T.C.
BAHÇEŞEHİR ÜNİVERSİTESİ

ASSESSMENT OF STRATEGIC INTENTIONS AND BUSINESS READINESS FOR DIGITAL ERA ON IOT WAVE: AN EXPLORATORY STUDY OF TURKISH MARKET

PhD. Thesis

ENDER EMRE KANAAT

İSTANBUL, 2019

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SOCIAL SCIENCES INSTITUTE
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We hereby recommend that the dissertation prepared under our supervision by Ender Emre Kanaat entitled "Assessment of Strategic Intentions and Business Readiness for Digital Era on IoT Wave: An Exploratory Study of Turkish Market" be accepted in partial fulfillment of the requirements for the Doctor of Philosophy Business Administration .

Thesis Supervisor
Assist. Prof Gülberk Gültekin Salman

Recommendation concurred in:

Committe Members

Prof. Dr. Güven Büyükbaykal

Prof. Dr. Özgür Gerçel

Doç. Dr. Emin Köksal

Doç. Dr. Elif Yolaçan Ökten

Approved:

Program Coordinator

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ABSTRACT

ASSESSMENT OF STRATEGIC INTENTIONS AND BUSINESS READINESS FOR DIGITAL ERA ON IOT WAVE: AN EXPLORATORY STUDY OF TURKISH MARKET

Ender Emre Kanaat

PhD in Business Administration

Thesis Supervisor: Assist. Prof. Gülberk GÜLTEKİN SALMAN

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Rapid changes in technology have a deep impact on business world today. But the new context requires companies to examine the IoT concept more closely and to respond to changed dynamics. It is a pre-requisite to acquire these new technologies and implement them to the business processes in order to be competitive and to be able to continue operations. However, current business practices are limited, strategies are not clear and literature has not yet provided usable approaches for businesses. The buzz is loud in the business world, academicians are curious but there are many questions to be answered in the coming days.

The thesis aims to explore the new phenomena under four dimensions: understanding the maturity level of the market, understanding the approach of suppliers, understanding the readiness of the eco-system in the process of supplying IoT related products/services and available business models.

Key words: IoT, Digital Transformation, Industry 4.0

ÖZET

NESNELERİN İNTERNETİ DÖNEMİNDE İŞ DÜNYASININ STRATEJİK EĞİLİM VE HAZIRLIK SEVİYESİNİN DİJİTAL ÇAĞ İÇİN DEĞERLENDİRİLMESİ:
KEŞİF AMAÇLI TÜRKİYE PAZARI ARAŞTIRMASI

Ender Emre Kanaat

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Tez Danışmanı: Assist. Prof. Gülberk GÜLTEKİN SALMAN

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Teknolojideki hızlı değişim bugünün iş dünyasını derinden etkilemektedir. Yeni dinamikler şirketlerin Nesnelerin İnterneti kavramını yakından izlemelerini ve değişime uygun hareket etmelerini gerektirmektedir. Firmaların rekabetçi kalarak operasyonlarının devamlılığını sağlayabilmeleri için gelişen yeni teknolojileri edinerek iş süreçlerine uygulamaları zorunluluk halini almıştır. Buna karşılık sahadaki uygulamalar oldukça sınırlıdır ve stratejiler henüz netleşmemiştir. İş dünyasının kullanabileceği ve örnek yaklaşımları içeren literatür ise henüz yeterince gelişmemiştir. İş dünyasında hareket ve akademik dünyada ise merak yüksek olmakla birlikte önümüzde cevaplanmayı bekleyen çeşitli sorular bulunmaktadır.

Tezin amacı Nesnelerin İnterneti konusunu dört boyut altında keşfetmektir: Pazar olgunluk seviyesini anlamak, tedarikçilerin yaklaşımlarını anlamak, Nesnelerin İnterneti teknolojilerini kullanarak ürün ve servis sağlayan ekosistemin olgunluk seviyesini değerlendirmek ve pazardaki mevcut iş modellerini incelemek.

Key words: IoT, Dijital Dönüşüm, Endüstri 4.0

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ABBREVIATIONS

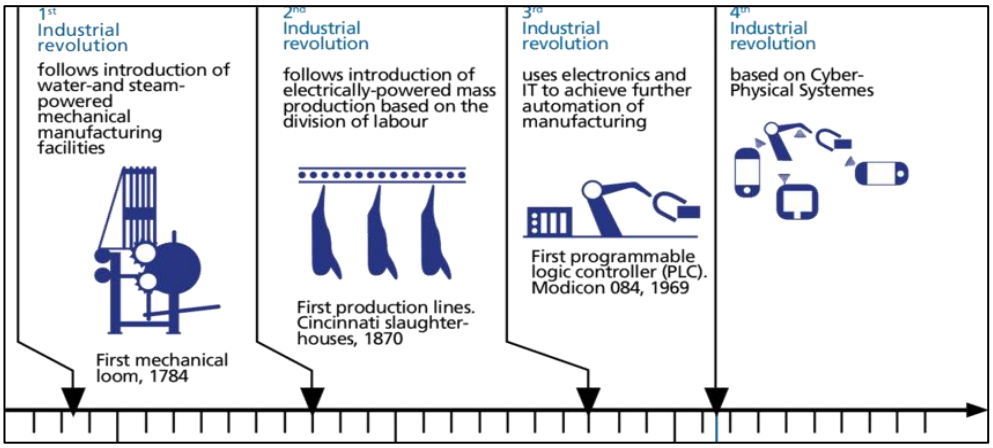
3D	: Three Dimensional
1G	: The First Generation of Wireless Telephone Technology
2G	: The Second Generation of Wireless Telephone Technology
3G	: The Third Generation of Wireless Telephone Technology
4G	: The Fourth Generation of Wireless Telephone Technology
AI	: Artificial Intelligence
API	: Application Program Interface
ARPANET	: Advanced Research Projects Agency Network
CAD/CAM	: Computer-aided design and Computer-aided manufacturing
CDO	: Chief Digital Officer
DFI	: Direct Foreign Investment
DSMM	: Digital Social Media and Mobile
GSM	: Global System for Mobile
ICT	: Information and Communication Technologies
IoT	: Internet of Things
IP	: Internet Protocol
IT	: Information Technologies
ISP	: Internet Service Provider
KOSGEB	: Small and Medium Industry Development Organization
LAN	: Local Area Network
M2M	: Machine-to-Machine
MAC	: Media Access Control
MUSIAD	: Independent Industrialists' and Businessmen's Association
NFC	: Near Field Communication
OECD	: Organization for Economic Cooperation and Development
PAN	: Personal Area Network
PIC	: Programmable Card
R&D	: Research and Development
QoS	: Quality of service
PB	: Participation Bank
RFID	: Radio-Frequency Identification
SMS	: Short Message Service
SME	: Small to Medium Enterprise
TAM	: Technology Acceptance Model
TCP	: Transmission Control Protocol
TIM	: Turkish Exporters’ Assembly
TOBB	: Turkish Union of Chambers of Commerce and Commodity Exchanges
TUSIAD	: Turkish Industry and Business Association
TTGV	: Technology Development Foundation of Turkey
UGC	: User Generated Content
VC	: Venture Capital
WOM	: Word of Mouth
WSN	: World Server Network
WWW	: World Wide Web
YASED	: International Investors Association

1. INTRODUCTION

As technology advances, it profoundly affects businesses. Most noticeably, technological advancement transforms value chains and, as a result, forces companies to shift their operations substantially in order to avoid extinction. The impact of technology-induced change was first observed in Industry 1.0, and other waves followed at an accelerating pace, eventually bringing us to Industry 4.0 (Figure 1.1). However, the dynamics of the fourth industrial revolution differ significantly from those of the previous waves. In particular, given that the whole business context has undergone a complete transformation, more caution is required.

The first three waves, as illustrated in Figure 1.1, generated enormous increases in productivity and growth across the global economy. Production processes evolved and the value chain experienced a wholesale transformation. Nevertheless, while efficiencies in the domain of manufacturing increased markedly, products themselves remained largely unaffected. In their recent analysis of the first three waves, Porter and Heppelmann (2014) pointed out that technology occupied an enabling position in improving efficiency and increasing effectiveness. However, technology lies at the centre of life in the twenty-first century, and technology itself represents the product in the fourth wave.

Figure 1.1: Industrial revolution



Source*: DFKI (2011)*

The Encyclopaedia Britannica (2017) defines industrial revolution as the process of changing from an agricultural economy to one associated with automated manufacturing. This process began in the United Kingdom during the eighteenth century, after which other regions followed in the empire's footsteps. Although the term "industrial revolution" was originally used by French writers, Arnold Toynbee notably adopted the term to refer to the economic transformation that took place between 1760 and 1840 in England. However, the term has been used in a broader sense since then.

The first wave engendered steam-powered manufacturing facilities, which resulted in radical increases in efficiency. As for the second wave, it was marked by the replacement of steam-powered production facilities with electrically-powered ones, which further increased efficiency. At this point, the concept of the "division of labour" also emerged as one of the principal focal points of organisations. The third wave, which is usually dated to the middle of the twentieth century, involved the use of electronics and automation in manufacturing, which changed the nature of value chains. A particularly notable development associated with the third wave was the movement from resource planning to computer-aided design and computer-aided manufacturing (CAD/CAM). The enormous increase in the use of the Internet since the 1980s signalled the emergence of the fourth industrial revolution. One of the fundamental features of the Internet is that it enables stakeholders (e.g., suppliers, clients, and business partners) to coordinate and integrate with one another across global channels. It achieves this by providing inexpensive and ubiquitous connectivity. Additionally, the Internet has revolutionised the nature of products. Historically, products were configurations of mechanical and electrical components, yet in recent years products have been transformed into complex systems consisting of software, hardware, databases, computing devices, and sensors. As a result of improvements in computing power, the miniaturisation of hardware, and high-speed Internet and network connectivity, the new system has produced smart and interconnected products. These changes have disrupted value chains, pushing companies to re-assess their positions and re-work their future business strategies. As we enter the new era, many strategic options exist in terms of how value is created, where value stands in relation to change, what kind of partnerships should be established, and what companies should do (Porter and Heppelmann, 2015).

In 1999, British Technology Pioneer Kevin Ashton described the “Internet of Things” (IoT) as a system in which physical objects equipped with sensors are connected via the Internet to each other and to centralised storage. Around the turn of the new millennium, Ashton emphasised the importance of connecting the RFID tags used in supply chains in counting and tracking goods without human effort. In recent years, the term IoT has been used more broadly to describe situations in which connectivity, facilitated by the Internet and computing power, is leveraged by various objects (Rose et al., 2015).

Significantly, the disruptive changes associated with the fourth industrial revolution and the IoT are expected not only to affect production processes but also to reshape the field of marketing. In particular, profound changes will emerge – and, to a certain extent, have already emerged – in relation to product and services design, initiated largely by new customer insights, distribution networks, after-sales activities, and the requirement for new capabilities (e.g., security and data analytics). However, the rules of competition remain the same, and companies need to understand the rules of this new technology better than ever.

Rapid changes in technology have deeply impacted today’s business world. While adaptive companies are using new technologies to improve their business, increase their market share, and build a better future, companies that have failed to maintain pace with technological change have started to lose their competitiveness and market share (Porter and Heppelmann, 2015).

The latest wave in technology is the ability to connect devices with computing capabilities over communication networks, which is also referred to as the "Internet of Things" (IoT). One of the defining features of the IoT is that it enables companies to devise more efficient and effective production processes, which suit a variety of business model opportunities. Noteworthily, these also often involve an ecosystem of partners (Mentoro, 2018).

However, the new context necessitates that companies examine the IoT concept more closely and, in line with this, respond to the changing dynamics. It is a prerequisite for companies to acquire these new technologies and, furthermore, to implement them within

their business processes. This is because doing so will allow them to remain competitive and, as such, continue their operations. However, current business practices are limited, the available strategies are unclear, and the literature has not yet provided usable approaches for businesses. In this way, the buzz is loud in the business world and academicians are curious, but many questions remain to be answered. Since IoT is a recent development, making the right decisions is a complex matter for companies. In particular, studies are limited from the perspective of the managerial, cultural, and economic dimensions (Lee and Lee, 2015).

Earlier studies indicate directions for further research in this field. Since each report presents data gathered according to a different methodology, the comparison of the results can only be partly indicative. Therefore, when using past experiences, in order to achieve tangible results, the need exists to conduct uniform research among entrepreneurs in the future. This should relate to the implementation of the concept within industries, and it should especially be limited to small and medium-sized enterprises (SMEs). Since these entities do not always possess sufficient funds to invest in modern technologies, researching the opportunities associated with implementing Industry 4.0 tools in these entities represents an interesting project (Ślusarczyk, 2018).

As mentioned, IoT is an attractive area for academic research. Several studies, especially in the domain of consumer acceptance, have addressed the topic, but research at the company level is limited. Therefore, this study will contribute to the literature by examining the factors that influence intentions to adapt to the new technological developments in IoT, as well as the maturity level of companies involved in the transformation process. The exploration model will be empirically tested using data collected from a survey of companies in the Turkish market.

As the market penetration of IoT increases, new products and services will begin to emerge which are not feasible from the economic and technical perspectives. New Internet-based collaboration tools, based on the working culture of the twentieth century, introduced the concept of crowd-sourcing and, in this way, increased the value of outsourcing options. Enormous data sets collected from sensors are shared with

entrepreneurs under the new crowd-sourcing concept, and this new situation has prepared a game-changing environment for new market players (Brown, 2017).

It is also noteworthy that an assessment of the external and internal factors affecting businesses, as well as an understanding of business models, can help decision-makers establish strategies in a competitive, new, and complex IoT context. In view of these considerations, this study is expected to serve as a starting point for executives, allowing them to build a practical framework through which a picture of the coming era's business models can be drawn.

The objectives of this study is detailed below:

i. The concepts of IoT and digitalisation for companies
ii. Global statistics
iii. The fourth industrial revolution and its impact on businesses
iv. Why and how the fourth industrial revolution is different
v. Available business models in the market
vi. The strategic intentions of Turkish companies
vii. The maturity level of the Turkish market
viii. The maturity level of Turkish companies

In light of the abovementioned topics addressed by this study, the following overarching topic is proposed: "Assessment of Strategic Intentions and Business Readiness for Digital Era on IoT Wave: An Exploratory Study of Turkish Market".

2. CONCEPTUAL FRAMEWORK

2.1 INTERNET OF THINGS

As previously mentioned, connectivity, or – to put it in an alternative way – the Internet, has played the most significant role in bringing about the fourth industrial revolution. Everything started with commercial Internet service providers (ISPs) in the late 1980s, and after the ARPANET and NSFNet were decommissioned in 1990 to remove restrictions on the use of the Internet for commercial activities, commercialisation and Internet usage rates accelerated. In December 1995, there were only 16 million Internet users, which represented 0.4% of the global population. Contrastingly, in March 2017, the number of Internet users reached 3.74 billion, accounting for 49.6% of the world's population. In the 1970s, McLuhan envisioned the "Global Village", and with the continual growth of the Internet since then, many consider that McLuhan's Global Village has become a reality (Internet World Stats, 2017).

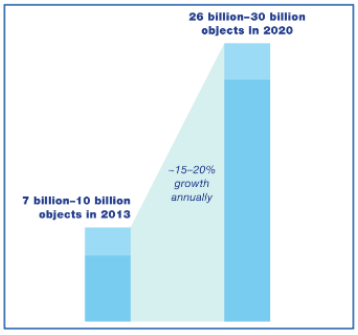
The mobile capabilities of networks further increased the practical use of the Internet by enabling users to be online without any constraints in terms of location, time, and platform. In the late 1990s, mobility started with analogue portable phones (1G), which soon transformed into increasingly sophisticated devices. Initially, basic calling abilities were introduced, and the technology evolved into GSM (2G) during the mid-to-late 1990s. The first pre-smartphones started to appear around this time, with digital transmission capabilities allowing them to provide functions such as SMS, downloadable content, and primitive Internet access (e.g., sending e-mails, viewing online multimedia, and downloading simple digital content). In the early 2000s, the first true smartphones arrived with the emergence of 3G networks. Following the turn of the new millennium, operators began offering 3G services with better wireless networks. As technology advanced, an explosion in online media consumption and mobile applications took place in smartphones. In the 2010s, operators slowly started to replace 3G networks with 4G networks, which are faster, more efficient, and optimisable (Reagle, 2012).

However, the nature of mobility has given rise to a number of differentiating characteristics with respect to electronic commerce. Dholakia and Dholakia (2004) classified the elements of this new and complex system as user experience, different terminals, flexible location, multi-transaction services, on-the-go flexible services, on-the-go flexible configuration, enterprise integration, and geographic location. In summary, mobility brings various possibilities to companies because it allows them to reach potential customers at any location, on any platform, and through any device. Consequently, firms can expose their products and services in such a way as to promote engaging and consistent customer experiences (Samuelsson and Dholakia, 2004).

Indeed, mobility is ubiquitous because it allows companies to reach consumers at any time and place. When compared to traditional channels, mobile channels significantly improve the effectiveness of relationships with consumers and allow companies to develop dynamic communication methods. They also offer control mechanisms that consumers can use to obtain information whenever and wherever they want (Masa, 2013).

Gartner (2013) estimates that by 2020, more than 30 billion devices will be connected to the Internet with a unique IP address (Figure 2.1).

Figure 2.1: Connected devices



Source: GSMA (2017)

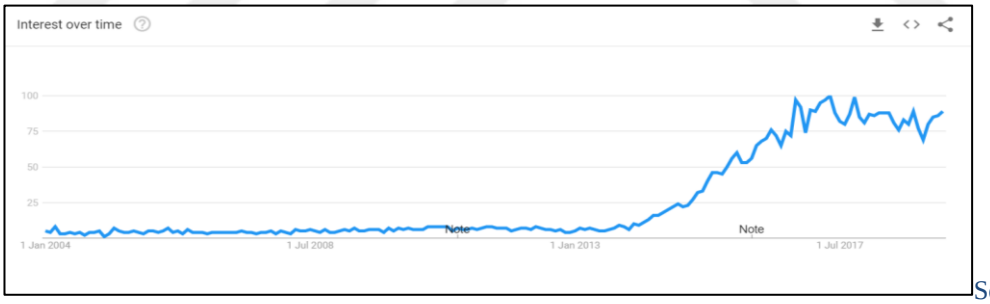
Statistical evidence indicates that the number of mobile subscribers globally jumped from 297 million in 2007 to nearly 4.9 billion as of 2019. As previously mentioned, advances in communication technologies and computing power have created a situation in which mobile devices have been connected to the Internet, and this new opportunity has taken the number to 8.1 billion mobile subscribers worldwide who operate over machine-to-

machine (M2M) connections (GSMA, 2017). Significantly, GSMA figures only report the subscription numbers over mobile networks, but the actual number of Internet-connected devices is much greater.

The McKinsey Global Institute recently released a forecast showing that the number of Internet-connected devices has increased three times over the last five years, which stems from the increased penetration of IoT Technologies. This new technology has brought a new perspective in terms of how devices can be used by connecting to the Internet in order to address daily needs (Bauer and Patel, 2014).

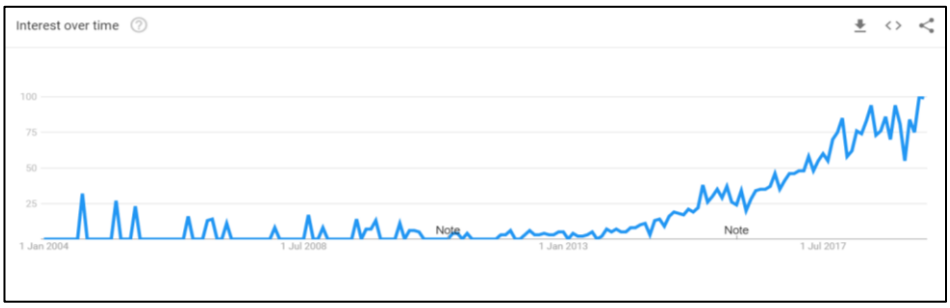
Recently, Google launched a service called Google Trends, where real-time data is used to show how people around the world are reacting to major events. The vast number of searches performed with Google are summarised in a way that reports on what they are currently interested in. Figures 2.2, 2.3 and 2.4, which visualise data from 2004 to 2019 across the globe, clearly show the rising levels of interest from 2014 associated with three topics: namely “IoT”, “Industry 4.0”, and “Digital Transformation”.

Figure 2.2: Google trends IoT (2004 – 2019)



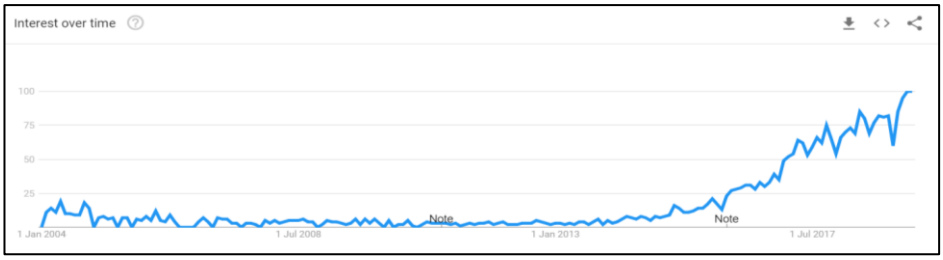
Source*: Google Trends*

Figure 2.3: Google trends industry 4.0 (2004 - 2019)



Source: Google Trends

Figure 2.4: Google trends digital transformation (2004 - 19)



Source: Google Trends

Ślusarczyk (2018) also searched for similar terminologies in different databases containing academic articles, showing the interchangeable nature of the usage (Table 2.1). The researcher's analysis of the number of publications indexed in several databases (specifically, Web of Science, Scopus, and Google Scholar) in the period from 2011 to 2017 shows that the figures have only risen steadily, but they are rising nonetheless.

Table 2.1: Industry 4.0 terminology in academic literature (2011-2017)

	Web of Science Core Collection (title, topic)	Scopus (title, abstract, keywords)	Google Scholar (all fields)
Industry 4.0	1311	2022	14700
Industry of the Future	25	52	1490
4IR = 4.0 (Fourth) Industrial Revolution	235	976	6500
Production of the Future	7	22	539
Intelligent Manufacturing	383	579	17200

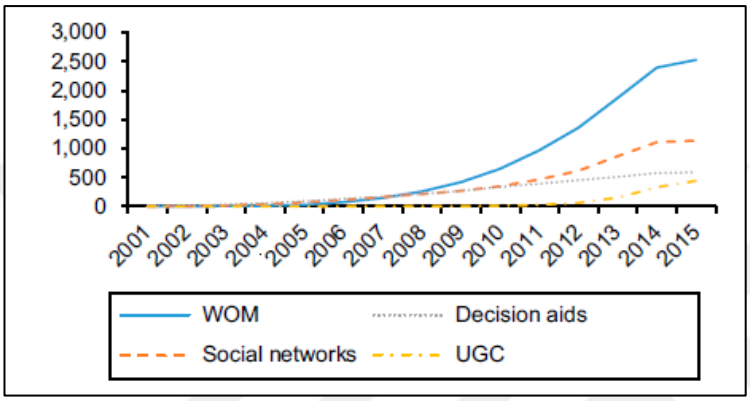
Source: Ślusarczyk (2018)

Although IoT is an emerging concept, it began with the birth of the Internet. Therefore, understanding how the Internet developed, how it affected business, and how academic literature has approached the subject is critical in developing the study, which is entitled "Assessment of Strategic Intentions and Business Readiness for Digital Era on IoT Wave: An Exploratory Study of Turkish Market".

