	☐
Süreç Inovasyonu						
16.	Şirketimizin teknolojik rekabet gücü.	☐	☐	☐	☐	☐
17.	En son teknolojik inovasyonların süreçlerimizde edinilme hızı.	☐	☐	☐	☐	☐
18.	Süreçlerimizde kullanılan teknolojilerin güncelliği veya yeniliği.	☐	☐	☐	☐	☐
19.	Süreçlerimizde, tekniklerimizde ve teknolojilerimizde değişim oranı	☐	☐	☐	☐	☐

Appendix – 2

APPROVALS



İSTANBUL TİCARET ÜNİVERSİTESİ İSTANBUL TİCARET ÜNİVERSİTESİ REKTÖRLÜĞÜ

HİZMETE ÖZEL

T.C.

Tarih: 10/01/2022
Sayı: E-65836846-044-235788



0000235788

Sayı : E-65836846-044-235788
Konu : Etik Onayı

10.1.2022

Sayın Esra ERGÜN

İlgi : 24.12.2021 tarihli dilekçeniz.

İlgi yazınız ile "Kurumsal Stratejiler ve İşletme Rekabet Stratejilerinin İşletme Performansları Üzerindeki Etkisinde Yapay Zekanın Aracı Rolü" isimli çalışmanın anket sorularına Etik Kurul onayı talep edilmektedir.

Adı geçen ve ekte yer alan anket soruları, Üniversitemiz Etik Kurulunca incelenerek etik tanım, değer ve ilkelere aykırı bir düzenleme tespit edilmediği, önerilen anket sorularının etik kurallara uygun olduğu ve etik onayının verildiği ifade edilmiştir.

Konuya ilişkin bilgilerinizi rica ederim.

Prof. Dr. Elçin AYKAÇ ALP
Rektör Yardımcısı

Ek: Etik Onaylı Anket Soruları