Lamberton and Stephen (2016) provided an excellent benchmark that offers a snapshot into the manner in which academic literature on IoT may develop in the future. Of course, the exact answer requires more in-depth research. The digital transformation of marketing started in the 2000s and, significantly, it transformed the behaviour of firms and

customers. As social media and mobile (DSMM) expands, both academics and practitioners in the field of marketing have been able to observe this transformation. Figure 2.5 clearly shows that concepts related to the digital transformation of marketing only started to leave a significant impact on the literature after a decade. We may expect a similar pattern to emerge in relation to the accumulation of IoT-related literature as well.

Figure 2.5: Cumulative citation counts over time for four most cited topics



Source: Lamberton and Stephen (2016)

By making a similar comparison for the birth of IoT, it may be assumed that academic literature has just started to accumulate in parallel to the transformation in business, as well as the increasing acceptance among consumers. Therefore, the proposed study is expected to contribute to the exploration of this new technology on the business side.

2.1.1 Acceptance of Internet of Things (IoT)

Gerald Santucci (2018) from the European Commission believes that IoT is set to give rise to fundamental changes. Furthermore, the commentator argued that in the sphere of business, companies will need to implement and use IoT technology in order to remain competitive and, in this way, survive. IoT has also had a profound societal impact by imposing a new social contract. However, the new agreement will be between humans and objects since everything is interconnected, irrespective of its status as a living creature. As scholars have pointed out, however, this substantial change will bring with it new challenges, including security and privacy issues.

With IoT technology, unpredictable changes are expected to take place in areas such as health, education, and transportation, and even our homes are set to become increasingly smart. The realisation of these changes is expected to have significant implications for the nature of life in the twenty-first century. For example, fridges will be able to inform their users about whether certain types of food should be disposed of, and washing machines will be able to operate more efficiently by washing clothes at optimal temperatures based on the type of garments they contain (Lin and Bergmann, 2016).

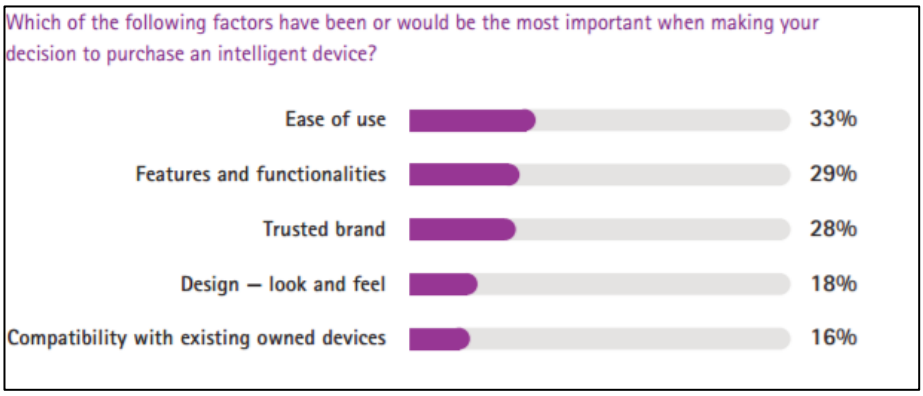
In order to discuss business, a market should exist consisting of buyers and sellers. Therefore, the next wave of IoT needs to be analysed from two perspectives: firstly, from the perspective of consumers; and secondly, from that of companies. It is believed that for commercial volume to exist and business growth to take place based on new technologies, two preconditions must be met: firstly, the technology must be widely accepted; and secondly, that the maturity level of both consumers and companies in the market must reach a certain point. Previous studies in the literature have focused extensively on the technical issues associated with IoT implementation. However, comparatively little attention has been paid to explore the acceptance of IoT technology among consumers. Additionally, a gap in the literature exists regarding the social impact of IoT technology, as well as individual and technological acceptance characteristics (Li and Wang, 2013). With these considerations in mind, to provide a theoretical framework for the present study, technology acceptance models in the literature are investigated, both at the company and the consumer levels. As mentioned, the literature is limited in terms of the IoT context (Gao and Bai, 2014).

A theoretical model, commonly referred to as the technology acceptance model (TAM), was designed to promote an understanding of the influence associated with the acceptance of information technology, and to illuminate information technology adoption behaviour (Venkatesh and Davis, 2000). The purpose of the TAM is to gauge the effect of external variables on internal beliefs, intentions, and attitudes, including perceived usefulness (PU) and perceived ease of use (PEOU) (Marchewka and Kostiwa, 2007).

Initially proposed by Davis (1986), the TAM is a cornerstone in the literature, and it has been tested and applied in numerous studies. As previously noted, the TAM focuses on PU and PEOU as a way to gain insight into a user's intention to accept or use a new system or technology. In the years following Davis' (1986) initial publication, researchers simplified the TAM by removing elements and introducing factors from related models. In particular, additional belief factors were introduced, and moderators and antecedents of PU and PEOU were examined. One of the defining strengths of the TAM is its ability to illuminate the perceptions relating to the use and acceptance of novel technologies from the consumer perspective (Venkatesh and Davis, 2000).

According to a report published by Accenture (2014), consumers started to adopt digital lifestyles in line with the increasing ubiquity and development of the world wide web, smartphones, and electronic devices. In contemporary society, the global population is spending increasingly large amounts of time connected to the Internet, and individuals use various devices to remain connected. Furthermore, consumers are increasingly demanding new IoT devices, including wearables, home electronics, digital health devices, and other applications. Based on Accenture's (2014) survey results, five factors affecting consumer purchase decisions with respect to IoT devices appeared to dominate, as illustrated in Figure 2.6.

Figure 2.6: Consumer decision making process



Source*: Accenture (2014)*

According to a home automation study released by Microsoft (2010), four key elements were identified as barriers to purchase decisions: the acquisition cost, security issues,

inflexibility, and poor performance (Brush, Lee, and Mahajan, 2011). Another study by Canhoto and Arp (2016), which focused on the adoption and sustained use of health and fitness IoT devices, indicated that in terms of the characteristics of devices, the context and the user critical factors. Gao and Luo (2015) investigated the variables that affect consumer decisions to use healthcare wearables, reporting that consumers are strongly influenced by hedonic motivation, ease of use, security, and word of mouth (WOM), particularly the recommendations made within friendship networks and family reference groups.

Despite the accumulation of knowledge regarding the antecedents of buyer decision-making processes with respect to IoT devices, the consumer side is complex. This is due to the personal nature of the relationship between a consumer and their connected device, which they commonly regard as an "intimate accessory" (Bauer et al., 2005). As the IoT concept further develops and the variety of services increases, understanding consumer behaviour in this new context will give rise to numerous research opportunities.

On the supplier side, various studies have demonstrated the importance of performance improvement in driving the acceptance of novel technologies. In particular, these performance improvements tend to arise as a result of information and communication technologies (ICT), and they emerge from different angles, including productivity, profitability, market value, customer satisfaction, production flexibility, and market share. ICT helps companies to improve their competitive advantage by enabling them to operate either at a lower cost or in a differentiated position by charging premiums (Porter and Millar, 1985; Bartelsman and Doms, 2000; Colecchia and Schreyer, 2002; Dedrick et al., 2003; Melville et al., 2004; Voogt et al., 2013).

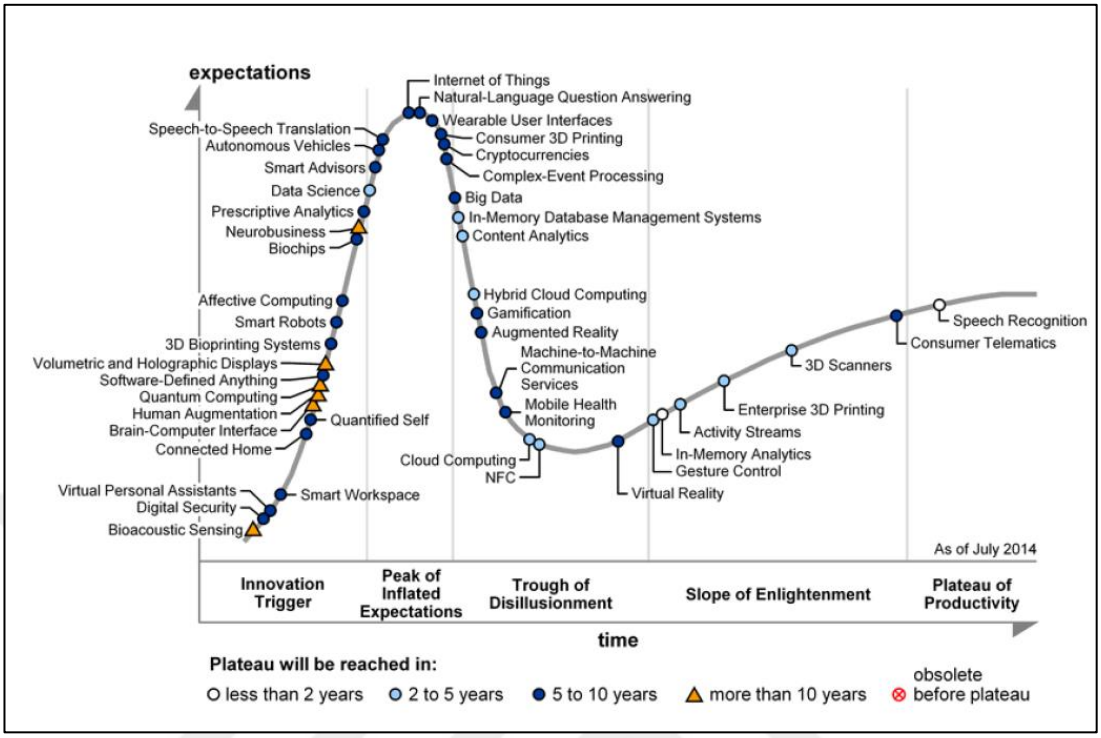
Grandon et al. (2004) proposed a technology acceptance model with three factors, each of which is posited as being influential in the perception of the strategic importance of information technologies: firstly, managerial productivity; secondly, operational support; and finally, strategic decision aids. The researchers also considered four other factors that affect technology adoption, namely organisational readiness, external pressure, perceived usefulness (PU), and perceived ease of use (PEOU).

Bayo-Moriones and Lera-López (2007) analysed the role of different ICT tools in the adoption and usage of five different aspects: environment, company characteristics, human resources, competitive strategy, and organisation. Their model was partially built on the model developed by Spanos et al. (2002). Additionally, in order to provide a list of predictors for e-commerce adoption, Molla and Licker (2005) proposed a multi-perspective audit of managerial, internal organisational, and external contextual issues. The researchers mainly focused on the concept of perceived e-Readiness to represent managers' and organisation's assessments, and external situations were also considered in decision-making.

Hong and Zhu (2006) analysed the factors that differentiate adopters and non-adopters of e-commerce technology at the company level. Their model indicated that functionality, the value of financial transactions, and the integration of externally-oriented, inter-organisational systems were the most influential drivers that informed migration to e-commerce technologies. However, firm size, partner usage, electronic data interchange usage, and perceived obstacles tended to have a negative effect on each company's decision to migrate to e-commerce technologies.

Garter's hype cycle for emerging technologies (Figure 2.7) is a generalised way in which to gauge the effects of applying specific technologies, particularly in terms of their emergence, adoption, and maturity (Jayavardhana et al., 2013; LeHong and Leeb-du Toit, 2013). The x-axis indicates expectations and the y-axis indicates the time factor. As noted in Figure 2.7, the IoT is considered an emerging technology, and it is estimated that IoT will be widely accepted in the market by 2022. As it is seen on the figure, Plateau of productivity will be reached soon but there is a need to understand how to benefit from Internet of Things technologies.

Figure 2.7: Gartner's hype cycle for emerging technologies



Source: LeHong and Leeb-du Toit (2013)

When implementing IoT applications, a range of challenges must be considered (Gazis et al., 2016). The principal challenges are as follows:

i. Technological Interoperability: The challenge of the IoT's interoperability relates not only to the issue of human-to-human interaction but also to that of human-to-device interaction. Significantly, one of the key differences associated with IoT devices when compared to previous innovations stems from the nature of the technologies they draw on.

ii. Semantic Interoperability: IoT devices must share information correctly and liaise with each other. Therefore, room for improvement exists in relation to semantic devices, web discovery, and distributed ontologies.

iii. Security and Privacy: Personal data is collected and stored as data traffic increases. For this reason, data integrity, encryption, and unique identification are core challenges.

iv. Smart Things: Devices that can tolerate difficulties should be developed. Additionally, the basic challenges of privatisation, energy collection, storage with low-energy processing, adaptation, security, and privacy should be addressed.

v. Resilience and Reliability: Temporary outages are unacceptable in industrial settings and emergency cases. Thus, resilience and reliability should be investigated from broad perspectives, and perspectives should be involved such as accessibility, vigour and adaptability of the information exchange and equipment to dynamic environments, or the meaning of information preparing to questionable data.

2.1.2 Infrastructure of Internet of Things (IoT)

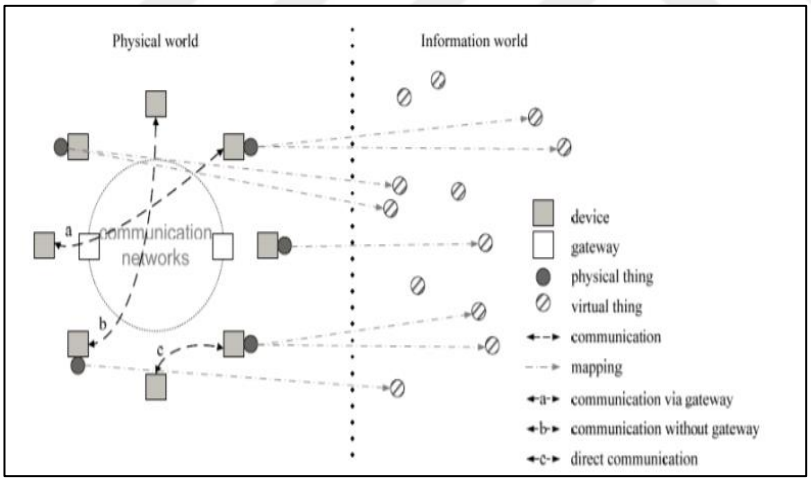
Gartner estimates that approximately 25 billion devices will be connected by 2020 on the TCP/IP architecture that was introduced in 1980 (Hauben, 2007). However, the existing network will not be sufficient due to movements. In particular, new open architecture is needed to solve security and quality of service (QoS) problems (Jian et al., 2012).

As defined by Verizon (2015), IoT is a connectivity technology that works based on cloud infrastructure through machine-to-machine (M2M) communication. According to the report, IoT must have the so-called “three As”, namely it must be aware (in terms of what it is sensing), autonomous (in terms of transferring data automatically to Internet services or other devices), and it must be actionable (that is, actionable for integration).

A critical qualification of the IoT is that the devices on the network must be interconnected. Furthermore, the IoT operations that link the physical and virtual worlds must be guaranteed by the IoT architecture. Processes, networking, communication, and many other factors must be included in the design of IoT architecture. When designing IoT architecture, operability, scalability, and extensibility among devices are key considerations. At the same time, IoT architecture should be easily adaptable in order to allow for the straightforward incorporation of new objects into the system. Furthermore, IoT systems should operate evenly across the entire system rather than from a specific, centralised point (Gokhal, Bhat, and Bhat).

Given that IoT is underpinned by communication, M2M communication is the most vital part of the technology. Other functional properties such as movement, gear, sensing, storage, and catching capabilities are only necessary depending on situational factors. Real physical and link layer communication within IoT can be accomplished in many ways. IoT devices can communicate not only through the network but also by other means, as indicated in Case C in Figure 2.8. If two devices are proximate, both can communicate via protocols that provide direct communication (e.g., Bluetooth or ZigBee). Additionally, devices can communicate via a gateway using a protocol, and then the gateway can communicate using a protocol that was previously unused over a communication network. Case B in Figure 2.8 illustrates two devices that are directly communicating without the requirement for a gateway. These devices are directly connected to the network and, due to this, can communicate even if they are not in the same location (Bude and Bergstrand, 2015).

Figure 2.8: Communication between machines



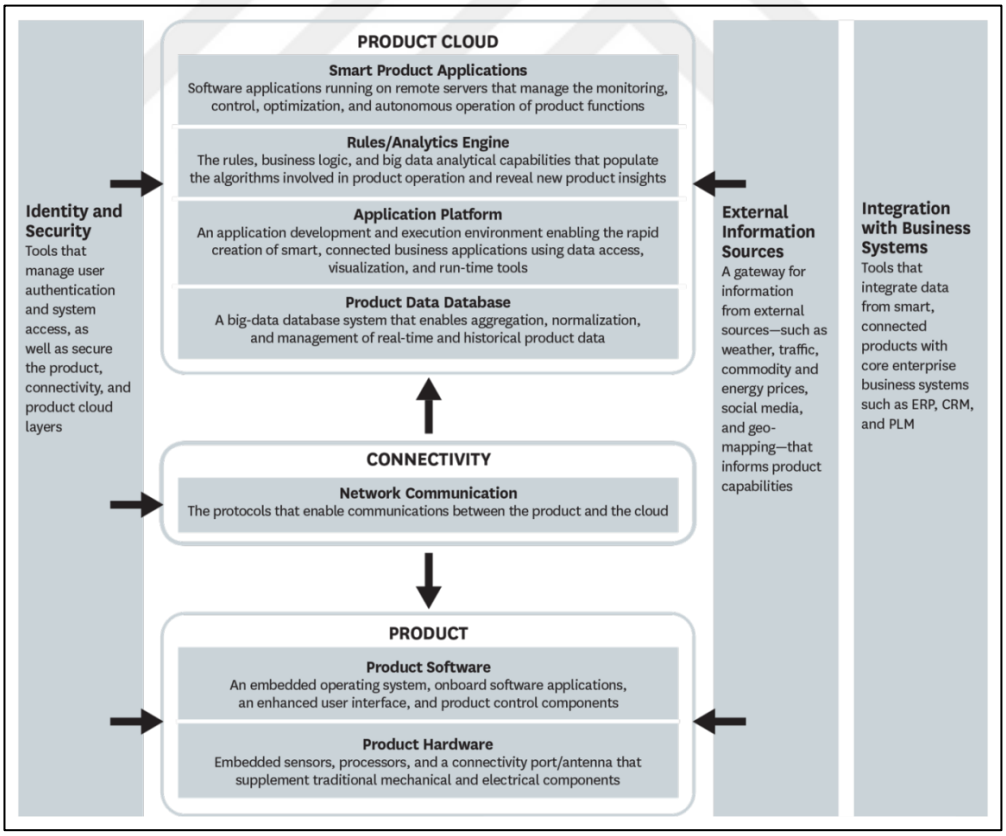
Source: Bude and Bergstrand (2015)

Several major qualifications exist with respect to IoT, including commitment, scalability, extensibility, and interoperability (Al-Hunaity et al., 2015). As the number of devices increases in the network system, the risk of decentralised entry points for malware increases. Furthermore, more middleware integration, more layers of software, and greater M2M communication lead to a higher order of complexity. Significantly, security risks increase in a directly proportional way with the complexity of the system (Alansari

et al., 2018). Additionally, an open source architecture is required for IoT in order to increase interoperability between parts (Mohammad et al., 2018).

Building a system for services and products with IoT technologies is not an easy task. It requires large investments with an uncertain return on investment (ROI). Porter and Heppelman (2015) explained that the so-called "technology stack" required for smart and connected products consists of different layers, including product hardware, embedded software, connectivity, the cloud, security layers, a gateway (which connects external data exchange points), and an integration with corporate platforms. Importantly, setting up and providing maintenance for the technology stack required for smart and connected devices depends not only on an initial investment but also on new and emerging skill sets. These skills sets include data analytics, engineering, and software development (Figure 2.9).

Figure 2.9: Technology stack



Source: Porter and Heppelman (2015)

2.1.3 Challenges

The purpose of this section is to examine several of the core topics that need to be addressed in order to build an IoT based on the work by Kranenburg and Bassi (2012). Solutions to these issues must be handled widely to ensure their broad acceptance across the IoT community.

i. Standards and interoperability

The creation of new market standards is critical for new technology. This is because standards provide a specific discipline. In the event that manufacturers do not use a common framework when producing the same products, problems may arise. Different data standards can lock users into a single brand or family of products. If a device change takes place, or if users start to use devices released by different manufacturers, they may encounter problems in terms of the movement of data. Consequently, difficulties may arise when attempting to use the old data.

ii. Security

Security is a critical problem for the IoT. The IoT consists of millions, potentially billions, of devices. These devices interact not only with each other but also with an assortment of virtual elements and humans. All interactions may require different rules to protect information, to provide services to all parties involved in the communication, and to control and classify the events that affect the IoT ecosystem.

iii. Trust and Privacy

An increase in sensitivity to control data access and ownership will occur by monitoring a core use and remote sensors for IoT. The complexity of the use case scenarios will continue to be critical in medical applications, given that errors in these areas can lead to physical impairment or death. Improvements in compatibility will be needed to assess the unique problems of IoT, and concerns in terms of the social and political implications may also prevent IoT acceptance.

iv. Complexity, confusion and integration issues.

Testing difficulties are associated with IoT due to the existence of multiple platforms, protocols, and application programming interfaces (APIs), as well as the high level of integration. Additionally, changing standards may further hinder the technology's acceptance. The rapid evolution of APIs will consume unexpected development resources, thus reducing developers' ability to add essential new types of functionality. Ultimately, the slower rate of acceptation and the unforeseen requirements that may exist in terms of development resources will decrease revenues

v. Immature communication protocols and unclear standards

The number of firms working on IoT is increasing on a daily basis. Furthermore, existing companies are attempting to safeguard their comparative advantages and determine new standards. Competition is being attempted to protect the advantages of the old companies and, alongside this, new standards are being formulated. These developments are increasing the level of competition among companies. Importantly, existing standards may be established for different purposes, and it is expected that device class, power requirements, capabilities, and use cases will contribute to the determination of future standards.

vi. Concrete use cases and compelling value propositions

IoT is a developing concept. For this reason, it is difficult to understand. While sufficient information has been generated for early adopters, sales are insufficient for the expansion of the IoT concept. Therefore, the concept must be clearly communicated to users, particularly in terms of its concrete use cases and compelling value propositions. Otherwise, companies will be obligated to explain many issues, especially the basic benefits of IoT.

2.1.4 Internet of Things and Industry 4.0

As previously mentioned, the concept of IoT originated from the birth of the Internet. Over the Internet, individuals and devices started to communicate interactively without constraints in terms of time, location, and platform. The commercialisation of these

activities gave rise to electronic commerce, and this developed further by extending to mobile networks at an increasing rate.

In addition to being revolutionary, the Internet is indispensable for human beings in a variety of ways. In the present situation, two forms of communication exist: firstly, human-to-human; and secondly, human-to-device. However, with the development of IoT, machine-to-machine (M2M) communication has emerged, which some commentators say signals a beautiful future (Farooq, 2015).

Wireless sensor networks (WSNs) are a ubiquitous technology, and this technology is located in today's world. The capabilities afforded by WSNs allow us to measure and understand environmental stimuli ranging from natural to urban resources. Actuators and sensors combine smoothly with the environment in which we live in. Data is allocated across platforms to form a common operating picture (COP). IoT has started transforming the Internet by increasing the level of interaction between devices and living creatures, and it marks the beginning of a future Internet model. The transition started with the static web (www), which then turned into the dynamic web (Web 2.0). At present, the ubiquitous computing web (Web 3.0) is emerging. One of the key characteristics of Web 3.0 is high levels of data transmission on demand, which is facilitated by advanced technologies (Gubbi et al., 2013).

As a technological revolution, IoT represents the future of computing and communications. Furthermore, the development of IoT is intimately related to dynamic technical innovations in a number of significant fields, including WSNs and nanotechnology. These innovations will mark each object for automation, identification, monitoring, and control (Madakam et al., 2015). The proficiency with which objects can be coded and tracked through IoT has allowed the process to become effective and expedited, increasingly free from errors, and it includes advanced and flexible organisational systems. Simply put, IoT allows everything around us, ranging from machines and electronic devices to cars and even living creatures, to connect to each other via the Internet (Ferguson, 2002).

Unfortunately, a commonly accepted definition of IoT does not exist. Many different definitions have been proposed by different groups, but an initial one was offered by the digital innovation expert Kevin Ashton. The concept of a smart device network was first discussed in 1982. The coke machine designed at Carnegie Mellon University is considered the first example of an Internet-connected device. Essentially, the function of the device was to report on the temperature of the drinks on sale. However, one feature that is consistent across all definitions is that data in the first instance of the Internet is generated by people, and in the latter case, that data is generated by things (Ali et al., 2015).

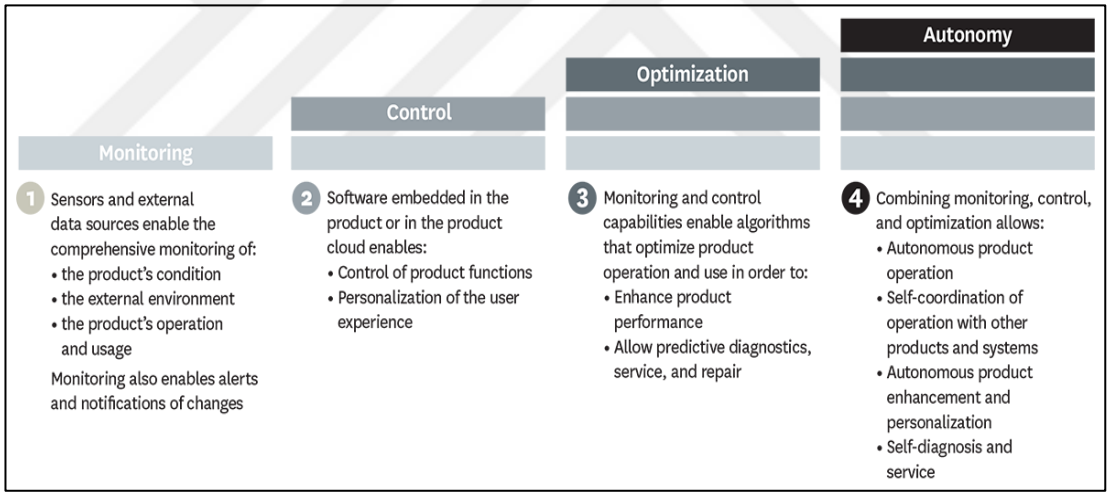
It is worth noting that the way in which IoT is defined varies depending on the perspective of the individual who is defining it. In 1999, the British technology pioneer Kevin Ashton defined the term IoT as a system in which objects equipped with sensors collect data and then convey them, using the Internet, to a centralised storage location. However, in recent years, the IoT has expanded to include all connected devices rather than just computers. In this way, the starting point of the concept of IoT is the communication that takes place among various devices (e.g., household, transportation, and monitoring devices), and which is facilitated by exchanging enormous amounts of data gathered by sensors. At the end of the 1990s, the term "IoT" had been used in many ways and in many places. Many publications were written to understand the concept, and many different definitions were proposed (Khedekar et al. 2017).

Items or objects must contain electronic components in order to be identified as part of the IoT. Furthermore, these devices must perform some function (e.g., the role played by RFID tags in inventory management). Significantly, these devices include actuators and sensors. Additionally, these devices can examine different parameters (e.g., motion, sound, humidity, and position), and they can convey information to other network-connected devices or sensors. These sensors are placed on chips, otherwise known as programmable cards (PIC), examples of which include Raspberry Pi, Beagle Bone, and Arduino. When chips are added to the PIC, these types of IoT are referred to as Near Field Communication (NFC), Personal Area Networks (PAN), Local Area Networks (LAN), Bluetooth, and Wide Area Networks (WAN). Link is trying to personalise with unique

network identities such as Internet Protocol (TCP/IP) and Media Access Control (MAC) in IoT communication (Holler et al., 2014).

Porter and Heppelman (2015) discussed smart and connected products in order to further develop the concept of IoT. In their view, smart and connected products are not synonymous with IoT, and they emphasised the smart component in addition to the physical and connectivity components. The researchers placed a strong emphasis on the smart capabilities of IoT devices in view of the fact that the products themselves are enabling the revolution. Furthermore, the researchers grouped the capabilities of smart, connected products into four areas: namely monitoring, control, optimisation, and autonomy (Figure 2.10). Autonomy is the latest stage which covers all previous three stages and things actually gains the "self" concept in decision making process.

Figure 2.10: Smart, connected products capabilities



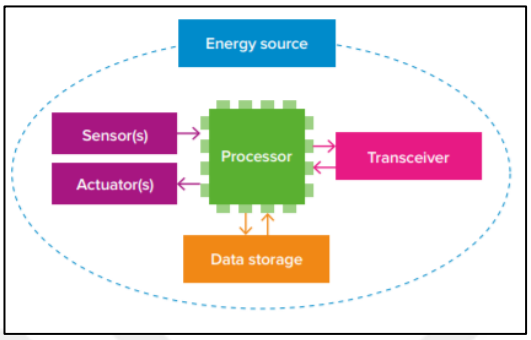
Source: Porter and Heppelman (2015)

In 2008, the number of connected devices surpassed the number of connected people. Cisco forecasted that by 2020, there will be 50 billion network-connected devices, amounting to around seven times the global population (Evans, 2011).

Transceivers, digital sensors, processors, and data storage spaces are the fundamental components of any IoT device. Additionally, as illustrated in Figure 2.11, an energy source is necessary to facilitate the device's operation. By using the features of IoT

devices, many value-creating applications have been created and commercialised (Farhan et al., 2017).

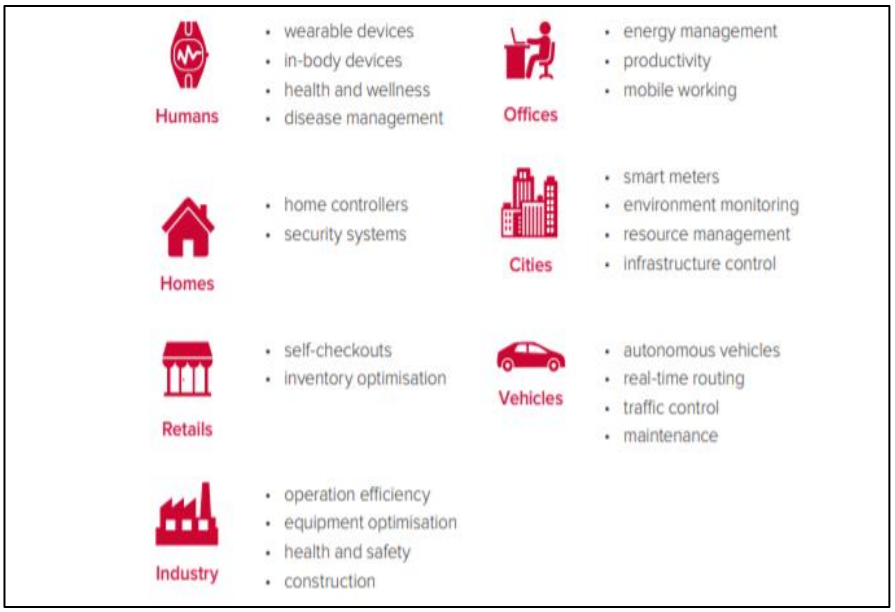
Figure 2.11: IoT device



Source: Farhan et al. (2017)

Farhan et al. (2017) also provided examples of IoT devices and discussed how these diverse technologies can be used in daily life (Figure 2.12). Daily use cases are numerous such as wearables, home-systems, industrial implementations, enhancing productivity in industries, improving logistics, etc.

Figure 2.12: Daily use cases of IoT devices



Source*: Farhan et al. (2017)*

IoT is the concept of information exchange that involves multiple communication methods and various objects. In contemporary society, the descriptive vision of IoT is that everything should be connected to the Internet. IoT will be a keystone of the future because it will conduce to new innovations, new services, and new products. When they operate in a non-protected ecosystem, they exchange data with each other. However, non-protected exchange environments also lead to major security problems (Bude and Bergstrand, 2015).

2.2 DIGITAL TRANSFORMATION AND INDUSTRY 4.0

From the IoT perspective, a critical issue relates to the technological advancement and upgrading of analogue devices. For example, one of the best-known examples is Alexa, a product released by Amazon. This speaker-like device can receive voice commands and perform functions based on the user's request. (Lopatovska et al., 2018). Another example is Nest and Ecobee's smart thermostat. The basic function of the device is to control the temperature in every room within a building, but the smart thermostat can autonomously adjust the temperature by algorithmically evaluating the weather conditions outdoors. Additionally, when the residents leave the building, the smart device can automatically change the temperature in a suitable way (Năsulea and Moroianu, 2016)

IoT is used in various areas, including the private sector, the public sector, and among consumers. Additionally, the domain of manufacturing is a critical area in which IoT applications have emerged. In this context, IoT is actively used in the digitalisation of production sites (Karimi and Atkinson, 2013).

IoT is one of the core concepts associated with Industry 4.0. For example, IoT technology is used in smart factories for data collection and the supervision of production lines. Cost reduction and personalisation for consumers are examples of the metrics across which IoT is expected to yield significant benefits in the coming years (Wang, Wan and Zhang, 2016).

However, it is worth questioning whether a clear relationship exists between IoT and Industry 4.0. Essentially, Industry 4.0 uses IoT as part of its digital production. All devices, robots, and simulations have sensors that generate data (Lucidworks). Without

IoT, digital smart factories would not exist, and nor would Industry 4.0. The application of IoT has thus prepared the ground for new industrial developments, autonomous devices, and novel services. It is the basis for increased product customisation and greater flexibility, and it allows automated processes to be informed by consumer and supplier demand. Due to digitalisation, Industry 4.0 is set to become the new manufacturing paradigm for the next era (Stock and Seliger, 2016)

Digital transformation refers to transforming key business operations which has an effect on products and processes along with organizational structures and management concepts. The difference between the concept of digital transformation and Industry 4.0 is that the latter is used to describe the digitalisation efforts of firms in the manufacturing sector (Matt , Hess and Benlian, 2015)

2.2.1 Dynamics shaping Industry 4.0

Mentoro (2018) summarizes the driving forces leading to Industry 4.0:

i. Advances in Technology and Decreasing Costs

The decreasing cost of technology is the main cause of the change. Over the last decade, the cost of processing power has reduced 50 times, data storage 20 times, and bandwidth 40 times, while sensors and robots are 50% and 30% cheaper. This cost reduction has democratised technology, enabled new investments, and accelerated development. In this way, by leveraging digital technologies, new opportunities have emerged for companies, allowing them to reduce unit costs and offer greater benefits to consumers.

ii. Increasing Competition and Declining Customer Loyalty

Local and global competitors, customers, alternatives, and suppliers are putting pressure on prices and lowering company profitability. In such an environment, companies must seek to increase profitability by utilising digital technologies.

iii. Increasing the Importance of Geographical Proximity and Fast Delivery

Companies, particularly fashion brands, are eager to reduce delivery times due to rapid changes in the business environment. In the case of fashion brands, these organisations expect flexibility and agility from their manufacturers. In particular, they want to work with firms that can respond to the rapidly changing demands of end users, and this is a capability that digital technologies afford.

iv. Complexing Supply Chain

The supply chains across all business sectors are becoming increasingly complex. The number of companies operating in different geographical regions and in different stages of the activity chain is growing. Consequently, more effective uses of technology are required in order to manage suppliers and respond to needs in a timely way.

v. The Increasing Importance of Sustainability

The ability of corporations to produce sustainably is becoming an important purchasing element for end consumers. Therefore, the importance of sustainability for institutions is increasing on a daily basis. The trend is pushing institutions to work with producers who meet stringent sustainability requirements. It is significant, then, that the use of technology for sustainability is a prerequisite. Technological capabilities allow organisations to follow, plan, and make the processes more transparent in terms of issues such as energy, water, and other resource utilisation. Additionally, technologies promote higher efficiency, they avoid creating unnecessary waste, they promote occupational health and safety, and they are consistent with the rising demand for gender equality. Hence, it is important to recognise that businesses can only be sustainable by leveraging technology and implementing it properly.

vi. Accelerating Globalization with Digital Business Models

As a result of e-commerce, which has been shaped by the use of digital technologies, as well as potential customers in other countries and complementary and low-cost access and transaction opportunities to suppliers (including employees), companies can create supply-side economies of scale. More importantly, the profitability of firms increases when demand-side economies of scale are generated (i.e., by increasing the number of

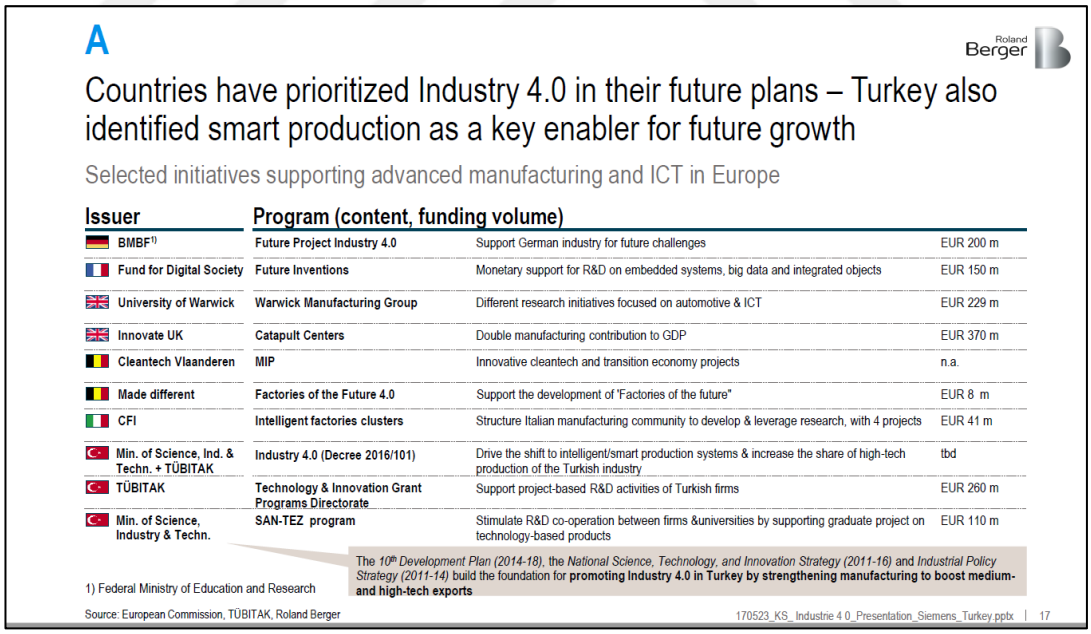
customers and increasing sales volume). In turn, this can be added to e-commerce systems, which enables international buyers, sellers, and complementary platforms to offer mutual value. In addition, digital marketing techniques, including content marketing and social media usage, can significantly reduce the costs of marketing communications.

2.2.2 Industry 4.0 in Turkey

Although new technologies bring great opportunities, it will be only possible to realise them by implementing the necessary preliminary preparations and providing macro-level state supports. As seen in all economies around the world; policies have been designed in this direction and public incentives has been expounded for work.

The study, which was prepared by Roland Berger at the Siemens event in 2017, summarized government incentives for European countries. It seems that Turkey is also allocated a high proportion of funds through different institutions. (Figure 2.13)

Figure 2.13: Selected initiatives supporting advanced manufacturing and ICT


A

Roland Berger

Countries have prioritized Industry 4.0 in their future plans – Turkey also identified smart production as a key enabler for future growth

Selected initiatives supporting advanced manufacturing and ICT in Europe

Issuer	Program (content, funding volume)		
BMBF[1)]	Future Project Industry 4.0	Support German industry for future challenges	EUR 200 m
Fund for Digital Society	Future Inventions	Monetary support for R&D on embedded systems, big data and integrated objects	EUR 150 m
University of Warwick	Warwick Manufacturing Group	Different research initiatives focused on automotive & ICT	EUR 229 m
Innovate UK	Catapult Centers	Double manufacturing contribution to GDP	EUR 370 m
Cleantech Vlaanderen	MIP	Innovative cleantech and transition economy projects	n.a.
Made different	Factories of the Future 4.0	Support the development of "Factories of the future"	EUR 8 m
CFI	Intelligent factories clusters	Structure Italian manufacturing community to develop & leverage research, with 4 projects	EUR 41 m
Min. of Science, Ind. & Techn. + TÜBITAK	Industry 4.0 (Decree 2016/101)	Drive the shift to intelligent/smart production systems & increase the share of high-tech production of the Turkish industry	tbd
TÜBITAK	Technology & Innovation Grant Programs Directorate	Support project-based R&D activities of Turkish firms	EUR 260 m
Min. of Science, Industry & Techn.	SAN-TEZ program	Stimulate R&D co-operation between firms &universities by supporting graduate project on technology-based products	EUR 110 m

The *10th Development Plan (2014-18)*, the *National Science, Technology, and Innovation Strategy (2011-16)* and *Industrial Policy Strategy (2011-14)* build the foundation for **promoting Industry 4.0 in Turkey by strengthening manufacturing to boost medium- and high-tech exports**

1) Federal Ministry of Education and Research

Source: European Commission, TÜBITAK, Roland Berger

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Source: Siemens presentation (2017)

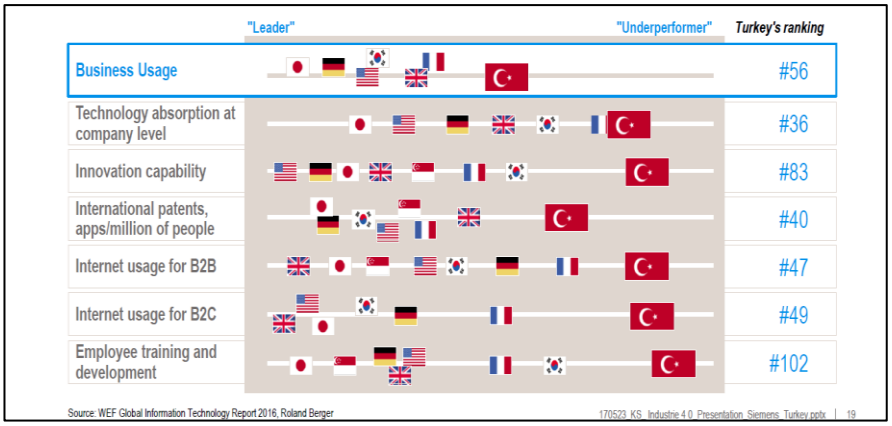
On the authority of Özlü (2017), Turkey has built up a model according to public-private cooperation to speed up the process of digital transformation in the industry and launched the Turkey's Digital Transformation Platform in Industry. The platform brings together

TOBB (Union of Chambers and Commodity Exchanges of Turkey), TİM (Turkish Exporters' Assembly), TÜSİAD (Turkish Industry and Business Association), MÜSİAD (Independent Industrialists and Businessmen Association), YASED (International Investors Association) and TTGV (Technology Development Foundation of Turkey). They established six study groups that focused on our country's precedencies;

i. Infrastructure working group led by TOBB will outline country's physical and technological infrastructure needs and the steps that need to be taken.
ii. TIM will lead the Open Innovation working group, which will refer the issues of establishing and strengthening platforms and an environment of collaboration that will ensure we evolve technology
iii. Digital Technologies in Industry group led by TUSİAD will identify the needs in this area and study on wielder tool that will ensure businesses both use and create more digital technology.
iv. Advanced Manufacturing Techniques group will lead by MUSİAD and clarify the needs in this area. As a result; they will confirm required manufacturing techniques and develop recommendations for more advanced manufacturing technologies.
v. YASED will focus on standards, legislation and intellectual property rights.
vi. TTGV will lead the last working group that will ensure the education in order to generate a workforce that will furnish the way for the digital transformation of our industry.

All these studies awaken hope for future but when taking a picture of the current situation, the ranking in the developed countries of Turkey seems to be far behind. In order to achieve the effective and efficient implementation of Industry 4.0 applications, it is necessary to increase its capabilities in the process of Digital Transformation.

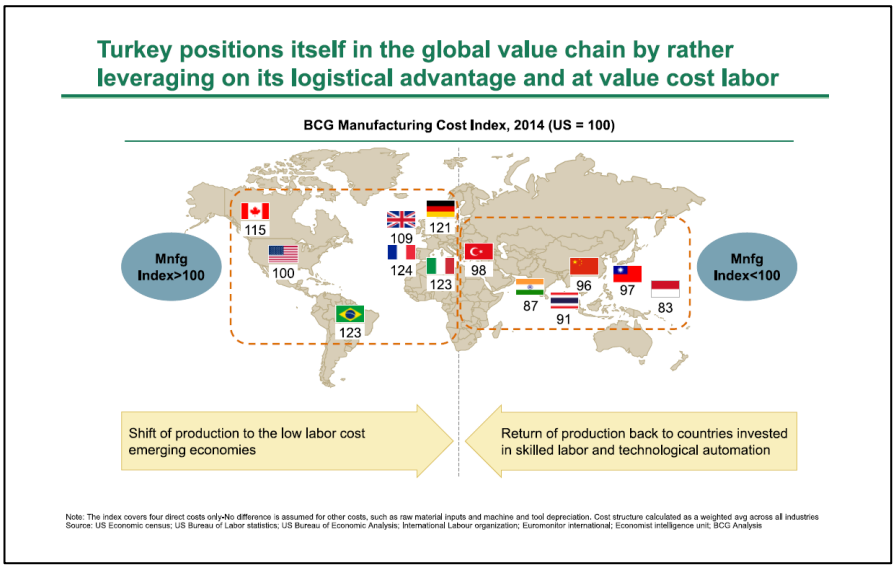
Figure 2.14: Turkey's ranking in business usage index



Source: Siemens presentation (2017)

According to study that conducted with BCG and published by TUSIAD in 2016, Turkey, competitive positioning in the global value chain has been achieved by providing flexible and low labor costs and benefitting from the advantages of the geographic location. BCG's "Global Manufacturing Cost Competitiveness Index" study, that calculates competitiveness scores based on manufacturing wages, energy cost, efficiency and exchange rate of currency refer to the U.S. Dollar, Turkey has 98 points. On the other hand, USA has 100 and Germany has 121 points. It means, Turkeys direct production costs are lower than Germany and USA. It also shows Turkey's competitive advantage in the global value chain (Figure 2.15).

Figure 2.15: BCG manufacturing cost index



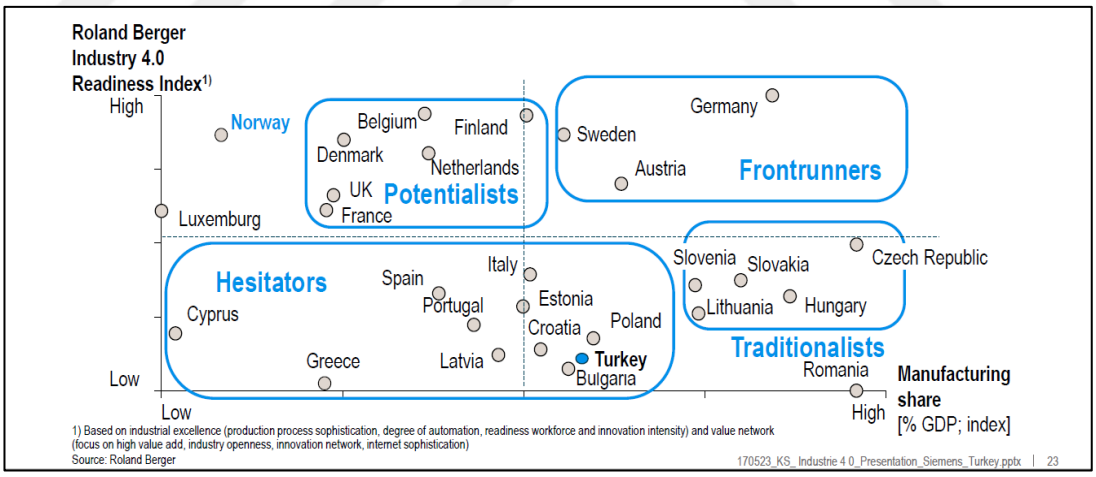
Source: BCG (2016)

But Turkey needs to address several issues, mentioned below, and start its structural change in order to remain competitive and improve its position in the value chain (Figure 2.16).

i. Exports are mainly dependent on imports: Input for manufacturing and exporting is highly dependent on imports, which creates a vicious cycle.
ii. High share of conventional goods: Although Industry 4.0 brings many opportunities to offer high value products, the share of those is still around 4%.
iii. Unskilled and scarce workforce: Turkey has not been able to transformed its human resources capabilities in line with 4th Industrial revolution; which hinders the adoption of new technologies.
iv. High employee turnover: There is a migration of labor from industrial to service sectors, which hinders the accumulation of know-how and experience.

These issues, coupled with the advances in other nations capabilities, threatens Turkey's competitive advantage and pushes down in the value chain.

Figure 2.16: Industry 4.0 readiness

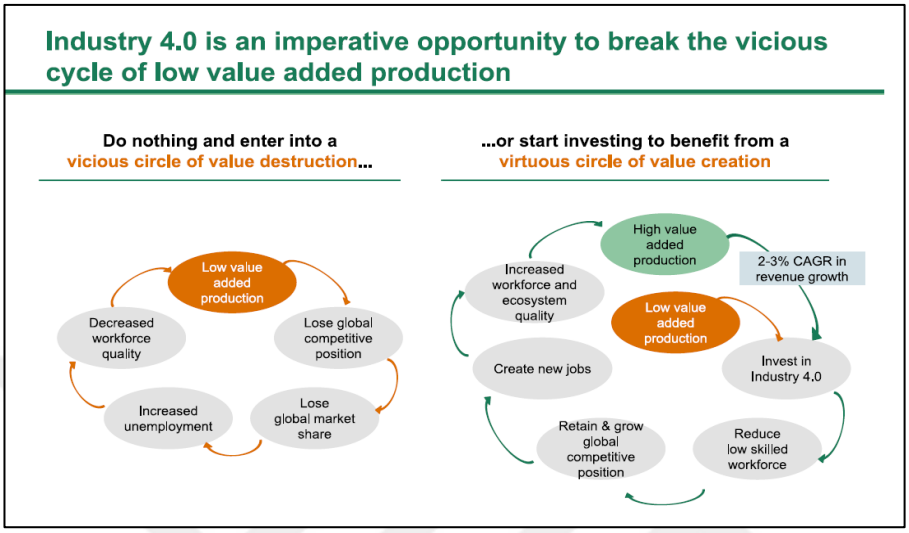


Source: Siemens presentation (2017)

In brief, potential worsening of global competitiveness as compared to other opponent countries of Turkey, causes a decline in global market share and leads to lower quality workforce with a higher unemployment rate. In that case, Turkey has a possibility to slide into a low value-added manufacturing and immoral cycle of underinvested. Besides, investing on Industry 4.0 and digitalization could demand a breakthrough shift for

Turkey's global competitiveness and guide to a higher share in the global value chain because of more jobs opportunities with a high-skilled workforce (Figure 2.17).

Figure 2.17: Role of industry 4.0 for Turkey



Source: BCG (2016)

It is seen that in Turkey, although a complete transition has not yet been made to the Fourth Industrial Revolution, the Industry 4.0 awareness has occurred. The infrastructure has started to improve; that some sectors and firms have been getting informed and receiving information with regard to Industry 4.0 via meetings and international visits. This is also evidenced by the inclusion of vision documents as well as the adoption of government policy as the date on which the research was carried out. The Ministry of Science, Industry and Technology in Turkey has completed preparations for the production reform package aimed at increasing industrial production in 2017 of April. Along with this production reform package, digital transformation will be widespread in production and the transition to the 4th industrial revolution will be achieved. It is thought that the announcements and studies made by the Ministry of Science, Industry and Technology especially in 2017 helps to increase awareness of Industry 4.0 (Yüksel and Sener, 2017).

The digital economy is an important part of the structure of the 4th Industrial Revolution. The Digitization Index (DiGiX), prepared by BBVA, evaluates factors, intermediary behaviors and institutions that make a country fully utilize ICT for increased

competitiveness and prosperity (Table 2.2). It is a composite index that summarizes the indicators related to the digital performance of 100 countries. This is a dynamical concept which helps to analogize countries' performance in the sample. The DiGiX has six dimensions; households' adoption, infrastructure, costs, enterprises' adoption, regulation and contents. Each dimension is divided into a several individual indicators adding up to a total of 21.

According to the report; DiGiX considers Luxemburg to be the world's top digitalized country. United Kingdom holds second place and it is followed by Hong Kong (3rd), United States (4th) and Netherlands (5th). The rest of the top 10 are Japan, Singapore, Norway, Finland and Sweden. According to the results, these countries determines the technological standards in terms of digitization as of today. The highest scores in this index represent the digital boundary.
Turkey ranks in 38th position which is another indication that Turkey needs to focus on the digital transformation of the country.

Table 2.2: BBVA digitalization index

1	Luxembourg	1.00	46	Kazakhstan	0.47	91	Pakistan	0.16
2	United Kingdom	0.97	47	South Africa	0.47	92	Paraguay	0.15
3	Hong Kong SAR	0.95	48	Slovakia	0.46	93	Zimbabwe	0.13
4	United States	0.92	49	Mauritius	0.46	94	Bangladesh	0.12
5	Netherlands	0.90	50	Colombia	0.45	95	Côte d'Ivoire	0.11
6	Japan	0.88	51	Russian Federation	0.45	96	Zambia	0.10
7	Singapore	0.87	52	Italy	0.44	97	Bolivia	0.07
8	Norway	0.86	53	Azerbaijan	0.44	98	Nicaragua	0.06
9	Finland	0.85	54	Poland	0.43	99	Cameroon	0.05
10	Sweden	0.84	55	Romania	0.43	100	Algeria	0.00
11	Switzerland	0.82	56	Croatia	0.43			
12	Iceland	0.82	57	Montenegro	0.42			
13	Canada	0.81	58	Kuwait	0.41			
14	New Zealand	0.80	59	Mexico	0.41			
15	Australia	0.79	60	Greece	0.40			
16	Germany	0.78	61	Armenia	0.40			
17	Denmark	0.77	62	Georgia	0.40			
18	Korea, Rep.	0.76	63	Panama	0.40			
19	Estonia	0.76	64	Macedonia FYR	0.39			
20	France	0.76	65	China	0.39			
21	Austria	0.73	66	Thailand	0.38			
22	United Arab Emirates	0.71	67	Morocco	0.38			
23	Belgium	0.69	68	Philippines	0.37			
24	Ireland	0.68	69	Sri Lanka	0.35			
25	Israel	0.68	70	Egypt	0.34			
26	Bahrain	0.65	71	Indonesia	0.33			
27	Lithuania	0.65	72	Bulgaria	0.33			
28	Malta	0.64	73	Moldova	0.33			
29	Malaysia	0.63	74	Tunisia	0.33			
30	Spain	0.62	75	Argentina	0.33			
31	Qatar	0.61	76	Kenya	0.32			
32	Saudi Arabia	0.59	77	Peru	0.32			
33	Portugal	0.59	78	El Salvador	0.32			
34	Chile	0.58	79	Serbia	0.31			
35	Latvia	0.55	80	Dominican Rep.	0.31			
36	Czech Republic	0.52	81	Vietnam	0.31			
37	Oman	0.51	82	Honduras	0.30			
38	Turkey	0.50	83	India	0.29			
39	Costa Rica	0.49	84	Albania	0.26			
40	Jordan	0.49	85	Senegal	0.24			
41	Cyprus	0.48	86	Guatemala	0.24			
42	Hungary	0.48	87	Ukraine	0.22			
43	Uruguay	0.48	88	Botswana	0.21			
44	Brazil	0.48	89	Nigeria	0.18			
45	Slovenia	0.47	90	Lebanon	0.18			

Source: Cámara, and Tuesta (2017)

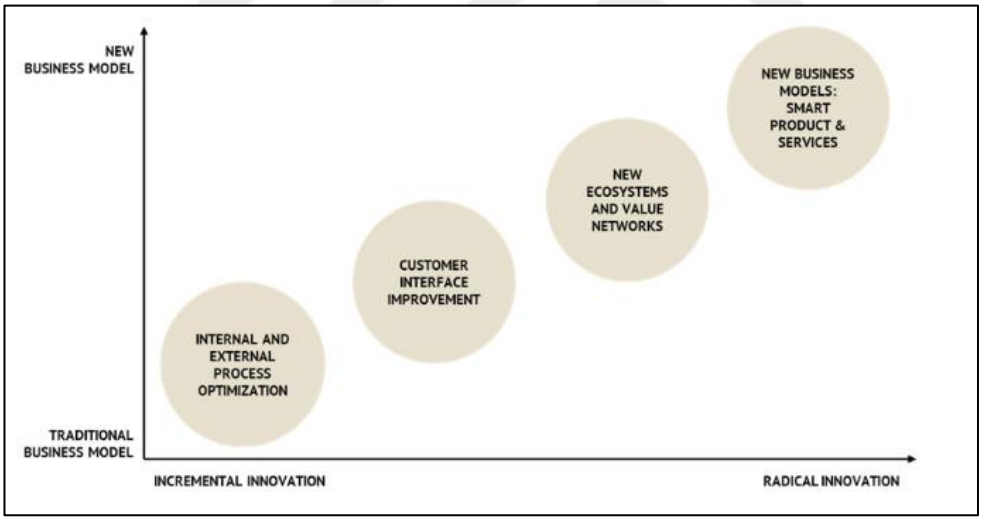
2.3 IMPLEMENTATION OF IOT ON THE FIELD

Smart devices will be essential elements for the hyperphysical system in many different areas, including transportation, healthcare, and education. However, the implementation

of IoT is associated with significant challenges in many layers where multiple components and users are operating (Fortine et al., 2014).

Based on the degree of innovation that is applied, four steps have been identified as essential for the digital transformation of manufacturing companies (Ibarra, Ganzarain, and Igartua, 2018). Each step involves changes to manufacturing elements, as illustrated in Figure 2.18. The first two steps can be introduced by the company's internal management team, in particular by benefitting from the latest readily-accessible technological capabilities. However, the third and fourth steps require external support, which is mainly derived from entrepreneurs. Due to this, a strong and capable ecosystem of entrepreneurs is a prerequisite for the evolution of industries. Thus, the present study focuses primarily on the third and fourth steps.

Figure 2.18: Digital transformation



Source: Ibarra, Ganzarain, and Igartua (2018)

Internal and External Process Optimisation: The transformation implies small changes in the business model. New technologies such as Big Data, artificial intelligence (AI), and cloud computing are introduced under Industry 4.0 for increased efficiency in value creation processes.

Customer Interface Improvement: This fruitful innovation is focused on AR and easy-input screen designs. New touch points are established using these technologies to increase the favourability of the customer experience.

New Ecosystem and Value Networks: This dimension involves radical innovation for the business model. In this context, radical innovation involves the integration of varied technologies into the company's value and product creation processes, with prominent technologies including Big Data, computing, AR, and virtual reality (VR). Stakeholders can interact using technological channels. Furthermore, it is imperative to note that changing value chains to ecosystems is required for the business model. This change will increase transparency in terms of the business channels and increase customer confidence. In this setting, new value creation processes should also be identified.

New Business Models, Smart Products, and Services: This dimension typically represents the endpoint of current IoT technology, where new capabilities are used to generate new ways of organising resources and processes. These offer smart products and services, which are consistent with current trends in emerging technology.

2.3.1 Entrepreneurship

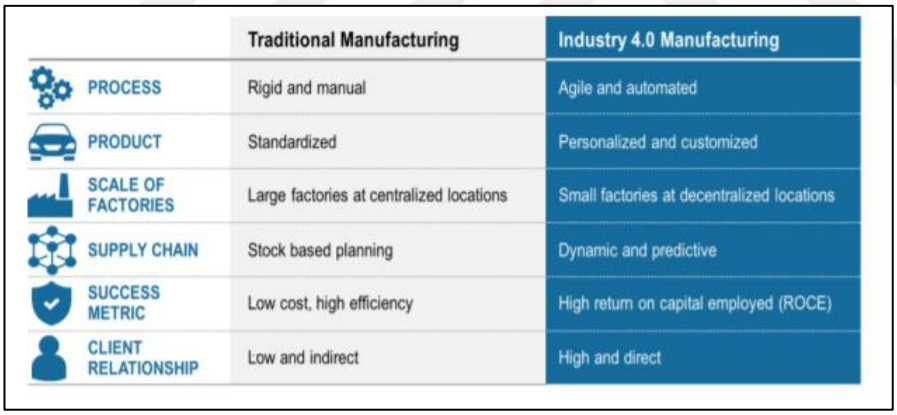
It can be argued that national economies are highly dependent on the competitiveness and effectiveness of their companies. In addition, the success of these companies depends on the capabilities of its entrepreneurs and management teams. Entrepreneurs are the engine of growth and welfare, and they use resources to achieve economic growth with accumulated tangible and intangible assets. Revolutionary technologies, such as Internet of Things, have opened new doors for entrepreneurs.

When entrepreneurs discover profitable arbitrage possibilities, they manage to shuffle the resources (Kirzner, 1973 and 1997). This movement brings a new equilibrium to the market. Entrepreneurship is a result of the action of individuals those are affected by the regions where they work and live (Gartner, 1985; Aldrich and Zimmer, 1986). Entrepreneurs create new opportunities for their business idea, try to develop and grow this idea in the dark with resources, introduce products to the market, try to get a pay from

market, and manage their business. Entrepreneurs can introduce new markets or enhance the existing market by relocating their resources to places that gestates economic growth (Wennekers and Thurik, 1999).

The essence of the modern corporate organization is found in the specialization of functions. The businessmen that manage economic activity are both managers and entrepreneurs. The businessman provides the necessary funds to establish the venture. The entrepreneur, without participating significantly in terms of capital, controls the firm. Studies show that business capabilities require the differentiation between the functions of entrepreneur, manager and capitalist. The individual entrepreneur explores business opportunities then exploits through small and medium-sized firms by selling the idea. In addition, the manager is basically responsible for the management of the organization (Cuervo, Ribeiro and Roig, 2007).

Figure 2.19: Comparison of systems



Source: BRICS (2016)

Industry 4.0 manufacturing introduces agile and automated production. It allows customized products and services. As a result of dynamism provided at the supply chain, small and decentralized production is possible. Employee skill sets are important and return on them is high. And the relationship with customers are highly engaged. Figure 2.19 by BRICS shows differences between traditional and Industry 4.0 manufacturing. It clearly displays the differences between the static, manual and efficiency-focused old

system and the dynamic, data-driven and automated system. The previous one focuses on mass production and the latter highlights customization.

Developed countries started launching nation-wide policies and allocated huge resources to benefit from the potential as soon as possible. The aim is re-locating production facilities from BRICS nations to their countries by removing the cheap labor cost advantage as a result of full automation opportunities which males the labor force dispensable. So, this is a clear threat to BRICS nations, and they also need to develop their policies and to take action in order to stay competitive in the market. However, adopting the new circumstances is not an easy task since it requires a highly skilled labour force which can only be achieved through proper education of the nation over years. Unfortunately, existing companies do not have this skilled work force and transforming the company and the culture requires time in order to comply with the new rules of the Industry 4.0 game. Entrepreneurs and start-ups enter the scene at this point by providing vision, enthusiasm, flexibility, and skilled work force to companies that plan to step up for the future (BRICS, 2016).

Eric Ries (2011) declared that, “A start up is a human institution designed to create a new services or products under extreme dubiousness conditions.” in his Lean start-up Manifesto. Steve Blank (2013) has a famous definition of a start-up as “a temporary organization seeking a quotable and scalable business model”. These two references, supporting uncertainty and questing for a quotable and scalable business model, are in the centre of the definition.

Isenberg (2011) emphasizes that entrepreneurial ecosystems can only develop under their unique circumstances. Ecosystem may be located within a geographical location but this does not necessarily mean that it is confined to that geographical location (OECD, 2014).

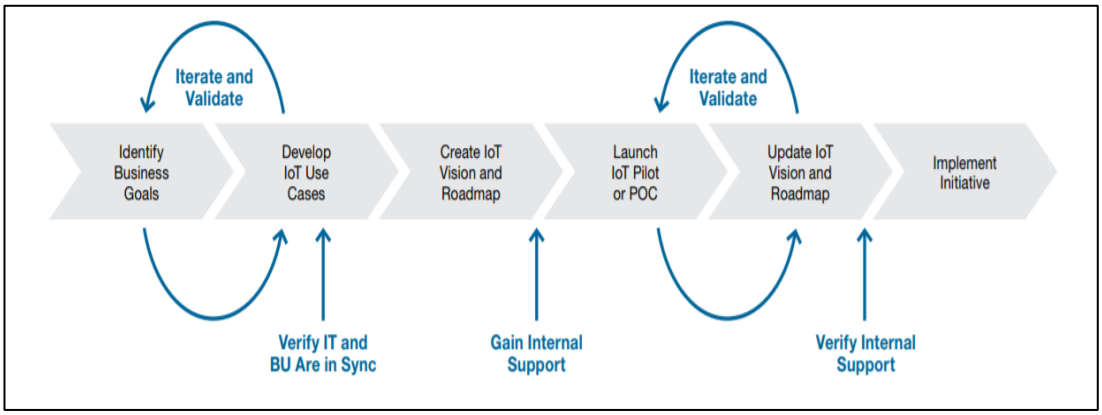
However independent of the entrepreneurial ecosystem, each business first needs to focus on the unique value proposition and how to develop it. Afterwards, the limitations of the ecosystem and bypassing the barriers become issues within the entrepreneurial ecosystem (Hudson, 2017).

The implementation of Industry 4.0 is related with the idea of bringing back the competitiveness in the manufacturing and high technology sectors to developed countries. However, it requires Research and Development (R&D) activities and achievement in eight areas for successful implementation. These are; standardization and open standards for a reference architecture, the management of complex systems, the delivering of a comprehensive broadband infrastructure for industry, safety and security issues, work organization and work design in digital industrial age, specific training and continuing professional development, an appropriate regularity framework as well as resource efficiency (Kagermann et al 2013)

IoT technology and ecosystem contexts are important as in the case with possibilities that accumulated data may bring. IoT is known as an example that changed dynamics of businesses and communities. Besides, in industries, there has been a deficiency for promoting entrepreneurial initiatives (Zarei, Jamalian and Ghasemi, 2017).

The preliminary agreement and mapping of IoT's business objectives, including the development of use cases and the creation of a vision and roadmap, can help move forward in meeting the stated business objectives (Figure 2.20) by Gartner “Leading the IoT”.

Figure 2.20: Business process map for IoT project initiation



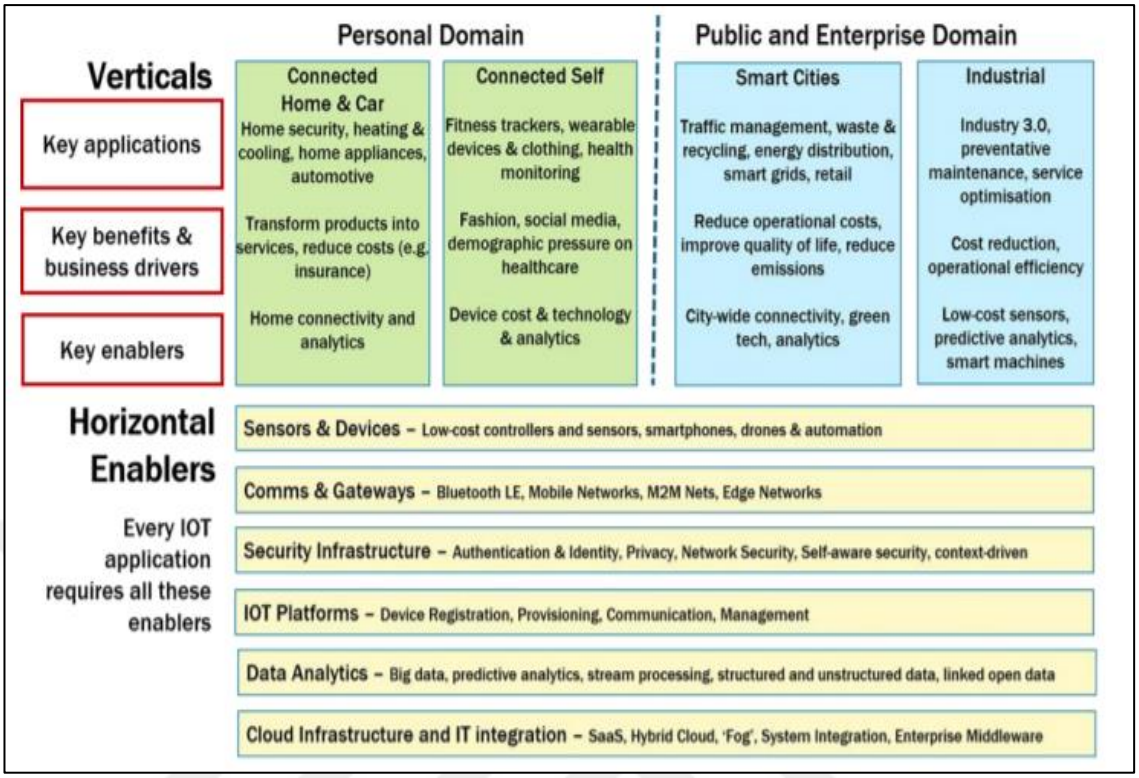
Source: Gartner (2017)

2.3.2 Role of Entrepreneurs in the Transformation Process

Technological developments are supporting IoT for improvements. Changing communications and network technologies such as new sensors of various kinds which makes the process cheaper, more intense and trustworthy and powerful, storage options in cloud or local servers are merges new types of products which were not possible a few years ago (Jekov, et al., 2017)

The conceptual model of Simon Fabri proposed in January, 2015 (Figure 2.21) divides the connected Ecosystem of things into industrial verticals and horizontal enablers. This emerges two types of essential groups in the game: the first one includes the companies which are found for providing solutions of technology, services, infrastructure and other solutions for any company for creating a ‘smart’ experience. The second ones are new or established companies which are using those kinds of vendors for new product developments or improving their existing products or operations.

Figure 2.21: Internet of things industry model



Source: Fabri (2015)

Nagji and Tuff (2012) explain core, adjacent and transformational offers as products and services (Table 2.3). Core offers focus on improving existing capabilities of products or services and expansion of existing markets; adjacent offers aim to expansion of current business into "new to the company" business; and transformational offers are suggesting innovation for markets which are not used in business yet. The author suggests how IoT offer may be classified into three categories by combining the typography of core, adjacent, and transformational offers, market possibilities and academic researches which are describing ranges of IoT offers:

Table 2.3: IoT offer types

IoT Offer Types		
Core IoT	**Adjacent IoT**	**Transformational IoT**
- Business performance improvement - Cost reduction - Performance improvement	- New offers - Recognized by market	- New offers - New market

Source*: Nagji and Tuff (2012)*

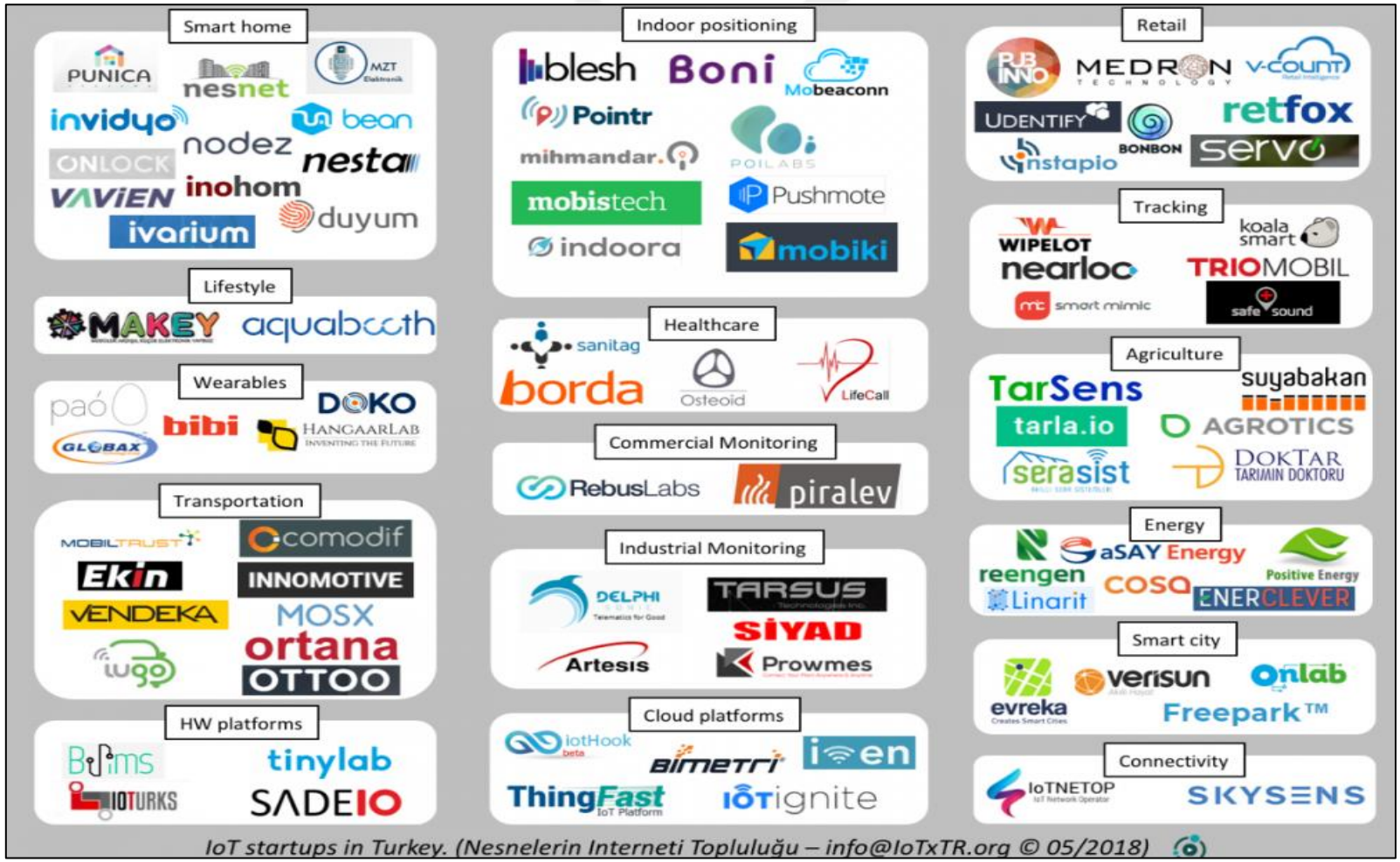
Any given IoT offer could remark core, adjacent, and transformational opportunities and thus appeal to operational, marketing, executive, or other buyers. The broadness and focus of IoT in can encourage taking widened and visionary approaches. An IoT entrepreneur must definitely be able to talk about short and the long term focus, to the immediate and adjacent opportunities, to the operational pragmatics and the transformational vision. The IoT entrepreneur must also have a systematically developed understanding of what makes their offering better than the competition's, and they must be able to communicate that compelling value proposition.

2.3.3 Turkish IoT Eco-System in Turkey

As discussed in the model by Simon Fabri (2015), there are numerous entrepreneurs working on IoT related products and services in many dimensions. Two groups, namely IoTxTR and Internet of Things Türkiye systematically searches the Turkish market and publishes the list of companies in IoT Business (Table 2.4 and 2.5). It is estimated that there are over 100 companies working directly in IoT domain as of May 2019.

The companies are the main engine to create awareness within the country, to internalize the know-how and to accumulate the experience. Their success of failure will probably high ly impact Turkey's performance in the near future. Therefore; the research objective is to highlight the current situation. As will be discussed in the coming pages, the study focuses on this eco-system by using Business Model Canvas Framework in order to reach its research objective.

Table 2.4: IoT Startups in Turkey



Source: IoTxTR (2018)

Table 2.5: IoT Startups in Turkey

Source: Internet of Things Tükiye (2018)

2.3.4 Engagement with Turkish IoT Eco-System in Turkey

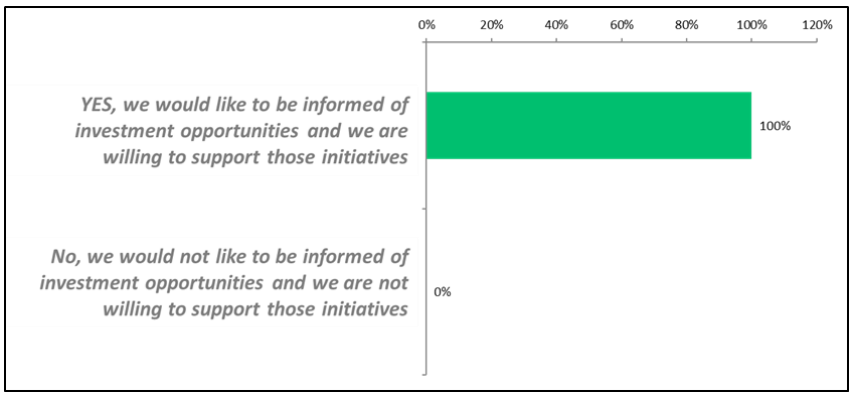
As mentioned earlier, expectations for support from the public sector is high. In addition, the public sector is also a big market with various implementations. Therefore, it is worth noting another research that is carried out by the author in 2019.
Marmara Municipalities Union (MMU) is the oldest and the largest regional Local Government Association in Turkey with 195 municipalities from the Marmara Region. The Union members are from different 13 cities in the Marmara Region.

Smart Cities Research was conducted in order to assess the effectiveness of implemented Smart City projects, to define challenges and to explore area to create further synergies.

Technology initiatives play an important role in the development and implementation of Smart City technologies. For this reason, the establishment of an entrepreneurial ecosystem that will support the studies and these supports to investments are important for the sustainability of the works. Therefore, participants of the research also asked for their interest in investing on entrepreneurial activities and in providing support for research and development processes.

When asked, if they would like to be informed of investment opportunities and willing to support those initiatives; 100% of them indicated that would be definitely interested (Figure 2.24).

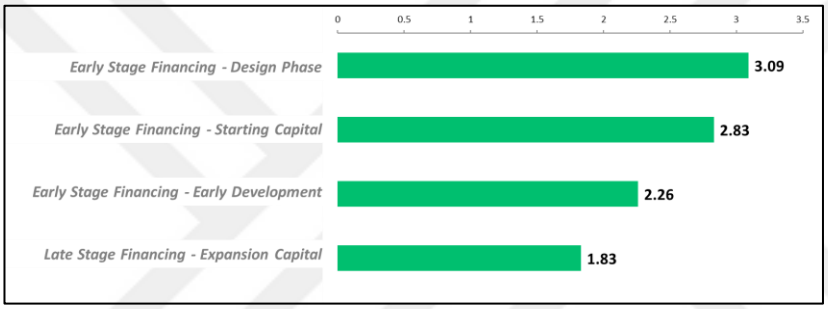
Figure 2.22: Interest of investment opportunities



Source: Letven (2018)

The same question from Turkey Entrepreneurship Landscape Research (2018) were also asked for the investment stage they prefer and their priorities. Results are similar but the difference is hidden is in their motivation to invest. They are supporting entrepreneurs to develop new products and services to improve their public service; not to look for a profitable investment or capital gain. So the main focus is early stage financing for co-development opportunities. The following Figure 2.25 shows the priorities of the institutions in terms of financing stages:

Figure 2.23: Interest of investment stages



Source: Letven (2018)

2.4 THE BUSINESS MODEL

Industry 4.0 is a technological concept that related with different topics such as economy, health, education etc. This concept changes each steps of product life cycle flow from design to services. Absolutely, the implementation of this concept has results for future jobs because of new business models (Ślusarczyk, 2018).

In term of business model was generated by financial journalist Micheal Lewis. He mentioned business model in a future prediction that connecting company with internet (Magretta, 2002). David T.Teece (2010) considers that business model still does not have a stable structure in economics. Digitalization has helped to bring about the change of founding business models (Roblek et al., 2013).

According to several authors, business model is a system that make money. In their thought, business model is an income and expenses generator. It is a set of activities that

create profit due to the collaboration of technologies and processes (Slavik and Bednár 2014).

Watsons (2005) describes it as companies' operations that including functions processes and components which is occurred cost for company and value for customer. Teece (2010) says that business model describes how company provides value to the customer and how it makes profit from it. According to Rappa (2010) business models is the method of how they retention itself which is also make revenue. Business model is a value chain that company creates for itself and how it can earn Money from them.

According to Slaviks (2011) opinion, business model generates Money. Marely Money is important but also suitable. Business model is a set of processes that visualizes company as a place decision and consequences in an operational view.

According to Magretta (2010) business models is manual guide which is explain how company works. Like a good map, a robust business model contains precisely delineated points, plausible pattern and a plot that turns on an insight about value. It answers determined questions; How do we make money? Who is customer? How we can deliver value to the customer?

Hummel (2010) business model describe that how companies create, deliver the value and process of generating a business model consider as a part of business strategy. In a scientific publications and research papers, several topics are mentioned. These are macroeconomic environment, the level of innovation, megatrends, labor market efficiency, hard/soft infrastructure and strategic supply and demand drivers (Eckert 2014).

Industry 4.0 target is creating horizontal integration through value networks with digitalization and vertical integration. This integration makes the systems more complex and changed the role of participants who is already a part of business model. As a result of this, approach will be disjunction, new structure, new pattern and new business models (Prause and Atari, 2017).

Considerable market analysis that included size and type of opportunities, was conducted for IoT vendors. This analysis supports the potential breadth of IoT applications and the magnitude of customer spending. Also, these analyses shed light on the subject of segmentation.

Columbus (2016) underline that, even though IoT include the breakthrough approaches to healthcare, tourism, education and so on, also areas that commercial activities such as inventory and stock management, industrial equipment has been peaked. This study shows that the extent to which the IoT supports markets need. There are some IoT technologies used across verticals as common. On the other hand, purchasing operation is a horizontal. Market analysis is a quite significant, but IoT entrepreneur will directly link to the customer, not with an entire market. According to the market analysis, some customers will be focused in their use of IoT operationally.

As a result, Dujin et al (2014) refer that Industry 4.0 value chain will go through the same disintegration, which have shown up in other monolithic industries like music and media. This disintegration comes along with low entry barriers for SMEs, such as entry of new countries bearing low labor costs (Belussi and Sedita 2010). Therefore, Industry 4.0 will present flexibility and hardiness. Also, Industry 4.0s' value chain will be construct business structure with flexibility and applicable (Koether 2006).

According to Ibarra, Ganzarain and Igartua (2018), Industry 4.0 will be the strongest driver of innovation over the next few years stimulating the next innovation wave. Hence, the main topics that Industry 4.0 has included such as collaboration, horizontal-vertical interrogation and real-time capability through information and communication technology systems, are considered as solutions to many problems faced by companies (Arnold, Kiel and Voigt, 2017; Bauer, et al., 2015).

This digitalization is crushing the accustomed barriers of the industry. Many practitioners and academics are clarifying the reconsideration of current business models (Gerlitz, 2016). Besides, those researchers are focused on the technological part of Industry 4.0

rather than business part which is emerging through the integration of technological innovations.

The study focuses on how the value is created. Bughin states IoT technologies are interchanging companies from bottom to the top (2010). Moreover, it is clear that business framework on the strength of today's immobile data structure offers new methods of value creation. Companies, those implemented the features of IoT technology, have an advantage over companies those have not implemented yet; since the real-time interpretation of data lead to creating new businesses and services (Mattern and Floerkemeier, 2010). This is all to say, IoT technology application requests new business models and new value offerings.

The root of the business models come from business strategy. In 1962, Alfred Chandler showed that the first well-organized and relative account of growth and switch in the modern industrial corporation (Chesbrough and Rosenbloom, 2002). After this study, few researcher rests against to this study. Soever the root of the business models come from business strategy; the two concepts are not same. Zott, Amit and Massa (2010) defined two essential difference between business model and business strategy. First of all, business models aim is creating value, however business strategy aim is capturing value. Secondly, business models concentrate to value proposition and generalized emphasizing on the role of customers, however business strategy does not (Zott, 2010).

The business models became widespread because of internet in the mid-90s and since then the acceleration continues to increase (Zott et al, 2010). Furthermore, a lot of research and work was done about business models any many description has been made for this concept. The very best one presented by Teece (2010) expressed that "a business models explains the rationale, the information and other proof that supports an offer for the client, and a feasible structure of incomes and expenses for the enterprise delivering that value ". Moreover, Osterwalder et al (2005) explained a business model as follows;

"A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description

of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams" (Osterwalder et al., 2005)

Only a few papers were discovered describing IoT business model research:

Liu and Jia (2010) described the flow of the value among firm who is in to the industry chain of IoT. Besides they offered a draft of the stakeholders and their relationships. Buchere and Uckelmann (2011) designed four different IoT business models script such as Product as a Service, End-user involvement ,information service providers and right-time business analysis and decision making.
Fun and Zhou (2011) put a spotlight on partners of IoT business models in logistics. It presented an outline of the IoT technology companies who works together, and relationships with regard to flow of services and payment in the postal logistics.

Sun, Yan, Lu, Bie and Thomas (2012) clarified the business DNA model, that is partialy based upon on the Canvas Business Model (Osterwalder and Pigneur, 2010) and presented of a business model with regards of design, aspirations and needs, which simplified analysis, design and presentation of business models. Moreover, a sample IoT business model flow of an application for smart logistics is explained.

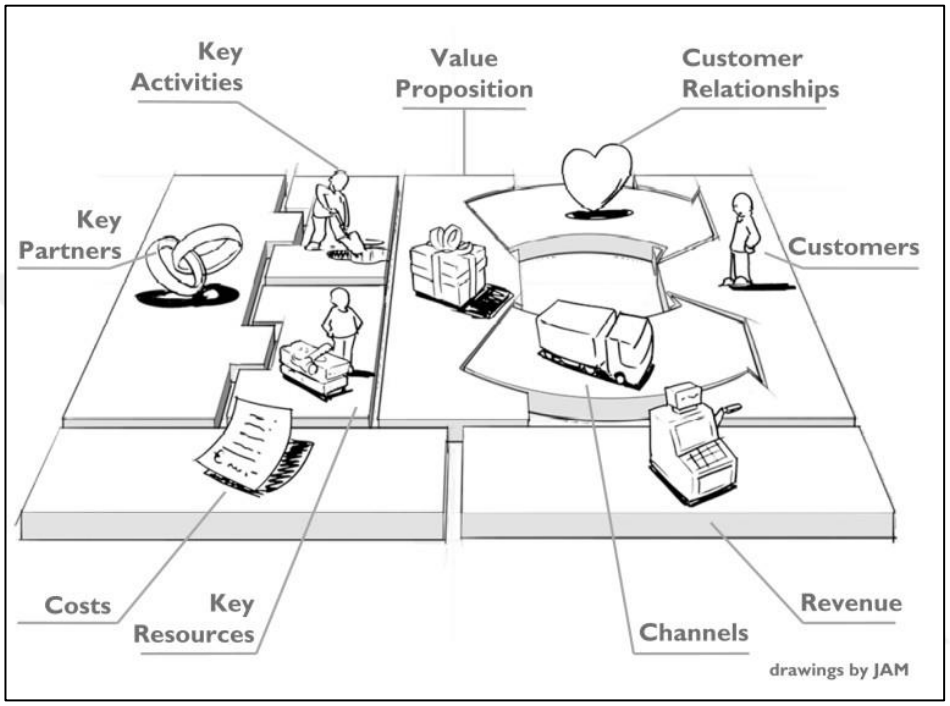
Li and Xu (2018) shown that a relative business model for IoT with regard to multiple open platform model, which differences between parties that must be concerned in the facilitation of the transformation and application of the IoT.

2.4.1 Business Model Canvas

This section explains the Osterwalder and Pigneur (2010) s Business Model Canvas profoundly. Business Model Canvas is an instrument for explaining, analyzing and planning business models. Nine building blocks are included in this model. These blocks show how a company generates revenue. There are nine blocks namely; customer

segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure. Below is the short description of these nine blocks. (Figure 2.26)

Figure 2.24: Business Model Canvas



Source: Osterwalder and Pigneur (2010)

Value Proposition: this block explains the product and service pack that creates value for a particular Customer Segment. Value proposition is aiming to make company or product more preferable from customer sides. This is the reason why customers change their decisions.

Customer Segments: clarified the group of people that you will try to reach. Every company requires well-paid customers for continues their works. Using the business model canvas, you will detect what your segment of customer will be. This block shows our customers segmentation to us.

Channels: Channels explain the way of communication to customer segment and deliver the value proposition. the best way to reach customers is to be well understood. Brief description of reaching the customers want is in below.

Customer relationships: Customer relationships explains the kind of relationship a company makes with customer segments.

Resources: Resources explained the significant entity required to constitute a business model work. These are the entities that let the enterprise to create and propose a value proposition, reach out markets, hold the relationships with customer segments and gain money.

Key activities: key activity is the most significant activity in completing a company's value proposition.

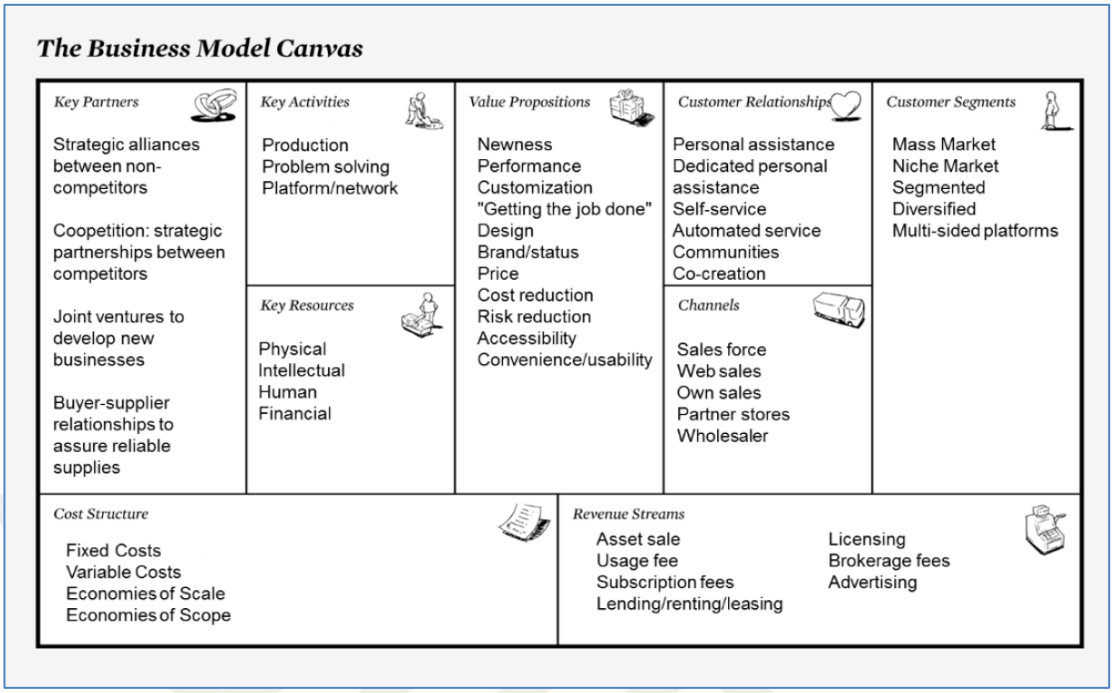
Key partners: Key partners are the entities that help your business model work such as government, non-consumers, and other business companies. They are organizations that help you do business with your contributions. Without them, jobs could not be done effectively.

Revenue Streams: The block explains the way to generate the revenue. Any suggestions that might answer this question can help to make money.

Cost structure: when operating your business model, Cost Structure explain all the expenses that your company face off. This is the final point of the decision that you will help your team decide whether continue or stop.

IoT concept is wholly changing the value chain. Hence, players should to review their strategies and change their business models consequently. In a research by Dijkman et al. (2015), only five papers using an actual business model on IoT were found, which shows the need for further research under this topic. Two of these papers were based on the framework "The Business Model Canvas" by Osterwalder and Pigneur (2010)

Figure 2.25: The factors of the business model canvas



Source: Osterwalder and Pigneur (2010)

2.4.2 Assessment of Business Model Canvas

Coes (2014) mentioned good sides of the framework by highlighting the visual representation power as its usefulness, strength and simplicity in communicating and designing business models.

Coffey and Canas (2003) explained business model canvas is a quite well tool for organizing and presenting evidence, establishing conceptual relationships, collecting, testing and refining hypotheses, anchoring participants in a common language and supporting social interactions and meaning making.

Spanz (2012) deals Business Model Canvas as a way of developing, questioning and visualizing business models in the brainstorming of young entrepreneurs around the world. These are; Simplicity, Practice-orientation instead of academic flannel and Plug-and-play principle.

The improvement of the canvases contributes two output: First, it guaranteed that core tacit knowledge from varied leadership members is jointed, thus continues to create on the joint knowledge foundation. Second, it guaranteed the raw data input about the current business models that is needed to able to improve with work (Kalen, 2015).

Business Model Canvas is quite simple and visually seductive. For that reason, companies believe Business Model Canvas let them to update the business models continuously. Though, previously studies showed that those updates happen when the companies are trying to scheduling improvements in their firms. That which is intended they do not consider the Business Model Canvas as something that pioneers them to rediscover their business models in rainy day. Also, Business Model Canvas is a tool that enable to make strategic, tactical and operational planning (Lopes J, et al., 2019).

According to Widner (2016) The financial viewpoints of the BM could be quite described here from revenue flow; cost and the critical partners are part of the BMF.

There are several fine criticisms for the Business Model Canvas done by people who worked on this previously. It is concluded that part of the growth strategy, in the manner the sustainability strategy, can barely be imaged and the Business Model Canvas just focus on the company and their customers, not focused on a big scale.

There is no consistency and power because of several intersect that in order caused by stable structure, can easily fill. First of all, company should understand business models very well. Then they may evaluate the model critically and also, they should consider some modifying (Verrue, J.2014)

The Canvas in some way recommend that only financial achievement can drive companies. This perspective could not be correct for social businesses such as NGOs. But it is assumed that there should be further motivations for companies (Komisar and Lineback, 2001).

Naturally, every decision should also consider the competition in the market but this aspect is not included within the model.

Many companies believe that the Business Model Canvas express the connection between nine elements. Besides, they could not clarify that connections. This happens the result of many potential combination of connections between elements. Under the circumstances, each one of all can be beginning for interchanging business models. Also, they made public that they have insufficient knowledge about how interchanging an element may affect another element. It shows that there is no tool in the Business Model Canvas to lead managers to clarify how it works (Lopes J, et al., 2019).

As a result of that, Business Model Canvas could be considered preliminarily by the companies and by the time of progress, they could apply unique variations that adapt to their businesses. Companies could use Business Model Canvas to understand their businesses clearly and they can illuminate the points with operating blindness (Hong and Fauvel, 2013).

There are three points for using and thinking the Business Model Canvas are emphasized by Osterwalder and Pigneur (2010):

i. Can be changed to fit the feasibility
ii. It is well expounded
iii. Could be used by any businesses.

3. METHODOLOGY

This chapter explains the motivation of the study, research perspective, framework, study design, data collection and descriptive statistics of the sample as an introduction to the analysis part.

3.1 PURPOSE OF THE STUDY

Rapid changes in technology have a deep impact on business world today. However, the new context requires companies to examine the IoT concept more closely and to respond to changed dynamics. It is a pre-requisite to acquire these new technologies and implement them to the business processes in order to be competitive and to be able to continue operations. Nevertheless, current business practices are limited, strategies are not clear, and literature has not yet provided usable approaches for businesses. The buzz is loud in the business world, academicians are curious but there are many questions to be answered in the coming days.

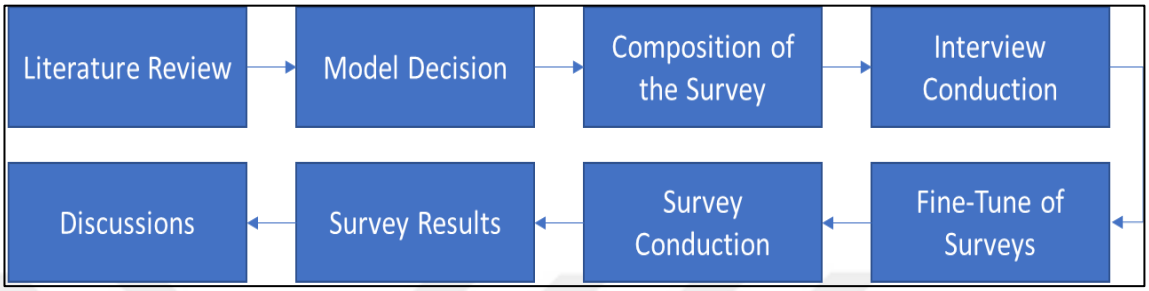
The study aims to explore the new phenomena under four dimensions: understanding the maturity level of the market, understanding the approach of suppliers, understanding the readiness of the eco-system in the process of supplying IoT related products/services, and available business models.

3.2 RESEARCH PERSPECTIVE

The research on IoT is still very limited and related business models are untouched. As a result, hypothesis have not been formulated; therefore, the study focuses on discovering the fundamentals by using an exploratory quantitative study approach. The exploratory approach is very practical for exploring the nature of the topic when variables of the topic are unknown (Hanson et al., 2005), which is the case in this study.

In similar cases, researchers first focus on collecting and understanding qualitative data and proceeds with quantitative data. Afterwards, results of these two streams are consolidated for further discussions to develop a methodology (Greene, Caracelli and Graham, 1989), which leads stronger conclusions.

Figure 3.1: Research perspective



3.3 FRAMEWORK

According to Liehr and Smith (1999); Conceptual and theoretical frameworks are the basis of academic studies with models to support the design. The theory identifies the background of the events the researches focuses on and provides a link for the outcome. The collection and analysis of data are managed in line with these frameworks. They also ensure that academic policies and standards are followed by formally explaining how the study is relevant and what is contributed to the academic literature. A framework is a map for the study which should be followed closely. It clearly guides when the survey is constructed, elements are defined, and steps are determined. Once the research is finalized, the framework helps the researcher to find out if the results are in line with the framework and if discrepancies exist.

Imenda (2014) provides a comparison of conceptual and theoretical frameworks in terms of genesis, purpose, conceptual meaning, how the literature is reviewed, methodological approach and scope of the application (Table 3.1). Although the aim of both conceptual and theoretical frameworks shares the similar purpose, the conceptual framework takes precedence over the theoretical framework by synthesizing the newly accumulated literature, providing fresh data to be discovered, and listing possible areas for further research. It is expected that a theory will be formalized as a result over time.

Table 3.1: A Summary of the differences between conceptual and theoretical frameworks

Variable	*Conceptual framework*	*Theoretical framework*
Genesis	(a) Created by the researcher from a variety of conceptual or theoretical perspectives;(b)	Evolves, or 'takes shape', from reviewed literature and/or the data collected. Adopted / adapted from a pre-existing theory or theoretical perspective.
Purpose	(a) Helps the researcher see clearly the main variables and concepts in a given study; (b) Provides the researcher with a general approach (methodology – research design, target population and research sample, data collection & analysis); (c) Guides the researcher in the collection, interpretation and explanation of the data, where no dominant theoretical perspective exists (d) Guides future research – specifically where the conceptual framework integrates literature review and field data.	(a) Helps the researcher see clearly the main variables and concepts in a given study; (b) Provides the researcher with a general pproach (methodology – research design, a target population and research sample, data collection & analysis); and (c) Guides the researcher in the collection, interpretation and explanation of the data.
Conceptual Meaning	Synthesis of relevant concepts.	Application of a theory as a whole or in part.
Process Underlying Review of Literature	(a) Mainly inductive, as in social sciences where research problems cannot ordinarily be explained by one theoretical perspective; (b) Some social science research also gets driven by theories, but theories in the social sciences tend not to have the same 'power' as those in the natural sciences.	Mainly deductive, as in the natural sciences where hypothesis testing takes place to verify the 'power' of a theory.
Methodological Approach	(a)May be located in both quantitative and qualitative research paradigms; increasingly, mixed-methods approaches are recommended; (b) Data mostly collected through both empirical and descriptive survey instruments, interviews and direct observations – hence, a preponderance of qualitative data; (c) Strong on consideration of context.	(a) Located mainly in the quantitative research paradigm; (b) Data collected mainly through experimental designs, empirical surveys and tests; (c) Efforts made to standardize context, or else ignore it.
Scope of Application	Limited to specific research problem and or context.	Wider application beyond the current research problem and context.

Source: Imenda (2014)

3.4 PRELIMINARY STUDIES

As mentioned earlier, studies on the business models of IoT are quite limited and the information has not accumulated yet. In order to set the basis; the study is built on two preliminary studies, namely "Turkey Entrepreneurship Landscape" and "Textile Sector Industry 4.0", which are described in the following section below.

Under “Findings and Discussions” session, the preliminary studies introduce the key findings on the entrepreneur landscape in Turkey and an example on Industry 4.0 from the real field experience and the main research takes off from that point.

3.4.1 Turkey Entrepreneurship Landscape

The author, E. Emre Kanaat, conducted a field study with Turkey’s leading private and public institutions for Letven Ventures, and the results of this study are used as the input for the present study. The aim of the field study was to identify areas for development in Turkey’s venture capital (VC) sector, to assess the sector’s performance, and to define the prerequisites for cooperation between local and global funds in such a way as to establish sustainable business models.

Recommendations to improve the sector were collected during the meetings, and the participants brought to the agenda the need for public support as a way to carry out work effectively in the identified areas for development. The institutions clearly stated their expectations regarding the motivational and financial dimensions, and they presented concrete proposals for the contributions they are currently positioned to make.

3.4.2 Textile Sector Industry 4.0

Textile sector is one of the leading implementation areas of Industry 4.0 and some investment initiatives have been taken in Turkey as well. Although the companies are eager for digital transformation, the path is not clear and the performance evaluation of the current investments has not been completed yet.

The study focuses on the maturity level of Industry 4.0 investments in Turkey by in-depth interviews from the field and brings forward ideas and suggestions for more effective implementations.

3.5 MAIN RESEARCH

The main research consists of two models, namely “The Market Maturity” and “Business Model Canvas”, which are described in the following section below.

3.5.1 The Market Maturity

The first research model “The Market Maturity” is shown in Figure 3.2. The Market Maturity Model, which is a measurement instrument developed by the Author previously, successfully helps to understand the demand side and maturity of the market players. Although the assessment of the market maturity measurement instrument is beyond the scope of this study, the validity and reliability of the results proves that it can be used in other researches as well. The model focuses on the following factors: competitive environment, perceived value, organisational readiness, perceived market maturity, and eco-system readiness. These factors have been selected in order to gain insight into companies’ intentions to adopt new IoT technology.

The model is constructed on 3 dimensions with 23 questions. Organizational Readiness on Supply Side dimension assesses the capabilities and the managerial motivation of the company. Perceived Market Maturity dimension focuses on the demand side of the market and Eco-system Readiness dimension the partnerships established to produce the products and services.

Figure 3.2: The market maturity model

3.5.2 The Business Model Canvas

The second research model "The Business Model Canvas" is shown. As explained in section 5, Business Model Canvas, developed by Osterwalder and Pigneur (2010), is an instrument for explaining, analysing, and planning business models. Nine building blocks are included in this model. These blocks show the logic of how a company aims to make money. These blocks are; customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure. The model is constructed on 9 dimensions with 52 questions.

3.6 SAMPLING PLAN AND EXECUTION

Sekaran and Bougie (2013) states that sampling starts with defining the target population. As mention in Section 4.1; two groups, namely IoTxTR and Internet of Things Türkiye systematically searches the market and publishes the list of companies in IoT Business (Table 2.5 and 2.6). It is estimated that there are over 100 companies working directly in IoT domain as of May 2019.

In order to cover the whole population, lists published by those groups are consolidated and a search was conducted over the Internet and LinkedIn. Total of 90 companies working in the domain is identified. C-Levels and Founders of the listed companies were reached directly via LinkedIn and invited to the research in interview, pilot and final stages.

Interviews were held with 4 companies. The questionnaire was tested with 17 companies and the final survey was conducted with 56 companies. Blank and duplicate responses were eliminated and companies with 250+ employees were put out of scope.

The sample consists of 43 small and medium-sized enterprises (SMEs) with less than 250 employees or less than 250 million TL revenue. The thresholds are in line with commercial classifications in Turkey.

The sample is considered statistically significant since the sample size is above 30 and around 40% of the universe is covered.

3.7 COMPOSITION OF THE SURVEY

The questionnaire is constructed by consolidating to question sets those belongs to "The Market Maturity" and "Business Model Canvas" respectively. Turkish and English copies of the survey is provided in Appendix 1 and 2.

The survey starts with a brief introduction to the participant and questions from the nine blocks of Business Model Canvas follow. As discussed, it is noted in a research by Dijkman et al. (2015) that only five papers using an actual business model on IoT were found and two of these papers were based on the framework "The Business Model Canvas" by Osterwalder and Pigneur (2010). Part of their research was focused on developing a measurement instrument built on Business Model Canvas by revising the shortcomings of the framework. Although the outcome is partially successful, the questions and details within the survey deviates from the original work by Osterwalder and Pigneur (2010).

The critical decision point was either building on the work by Dijkman et al. (2015) or strictly being committed to the work by Osterwalder and Pigneur (2010). The second option was preferred because of the reasons below:

i. The explorative approach aims to produce comparable data to academic and business world for further researches and business decision formulations. Despite the fact that academic literature is limited, there are plenty of business literature, consultancy support and field observations in other sectors based on the original Business Model Canvas. Even unexperienced professionals or academicians from other fields can easily benefit from the output of the study and make apple-to-apple comparisons.
ii. The priority of the study is to crack the window of IoT market realities rather than developing an instrument. The study serves as a starting point for further research.

It is expected that findings from different researches will accumulate over time and lead to formulation of different theories.

The results of the research show that the right decision was taken since strong conclusions have been reached although there are some reliability issues which can be ignored as explained in related sections.

In the second part; the Market Maturity Model questions, which is a measurement instrument developed by the Author previously, is embedded to the questionnaire without any revision.

The third sections collect the following basic information to define characteristics of the IoT venture:

i. Business model (B2C, B2B or both)
ii. Sector
iii. Size
iv. Communication details of the participant.

Likert scales were preferred in order to grasp the degree of agreement. Dawes (2008) states that the difference among 5, 7 and 10 scale is ignorable in terms of the results. Likert of 5-point scale with from “strongly disagree” to “strongly agree” terminology is implemented as suggested by Dillman (2000). Respondents were allowed to skip questions in order to collect accurate data.

Measures for the market maturity model, which have previously been used, were in Turkish; so, translation was not required. However, all measures for the business model canvas are translated from their original version in the literature and some minor corrections are made after pilot study according to the feedbacks of participants.

Turkish translations of measures are used for Turkish respondents. Among all the scales, only the Cultural Intelligence scale has a Turkish translation which was used in previous studies.

3.8 CONDUCTING INTERVIEWS

Interviews are conducted in a structured way in order to understand how to implement The Business Model framework accurately and to define where adjustments are required. A careful process with experienced professionals on IoT is conducted since there has not been an measurement instrument using The Business Model Canvas developed yet. The use of the Market Maturity part was quite straight forward since the instrument was tested and used in various researches previously. The flow of interviews was listed below:

i. Introduction
ii. Explanation of the aim of the study
iii. Explanation of the interview flow
iv. Questions on The Business Model Canvas
v. Questions on the market maturity level
vi. General questions about the company

3.9 SURVEY

The survey was conducted via SurveyMonkey online tool between the dates June 2018 and April 2019 in two pilot and final stages. C-Levels and Founders of the all identified companies were reached directly via LinkedIn and invited to the research. Invitations are made only once in order to prevent any bias and not to create any kind of pressure on the participant.

3.10 SURVEY STATISTICS

This section summarizes the base information on the survey and the characteristics of the companies surveyed. The survey was conducted in Turkish Language with 85 questions under 18 question blocks and on 8 pages. 18 minutes were spent to complete the survey on average and 85% of survey completion rate reached.

39 out of 43 participants shared the sector information. The results indicate the dominance of technology companies working in IoT domain and offering products and services. It

should not be a surprising point since technology firms are able to notice the technological trends relatively earlier and they already started their initiatives to fully benefit from early mover advantage (Table 3.2).

Table 3.2: Survey statistics breakdown by sectors

Sector	#	%
Technology	25	64%
Energy	4	10%
Retail	2	5%
Consultancy	1	3%
FMCG	1	3%
Medical	1	3%
Telecom	1	3%
Other	4	10%
Total	**39**	**100%**

40 out of 43 participants shared the company size information. The results indicate that pioneers that have entered to the market until now are small-sized entrepreneurs which is in line with the notion that entrepreneurs are the driving force of the digital transformation (Table 3.3).

Table 3.3: Survey statistics breakdown by company size

Company Size	#	%
0-10	21	53%
11-50	16	40%
51-250	3	8%
Total	**40**	**100%**

40 out of 43 participants shared the business focus information. Although the academic and business world focuses on the acceptance and implementation at the consumer side, the actual market players are focused mainly on the B2B side (Table 3.4).

Table 3.4: Survey statistics breakdown by business focus

Business Focus	#	%
B2C	2	5%
B2B	22	55%
Both	16	40%
Total	**40**	**100%**

4. FINDINGS AND DISCUSSIONS

This chapter displays how data are analysed and related explanations are provided in detail. Analysis was made with the Statistical Package for Social Science (SPSS) for descriptive statistics, validity, reliability, correlations, normality and one-sample tests. Results of the tests are provided in Appendix 3.

4.1 PRELIMINARY STUDIES

The proceedings of the preliminary studies, Turkey Entrepreneurship Landscape Research (2018) and Textile Sector Industry 4.0 Research (2018) put forward some clues on what may be the study results, which discussed in detail on the following pages.

4.1.1 Turkey Entrepreneurship Landscape

The overall assessment revealed that prior to 2018, Turkey's recent performance in the Venture Capital (VC) sector has been brilliant. The principal reason for this success relates to the transfer of resources that accumulated in funds during previous years. Due to the economic and political conjuncture, the problems in generating new funds have been voiced, and these, in turn, have drawn attention to issues that may occur in this area in the coming period, as of 2018.

In addition to the risks associated with fund flow, the evaluation of the factors affecting the development of the entrepreneurship sector revealed areas in which Turkey's performance must be improved. In terms of public and private sector activities, it was emphasized that the studies conducted in this field have not been sufficient. Moreover, it was recognized that coordinated, less superficial, and more focused studies are needed.

In all developed countries, a long-term and successful VC sector is dynamic, creative, and innovative. Furthermore, it enables entrepreneurs at every stage of a project to realize their investment ideas, providing business and management support when necessary and

sharing capital methods in a manner consistent with modern financial theory (Kuğu, 2004).

Through an examination of the leading players of economic development in today's globalized world, it becomes clear that the figures responsible for success are the entrepreneurs who closely follow technological developments, and who know how to take risks when necessary. The weight of any country in a globalized world is directly proportional to its productive forces. For this reason, new value creation initiatives should be undertaken by producing products and services rather than earning money from money (İştar, 2013).

It is known that the success of entrepreneurship activities is critical in bringing efficiency to the development of the world's developing countries. When considering the issue from the perspective of Turkey, it becomes clear that many initiatives have failed at the idea stage due to a lack of experience in the field of entrepreneurship, paired with financing problems. In order to avoid this situation, efforts in terms of entrepreneurship financing should be intensified and supported (Bingöl and Yılmaz, 2016).

4.1.1.1 Factors affecting venture capital sector in Turkey

Various studies have been conducted to explore the factors affecting the efficiency of the venture capital (VC) sector. According to the literature search on this subject, six key variables stand out in the development of a country's VC sector (Groh, Liechtenstein, and Lieser, 2010).

Ertürk and Sayılgan (2014) summarized these factors, each of which is discussed in the following subsections. It should also be noted that this study's field study was informed by these factors.

i. Economic Activity

The size and growth rate of an economy directly affects the number of new companies for which a general level of welfare has been established. As the economy grows, new

companies are established and new VC opportunities emerge. In addition, a directly proportional relationship exists between the level of welfare and variables such as savings and the level of funds flowing into the VC sector.

ii. Entrepreneurship Culture and Investment Opportunities

A country's capacity in the areas of R&D and innovation is important in enabling households to adapt rapidly to new technologies. At the same time, the ease of the business environment, which is concerned with issues such as the establishment of a new company, the management of a company, and the ease of liquidation, is a determinant of the VC sector's development.

iii. Depth of Capital Market

The existence of an advanced stock exchange market in which the public offering process is straightforward is beneficial in allowing VC to exit from investments. Various factors affect VC investments, including stock market liquidity, market size, and the number of Initial Public Offerings (IPO).

iv. Taxation

The impact of taxes on the VC sector is a controversial issue. However, the literature indicates that positive factors for VC include a low corporate tax rate, the provision of tax incentives for VC investors, and the reduction of VC administrative obligations. In some countries, income tax rates are higher than corporate tax rates to encourage the establishment of new companies.

v. Investor Protection and Corporate Management Principles

VC funds are built on complex legal contracts. Legal protections for those investing in these funds is essential, and so too is the completion of court procedures at the earliest available opportunity. Within this scope, the establishment of a strong legal infrastructure in which investors and copyrights are protected increases the efficiency of VC. This is

also true for the establishment of solid corporate governance principles, as well as the existence of institutions equipped to help factors.

vi. Human Capital and Cultural Environment

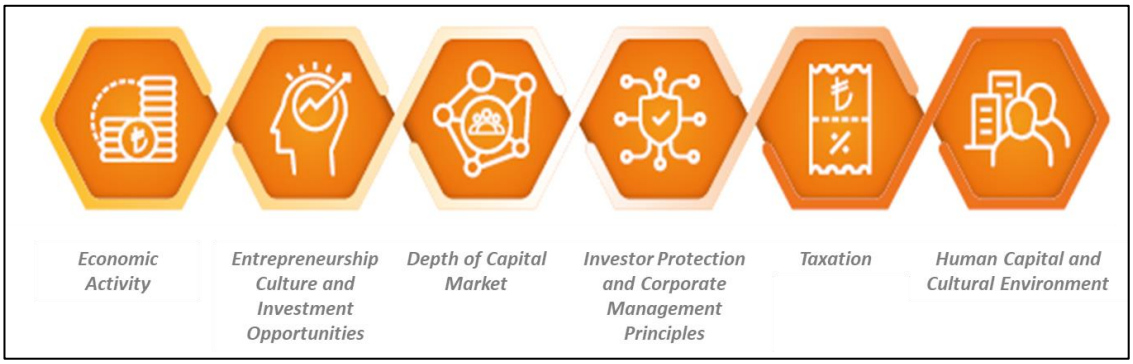
The quality of education directly determines the quality of human capital. The establishment of an education system for entrepreneur training is important for increasing VC activities. Advancing supportive university programs would help to increase entrepreneurial culture and capacity. On the other hand, an inflexible labor market, bribery, corruption, an unregulated economy, and bureaucratic barriers have a negative impact on VC.

In the first part of the field study, the participants were asked about the effectiveness of VC activities. Through open-ended questions, studies and required expectations were clarified.

In all developed countries, a long-term and successful VC sector is dynamic, creative, and innovative. Furthermore, it enables entrepreneurs at every stage of a project to realize their investment ideas, providing business and management support when necessary and sharing capital methods in a manner consistent with modern financial theory. However, this is not yet fully-known in Turkey, and it has had a limited number of applications due to insufficient risk capital incentives (Poyraz and Tepeli, 2016).

During the meetings with the institutions, the author asked relevant personnel to rank the abovementioned six factors according to their importance, from the perspective of their organization. The ranking devised as a result of their evaluation is presented in Figure 4.1.

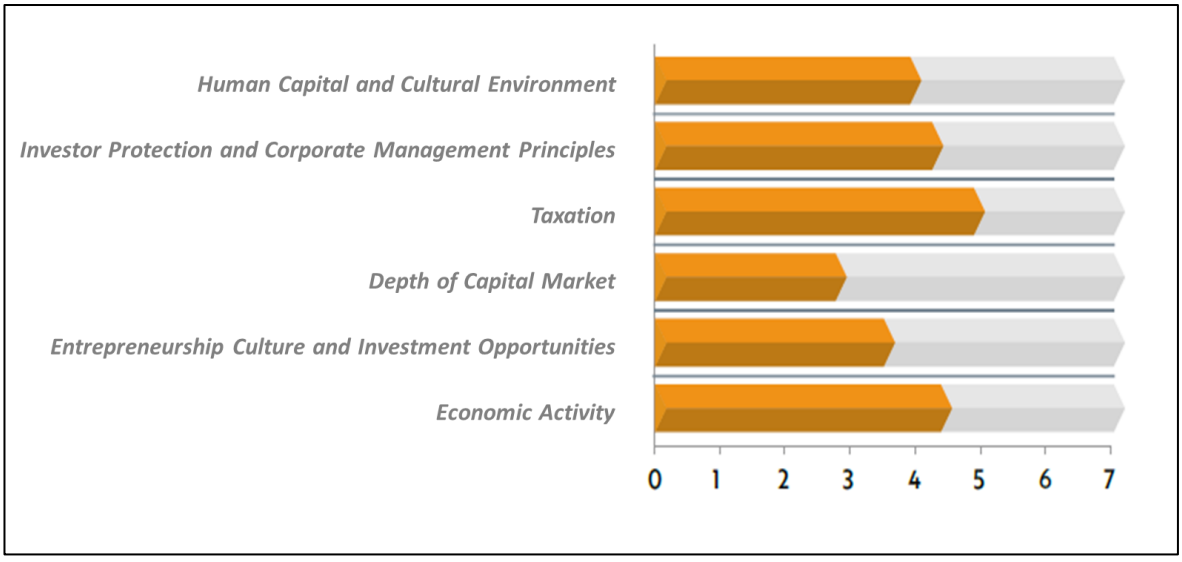
Figure 4.1: Factors affecting investments



Source: Letven (2018)

The weighted average of all factors was calculated as 3.88 (Figure 4.2). This result indicates that in terms of development in the entrepreneurship sector, Turkey is not yet at a sufficient level. Given that the performance was below average, performance improvements are necessary.

Figure 4.2: Investment factor assessment



Source: Letven (2018)

Looking at the details on the basis of substances, economic activity, and taxation issues, which are directly related to activities in the public domain, these are considered to have

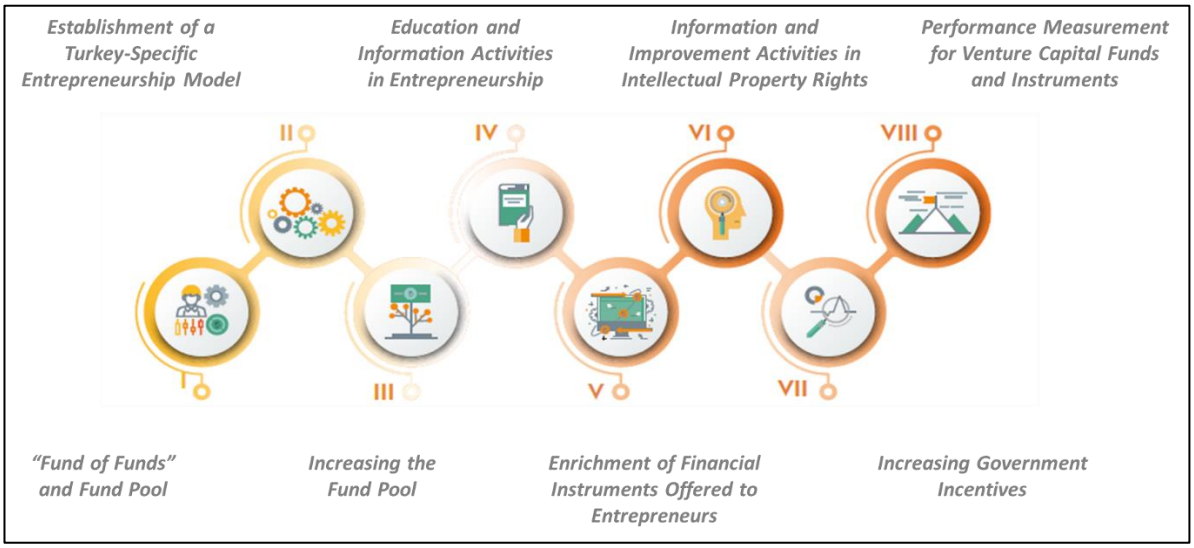
reached sufficiency. The depth of the capital market and the culture of entrepreneurship and investment opportunities emerged as areas that are open to development (Figure 4.2).

4.1.1.2 Improvement areas for entrepreneurship in Turkey

The topics considered should be studied to facilitate the development of the Turkish venture capital (VC) industry. Based on the results of the field study, it was determined that the issues to be studied in the coming period are the following: firstly, increasing the pool of funds; secondly, training and information activities in terms of entrepreneurship; thirdly, information and improvement activities with respect to the issue of intellectual property rights; fourthly, performance measurement for VC funds and instrument; and finally, state aids.

Initiatives thought that the headings should be studied to promote the development of the Turkish capital industry (Figure 4.3).

Figure 4.3: Improvement areas for investment landscape in Turkey



Source: Letven (2018)

4.1.1.2.1 Fund of Funds" and fund pool

Turkey has performed excellently over the last period because the funds accumulated in the funds successfully flowed into initiatives. However, due to the completion of fund investments in the first period and difficulties in the new fundraising process, the period since 2018 is commonly regarded as a troubled one.

In addition, development finance institutions (DFIs) are dominant in the Turkish market. However, DFIs are not open to innovation due to their structure, and they act within strictly-defined rules. Then, it will also become clear that the interest of these funds will fall in Turkey in the period following the beginning of 2018.

For this reason, the issue of fund creation should be taken as a priority. An alternative to Western funds can be created, and this can flow from Asia and the Middle East. The establishment of a "Fund of Funds" could be valuable in ensuring the flow of new funds to Turkey. It is possible to ensure that the funds are included in another fund, which itself is composed of small/symbolic numbers of funds that operate on a global scale. Through the relationship established with these funds, different information can be provided about market intelligence and know-how. Based on this, these funds may represent an opportunity to attract more investments to our country in the following period.

An examination of the investments for 2017 indicates that the total fund flow amounted to US$103 million. Significantly, this figure is low in comparison to that of developed countries. Although an upward trend has been observed in recent years, improvements can be made. Therefore, only focusing on the funding side is not the right approach. Funds and investable projects should be balanced. For this reason, studies should not focus only on fundraising; rather, they should simultaneously support the formation of investable projects.

4.1.1.2.2 Establishment of a Turkey specific entrepreneurship model

In examining entrepreneurship applications in Turkey, it becomes apparent that foreign models have primarily been implemented in the country. However, the national

conditions, cultural values, and social structures of every country are unique. Therefore, if Turkey is to advance in this field and get results, it is necessary to present a model that conforms to Turkish values.

An investigation of partnerships in Turkey reveals serious operational problems. In particular, it is difficult to carry long-term partnerships forwards into future generations. However, efforts can be made to establish healthy partnerships and, furthermore, to ensure the development of partnership culture in SMEs.

Consideration of our industry in Turkey indicates that the Turkish working method is production-oriented, but it is noteworthy that the rate of R&D is low. In Turkey, knowledge and experience is lacking in the area of engaging in innovative production, and the development of new products and services through ideas is lacking.

Innovative institutions such as Aselsan and TAV are more developed when compared to other institutions in terms of their production of new technologies. However, it is not possible to capitalize on these companies because they have a closed structure due to their culture. In this context, it is critical to recognize that the implementation of an innovative idea is a serious process that requires knowledge and experience. With this consideration in mind, opportunities for the transfer of know-how to entrepreneurs are needed.

4.1.1.2.3 Increasing the fund pool

According to some commentators, activities on the private equity side are satisfactory, and movement in the next period will continue. However, evaluation of the issue in terms of VC reveals that there is a shortage of funds. At the same time, resource flow is insufficient, particularly with respect to early-stage financing. Therefore, in order to support initial-phase or small-scale initiatives, it is necessary to create resources and increase the depth of the pool of funds. Furthermore, initial-phase and small-scale initiatives need to receive support. Hence, the creation of incentives that will ensure the flow of funds to these initiatives will accelerate entrepreneurial activities.

4.1.1.2.4 Education in entrepreneurship

The level of knowledge about entrepreneurship in society is low. When it comes to entrepreneurship, the first thing that comes to mind is starting businesses such as grocery stores. However, innovation – the most important part – is forgotten, and innovative activities remain limited. For this reason, it is difficult to generate qualified projects in Turkey and, as a result, investors who lose confidence may lose their motivation. Therefore, there is a need for activities that can raise awareness about entrepreneurship and, alongside this, increase the level of knowledge.

Not only individuals but also banks and capital owners lack information. The evidence indicates that many different ideas and projects arise from the organized events, but the support required for the development of such ideas and projects remains incomplete. From the author's perspective, this is because understanding regarding this issue in Turkey remains limited. For this reason, it will be beneficial to inform all sections of the society about this subject and, furthermore, to organize activities for their education.

The availability of well-informed and experienced human resources in the VC sector is relatively limited. Training and development programs are necessary not only to increase the quality of employment, but also to increase the degree to which existing employees are high-quality. For this reason, training initiatives should be organized for the development of the works in this field, and opportunities should be created to gain the necessary experience.

Turkish universities offer various activities in the field of entrepreneurship, and these institutions offer opportunities to support initiatives. Despite this, it seems clear that the effectiveness of these activities is relatively low. Therefore, it will be beneficial for the development of the sector to report on the performance of the activities until today, to identify the points of disruption, and to introduce necessary improvements.

In the context of VC, this author argues that sustainability is the issue that needs to be focused on. While the market has a certain level of capital and various incentives, difficulties are usually associated with the implementation phase. The availability of entrepreneurs who receive financial support, business education, knowledge, and

experience in this field, as well as management competencies, is insufficient. Considering the case of businesses and enterprises in Turkey, it is clear that the degree to which these entities are sustainable is limited. With this fact in mind, it is necessary to support entrepreneurs with respect to their implementation efforts and, at the same time, to ensure sustainability through the avoidance of failures.

The evidence indicates that in Turkey, the level of institutionalization of initiatives is low. However, the first thing that investors look at is the question of whether there exists a well-regulated, functioning structure with effective recording, which is maintained regularly and healthily. Support can be provided to these enterprises by organizing training programs to ensure the development of SME-level institutions in this area.

Both institutions and individuals are not sufficiently informed about identifying and managing risk. At the same time, it is often the case in Turkey that – due to cultural factors – risk-taking behaviours are uncommon. Therefore, it is necessary for Turkey to evolve into a creative, innovative, open-minded, and risk-taking society, which necessitates cultural progress. Significantly, this can be facilitated by providing relevant training in this field beginning in childhood. More specifically, the creation of an entrepreneurship culture and the attainment of a certain level of maturity will be aided by investigations and training in this direction, which commences at the secondary level.

4.1.1.2.5 Enrichment of financial instruments

Various topics, including the development of entrepreneurship, raising social awareness, informing society, and creating investment funds, have been discussed in the extant literature pertaining to entrepreneurship. However, the focus of these studies has not been on the modern financing tools that are vital to the initiatives that have been established. Another issue that has been largely overlooked is the question of how enterprises can utilize these tools. Financial leasing, factoring, and financing tools are necessary for enterprises, particularly during the establishment and growth phases. Therefore, it is critical to take into consideration the manner in which companies working in this field can be involved, and how they can support the initiatives in the healthy growth processes

of established enterprises. With this in mind, the creation and direction of funds into the field of entrepreneurship is an important issue in terms of Turkey's development.

An examination of the historical development of capital markets in Turkey indicates that the desired level of growth remains unsatisfied and that the share in the economy is only 7%. This reflects the underlying fact that there is a banking dominance in the sector. When considering Turkey in relation to South Korea, a country that was relatively undeveloped in the recent past, it is clear that South Korea succeeded in directing its investments to the right areas of initiative. Due to this, the level of economic development in South Korea is currently higher than that of Turkey.

Analysis of Turkey's financial sector shows that the sector is dominated by banks, with the proportion amounting to 87%. For the system to operate in a healthy way, the players in the sector, as well as the instruments presented to the market, must be distributed evenly. As a matter of fact, when considering examples in the developed countries, it immediately becomes clear that there is a balance, with the average proportion of the banks in the financial sector amounting to 30-40%. In order to create this wealth, public coordination activities are critical in terms of reaching the financial instruments they need in their development.

Participation banks (PBs), which work on the basis of a profit/loss partnership, have reached a certain level of maturity in Turkey. As a result, they have the ability to generate significant opportunities for the creation of VC funding. Furthermore, these institutions are well-positioned to bring together this funding with initiatives. The projects developed by the enterprises can be evaluated by the project departments within PBs and, in turn, supported using appropriate methods. In light of these statements, it will be useful to conduct studies regarding the ways in which the efficient use of participation financial instruments can be maximized in the system.

The VC sector in the Turkish ecosystem is not sufficiently developed. Islamic finance models, which form the basis of participation banking, coincide with the risk-earning philosophy inherent in VC. For this reason, arrangements should be pursued and

incentives should be provided in order to enable PBs to take action to support initiatives. The creation of a separate funding system to support the investments of PBs under the coordination of the Treasury will encourage the diversification of resources in the sector.

The risk-taking and profit/loss partnership understanding adopted by the institutions operating in the field of Islamic finance coincide with the VC system. Consequently, realization of the mechanisms associated with the field of Islamic finance will help to create a depth of resources.

4.1.1.2.6 Improvements in intellectual property rights

A majority of the ideas and investments in Turkey seem to focus on process innovation. From time to time, a case emerges in which it becomes clear that ideas can be copied quickly by investors, thereby leaving the owner out. Therefore, practical activities in the domain of intellectual property rights will be useful in order to create an atmosphere of trust among parties.

4.1.1.2.7 Performance measurement

It is true to say that the public sector is characterized by a greater level of activity when compared to the private sector in relation to VC activities. Furthermore, the public sector works more. However, increasing the efficiency of public activities has also emerged as a field of development.

As a case in point, the evidence indicates that the 1512 – Techno-Venture Capital Support Program provides effective support. However, questions remain to be asked, including the questions of which investments are used, how they are used, what the return rates are, what is learned from each investment process, the experiences that have been gained, and how the effectiveness of programs can be improved.

It is important to create and transfer funds and, alongside this, to prepare the analysis for the use and effectiveness of the funds created. Critically, improvements are required in this direction. Private pension system funds will evaluate a certain proportion of the funds

they have in VC funds. Nevertheless, the number of available funds is low, secondary markets are not formed, and there are no statistics to illuminate the performance of the investment areas. Therefore, performance measurements and the periodic publication of investments are of great importance.

In order for the public sector to support the VC sector, many incentive mechanisms have been established. At the same time, resources have been transferred from the created funds. Although studies such as these, as well as similar studies, are important, it will be useful to prepare reports on the results of the supports made so far, and to share the lessons learned from previous processes within the sector.

An evaluation of the past period indicates that some funds have been required to invest rapidly due to occasional restrictions. However, these investments were not the product of optimal decisions. Low or negative returns from these investments will create a poor reference standard for the future. For this reason, it is important to provide support in terms of the creation of investment areas, and to monitor and support the performance in this area.

Despite the various funds that operate in Turkey's markets, the availability of information about these funds is low. However, detailed information on the funds is available in the treasury, and the publication of this information with reference to the market situation can be useful in attracting new investments.

4.1.1.2.8 Increasing government incentives

It is reasonable to conclude that the economic sector in Turkey is a critical focal point. This stems from the fact that capital markets are required for business, and it is also informed by the recognition that all enterprises and companies are created for the purpose of profit maximization. Therefore, the public sphere should primarily support the people and institutions working on this issue and provide competition. It is significant to note that increasing competition is associated with both efficiency and social benefits.

The support of the state for the creation of funding is fundamental. This is due to the limited number of private sector representatives investing in this field. For this reason, state financing support can be provided. By providing tax advantages, the private sector can be encouraged to be more active in this area. Although there are many different agencies working in support of investment capital, the evidence indicates that the Treasury is lonely, both in terms of making arrangements and supporting funding through the maintenance of resources. However, in terms of the development of the sector, all players in the ecosystem need to work in a coordinated manner with a focus.

Turkey's VC sector is seemingly not yet sufficient in its level of maturity, and especially due to the substantial investment risks in the early stage, investors are hesitant to act in transferring funds to this area. However, in order to be able to drive the progressive stages and put viable ideas into practice, it is necessary to support the initiatives at this stage and to advance them to the next stage. For this reason, it is important for the public sector to pioneer and transfer the necessary funds to this stage.

It is clear that a vision was proposed by the government relating to entrepreneurship. Furthermore, to support work in this field, the issue was addressed with great excitement. Nevertheless, it seems to be the case that with respect to the implementation stage, the issue has not been studied sufficiently in the bureaucracy and the lower levels. In order for the works to proceed more effectively and efficiently, the kitchen work in the lower levels should be done in a more detailed manner.

Analysis of the current regulations reveals that there are many regulations surrounding the issue of capital formation. On the other hand, it can justifiably be stated that different funds have not been established and the interest is low. One of the focal points of this research is to determine why it is not desirable and, if necessary, to reflect on the various ways in which the legislation could be developed, reformed, and revised.

Investor institutions are hesitant about the prospect of transferring resources to enterprises, and support of early-phase initiatives belongs to the public sector. However,

private sector institutions should be encouraged to invest in this area with the support of the public sector, thereby facilitating the development of innovative and reforming ideas.

Protecting investors and affording a level of confidence should be studied as one of the principal ways in which to develop this field. Several of the negative experiences that have occurred in the past period have caused small entrepreneurs to hesitate to raise funds and support new projects. It is useful for public administration to work and provide certain assurances in order to assure greater confidence.

Recent developments such as Çiftlikbank have also harmed entrepreneurial activities in a serious way. Therefore, it is necessary for relevant institutions to focus on the subject, to implement more effective measurements for implementation, and to prevent further incidents of this kind.

When the samples of countries that experienced successes in the foreign capital sector are examined, apart from the regulations and the supports, we see that the public sector conducts positive discrimination in their commercial activities in order to support entrepreneurs and SMEs. With the creation of opportunities, it can be seen that the weight of SMEs in economic activities increases, and dynamism is ensured in new technologies due to improvements in fields such as exporting.

Finding and supporting the companies that develop critical technologies and, in conjunction with this, equipping these entities with grants from the newly-created special funds will be beneficial for Turkey. It is especially the case that these benefits will accrue in the form of domestic and international technological advancement in critical areas, and this will aid the country in advancing its position.

Public institutions may transfer a certain proportion of their R&D budget to KOSGEB for the purpose of providing resources to enterprises and SMEs. The fact that the tax structure is more open and transparent is important in terms of applicability.

4.1.1.3 Overview of Entrepreneurship in Turkey

The aim of the second part of the interviews was to measure the level of organizational awareness among the institutions about venture capital (VC), and to determine their areas of interest. The institutions were asked to share their thoughts about six different judgements separately, and a request was made for them to do so by taking their own organizations and members into account.

The results revealed and confirmed that a critical problem is the lack of knowledge surrounding VC, which emphasizes the importance of considering the problems highlighted in the previous chapters of this study. Despite corporations' intensive energy and the existence of pioneer institutions within Turkey that are working in this issue, the institutions tended to see their levels as average and/or below average. The members of the institutions were willing to create VC and ventures. However, the results indicated that they had limited knowledge and experience in this field, and in those cases where they were interested in continuing in this field, they encountered difficulties in making new investments.

Analysis of the data gathered from the interviews revealed that Turkey should focus on the development of entrepreneurs, investors, and other forms of human capital working in this field. Special attention should be paid not only to the field of fund creation, but also to the field of VC activities (Table 4.1).

Table 4.1: Investor knowledge

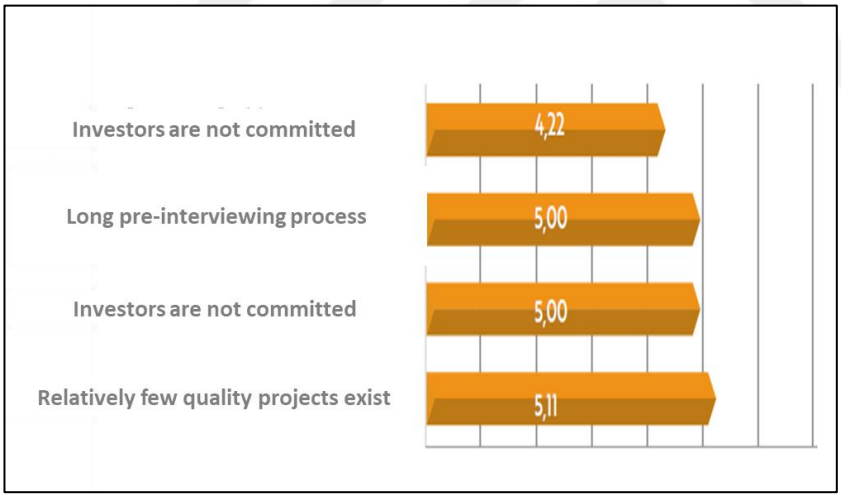
Our members have satisfactory know-how on Venture Capital Funds	3.89
Our members have satisfactory experience on Venture Capital Funds	2.78
Our members have satisfactory know-how on Public Supports to Venture Capital Funds	3.11
Our members are keen on investing on Venture Capital Funds	4.22
Our members can easily direct their Investment Funds to new entrepreneur initiatives	2.89
Venture Capital Investments by our members are satisfactory	2.13

Source*: Letven (2018)*

The representatives of the institutions were also asked to share their thoughts about the obstacles they encountered while transferring the funds they allocated as VC to new initiatives and projects. The results demonstrated that the issues of entrepreneurship culture and investment opportunities were apparent. Significantly, this was among the most important subjects highlighted during the interviews, but the data revealed that this is less an issue to think about in the nation-wide evaluation.

The participants stated that relatively few quality projects exist, Investors are not committed and, furthermore, that the process of pre-interviewing is long compared with the process in developed countries. The reason for this, as argued by the participants, stems from the limited information and experience that investors and entrepreneurs have access to (Figure 4.4).

Figure 4.4: Failure reasons in investments

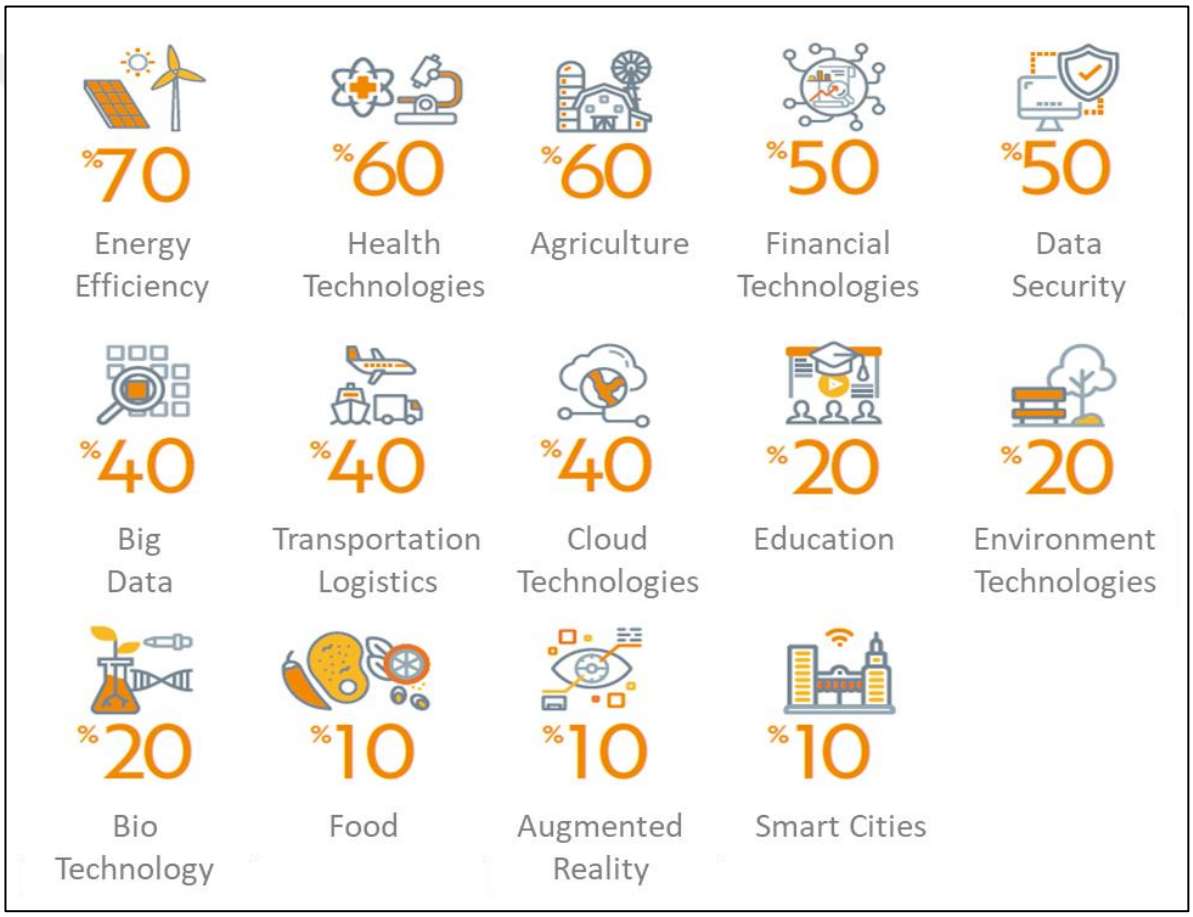


Source: Letven (2018)

Additionally, the participants raised the issue of balance between projects that is seen as an investment opportunity and funds. For this reason, the participants suggested that planned organizations will be useful not only in creating funds, but also in implementing a process to generate quality opportunities.

In order to identify the areas of investment in which the institutions were focused and to be able to conduct the activities to create investment opportunities in this direction, a list of topics was given to the participants. In turn, using this list, the participants were asked to mark the first five subjects in their fields of interest. The results indicated that the participants' interest rates centered around the areas of Big Data, Transportation and Logistics, Health Technologies, Agricultural Productivity, and Efficiency and Energy Efficiency (Figure 4.5).

Figure 4.5: Investment preferences



Source: Letven (2018)

In addition to the investment opportunities, institutions were also asked for the investment stage they prefer and their priorities. The results show that Early Stage Financing opportunities are more attractive for investors. Institutions are keen on testing ideas for a

certain period in the market until it reaches a certain maturity level. The following list shows the priorities of the institutions in terms of financing stages:

i. Early Stage Financing - Starting Capital
ii. Early Stage Financing - Early Development
iii. Late Stage Financing - Expansion Capital
iv. Early Stage Financing - Design Phase
v. Financing Financing - Pre-Ex-Funding

4.1.2 Textile Sector Industry 4.0

4.1.2.1 Important factors during implementation

As has been thoroughly documented in the literature, Industry 4.0 offers numerous possibilities for businesses. However, in order to leverage these possibilities and apply emerging technologies, companies must first establish a digital vision and strategy, acquire digital competencies, strengthen their informatics infrastructures, and create and manage ecosystems (Mentoro, 2018). In the following subsections, critical factors that must be considered during implementation are discussed.

4.1.2.1.1 *Digital vision and strategy*

The first step companies should take involves creating a digital vision and strategy, which necessitates the participation and engagement of senior executives. Companies can expand their operations in the countries and regions in which they operate by utilising digital technologies, meeting new customer needs, better serving existing customers, providing innovative benefits to customers, and strengthening their competitive advantage.

Additionally, digital technologies provide a facilitating infrastructure that firms can leverage to satisfy the principles of economic, social, and environmental sustainability. When creating their digital vision, companies should learn about digital technologies and potential application areas. They should also determine how digital technologies can be

used in their important processes, and they should plan a digital future and communicate a shared vision to employees. Critically, visions and strategies directly affect the performance of Industry 4.0. Therefore, companies should allocate the required time and resources to the fulfilment of these tasks.

4.1.2.1.2 *Acquiring digital competencies*

As a result of digitalisation, new roles and new competencies have emerged for institutions. In order to implement Industry 4.0 successfully, it is necessary for institutions to identify the required institutional and individual competencies, and to acquire these in line with their overarching strategy. Furthermore, task definitions of existing roles should be modified or expanded, or new roles should be created in the required fields. For example, positions such as data analyst, cloud manager, ecosystem manager, and digital marketing expert were not important five years ago, but today they play a critical role in terms of organisational success.

As noted above, the successful implementation of Industry 4.0 depends on the identification and acquisition of essential institutional and individual competencies. Significantly, these activities must be consistent with an institution's strategy. In terms of the specific operations which promote the successful implementation of Industry 4.0, these include measuring and assessing the digital competencies of employees; initiating development programs to advance digital competencies; driving the participation of individuals who are aware of digital technologies and their applications; and questioning the organisational status quo.

Another action that companies can undertake in a short timeframe involves including a digitalisation specialist in the institution's administrative body. In doing so, the company's leaders would receive support regarding the creation of a digital vision and strategy. This action would also facilitate the integration of groups that are well-positioned to take action on digitalisation and sustainability in terms of the company's governance models.

4.1.2.1.3 *Strengthening the knowledge structure*

Information technology (IT) infrastructures are the building block of any company's digital technologies. Noteworthily, it is necessary for these IT infrastructures not only to process data instantly but also to carry effective data-generating and portable devices and systems that are integrated with sensors. Therefore, IT infrastructures should be scalable and sufficiently flexible to meet new requests quickly, and to provide easy end-to-end access to data within the company.

4.1.2.1.4 *Creating and managing the ecosystem*

It is an unreasonable approach for a company to try to develop every required competency and resource. A more effective and responsive strategy involves gathering complementary and useful technology companies, including start-ups, that can be useful in areas related to digital transformation. In turn, these entities can be leveraged to develop new solutions, to access knowledgeable and experienced consultants and academics in Industry 4.0, and – in this way – to establish an ecosystem. Unlike the traditional approaches, firms should see their business partners in the ecosystem as true partners, and they should focus on offering value and building long-term relationships. The unique opportunity presented by ecosystems will provide a significant advantage to those companies that can establish one and, furthermore, extract knowledge and experience from the ecosystem. The opportunities in question include the mutual creation of value by all stakeholders within the ecosystem, the creation of new business opportunities, and the emergence of social benefits. Regarding the latter opportunity, these social benefits are likely to accrue to companies that positively contribute to the communities which reside in their areas of operation.

Mentoro's suggests a 10-step Digital Conversion Methodology to be applied to the digital transformation efforts of institutions:

i. Identify Digital Opportunities and Threats in the Industry
ii. Identify the Digital Start Point in Your Company (Including the existing IT infrastructure, Software and Tools, Machines and Features)

iii. Create a Digital Vision for Your Company with the High Participation of your Employees
iv. Create a Digital Transformation Strategy that Serves Your Digital Vision and Question Your Existing Strategy in the Light of the Effects of Digitalization
v. Select and Implement the Governance Model of Digital Transformation (Committees, CDO, Digital Representatives / Champions etc.)
vi. Identify Digital Transformation Projects by Reviewing All Your Processes and Prioritize Projects and Assign Persons According to Your Company's Needs, Return on Investment and the Impact it Will Create
vii. Choose the right technologies to implement the specified Digital Projects
viii. Create Corporate and Individual Competencies, Support Your Employees with Trainings
ix. Mobilize Your Organization with Digital Transformation
x. Determine what to do and how to take necessary precautions for change management

Failed digital transformation projects have some common features:

i. Internal reluctance to organizational change,
ii. Leader’s commitment,
iii. Weak digital culture and shared common vision,
iv. Incompatibility with business strategy,
v. Lack of digital transformation governance model,
vi. Technical competence deficiencies,
vii. Incompatibility between IT and business parties,
viii. Inadequate financial return of investment made,
ix. Meaningless, pretentious and digital value conversion programs,
x. Personal and inter-departmental jealousy.

The factors that hinder the success of digitalisation projects should be taken seriously and overcome by changing management approaches. Identifying and managing resistance among employees is critical, and so too is the provision of visible support for digitalisation among leaders. Another issue that is essential for the success of an Industry

4.0 implementation involves embracing digitalisation projects and integrating the digital strategy into the business strategy.

Digitalisation efforts should not intimidate company managers, and it should be recognised that implementing Industry 4.0 projects does not mean that the company should be turned into a high-tech start-up. Companies should begin with small projects, develop the necessary competencies internally, assess the project using appropriate key performance indicators (KPIs) and metrics, and continue to accelerate after the initial project has been shown to be successful for the whole organisation.

4.1.2.2 Effectiveness of entrepreneurs

As discusses throughout the study, entrepreneurs play a very important role in implementing the Internet of Things Technologies and industries in the digital transformation process are on the demand side with huge revenue opportunities.

The Textile Sector Industry 4.0 Research (2018), in which the author is one of the leading members of the project team, provides some clues to understand how entrepreneurs are effective in field implementations (Table 4.2).

Table 4.2: Effectiveness of ecosystem

We are able to find the Business Partners easily for our Industry 4.0 implementations when needed.	5.11
Our Business Partners, that we are working with for Industry 4.0 implementation, has satisfactory know-how.	4.96
Our Business Partners, that we are working with for Industry 4.0 implementation, has satisfactory experience.	4.89
We can satisfactorily utilize our Business Partners that we are working with for Industry 4.0 implementation.	4.59
We use external resources for idea generation and new product and services development.	5.67
Our Business Partners satisfactorily supports us to develop vision and related strategies for Industry 4.0 implementation.	4.56

Source: Mentoro (2018)

The Textile Sector Industry 4.0 Research (2018), in which the author is one of the leading members of the project team, provides some clues to understand how entrepreneurs are effective in field implementations.

The Textile Sector Industry 4.0 Research (2018) is conducted in six dimensions and the last dimension assesses the maturity of the business partners on 7-point Likert scale (Figure 4.6). Overall scores indicate that there is room for improvement and it is too early to conclude that Turkey has been able to achieved a well-functioning ecosystem to support industries when needed.

Firms are somehow able to business partners to work with in their manufacturing process but capabilities are limited in terms of experience and know-how. The firms also put a critic on themselves indicating that they are unable to benefit from their business partners as much as they expect although they are keen on outsourcing their activities.

Firms' expectations is not only limited to operational activities, they also look for visionary support and joint policy development; however is may take some time until the business partners, developing and implementing Internet of Things Technologies, reach a certain maturity level.

4.2 MAIN RESEARCH

4.2.1 The Market Maturity

4.2.1.1 Organizational readiness on supply side

The section with 12 questions explores the maturity level and the approach of the companies in the market working on IoT technologies. The assessment is based on the willingness and the capabilities of the practitioners while supplying products and services.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used

to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0 and 0.709 and denote a normal distribution.

The Cronbach's Alpha in Appendix 3.2 is 0.900 suggesting that the items have relatively high internal consistency.

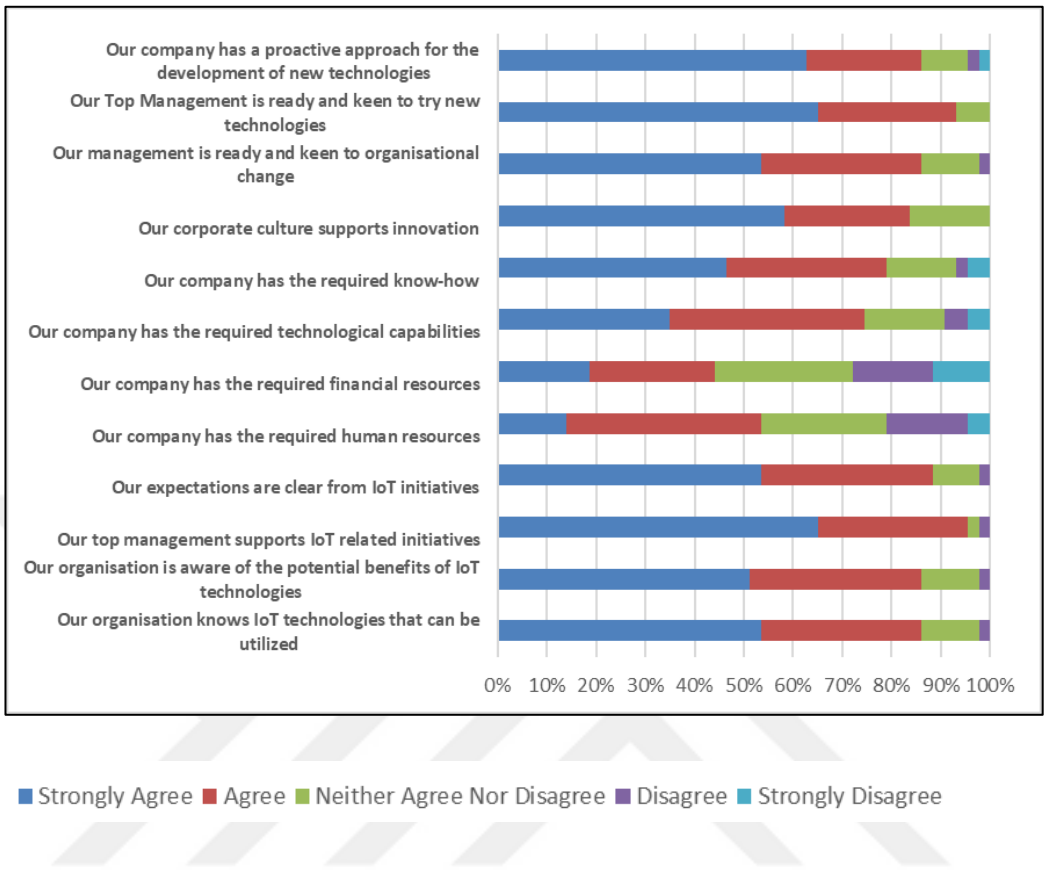
The results reveal the following conclusions:

i. Supplier companies are aware of the potential of IoT technologies and already started their initiatives to fully benefit from early mover advantage. But it should be noted that, these companies are mostly technology firms and is able to follow the trends; therefore, they take immediate actions.
ii. The corporate culture with proactive, supportive and innovative approach is an important driver.
iii. Companies believe that they have the required know-how and experience.
iv. But their financial and human resources are quite limited. Therefore, capital injection and support to these companies for sustainable process is critical.

The correlations in Appendix 3.1 leads to the following points:

i. Companies can assess the benefits if they have the know-how on IoT technologies
ii. Companies can formalize their expectations once they notice the trends and have the knowledge
iii. Companies do not hesitate to take actions and to proactively support initiatives when notice the trends and have clear expectations.
iv. The knowledge is the key to develop organizational capabilities.

Figure 4.6: Organizational readiness on supply side



4.2.1.2 Perceived market maturity

The section with 6 questions explores the maturity level of the demand site in the market. The assessment is based on the awareness of IoT technologies, intention to buy related products and services and the usage.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.361 and 0.709 and denote a normal distribution.

The Cronbach's Alpha in Appendix 3.2 is 0.852 suggesting that the items have relatively high internal consistency.

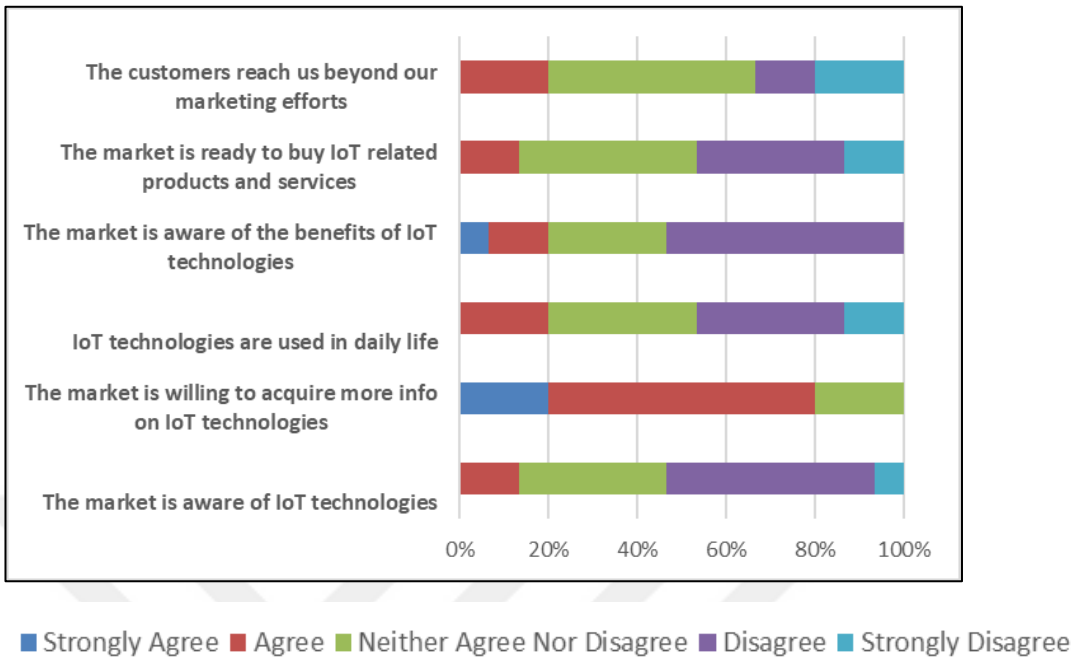
The results reveal the following conclusions:

i. It is clear that the market is not aware of IoT related product and services so they do not know benefits of these new technologies.
ii. It may be assumed that strong marketing efforts are needed in order to build the market.
iii. Potential buyers ask for more information when they are touched but do not seek information proactively.
iv. It is not possible to conclude that the market is ready to buy IoT related products and services.

The correlations in Appendix 3.1 leads to the following points:

i. Creating market awareness is very important in order to inform potential buyers about the value of these new technologies and to convince them to use and benefit from them.
ii. Usage of IoT related products and services strongly depend on knowing benefits and a positive intention to buy them.
iii. Once the potential buyers know the benefit, it is relatively easy to convince them to buy.

Figure 4.7: Perceived market maturity



4.2.1.3 Eco-system readiness

As mentioned earlier, the IoT technology is new and companies need to cooperate in order to develop new products and services. The new era of the business is a team game and there is only one way to become successful, which is establishing relationship with good partners. The section with 5 questions explores the eco-system in Turkey that supports businesses while they operate in the market.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.361 and 0.709 and denote a normal distribution.

The Cronbach's Alpha in Appendix 3.2 is 0.828 suggesting that the items have relatively high internal consistency.

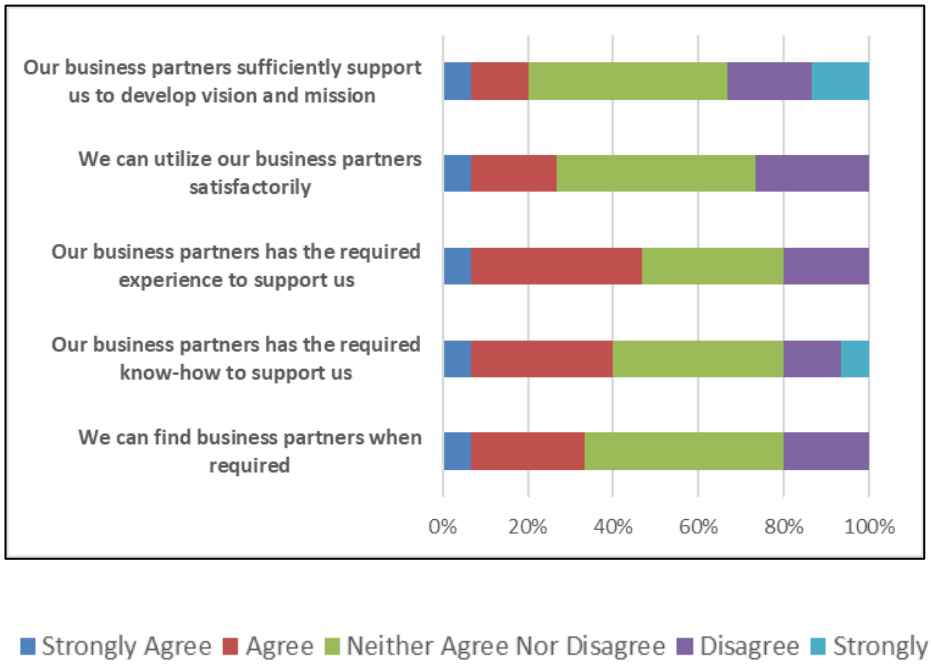
The results reveal the following conclusions:

i. The eco-system started being established but quite new. Suppliers of the IoT products and services can get some kind of support from the eco-system but available support is quite limited.
ii. The eco-system is also improving by learning and being more experienced. But it is not possible to say that the support market is mature.
iii. Effectively utilizing the eco-system partners to support the business and to grow the business is not possible.

The correlations in Appendix 3.1 leads to the following points:

i. A partner's know-how and experience are strongly correlated.
ii. A partner can be very useful if they have the know-how and the experience.
iii. Contributing to company's vision and mission highly effects the value of the support

Figure 4.8: Eco-system readiness



4.2.2 The Business Model Canvas

4.2.2.1 Value proposition

Value Propositions aims to understand the customer insight and seeks to solve customer problems by satisfying customer needs with value propositions. The section with 11 questions explores the value created for the customer.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.347 and 0.681 and denote a normal distribution.

The Cronbach's Alpha in Appendix 3.2 is 0.769 suggesting that the items have relatively high internal consistency.

The results reveal the following conclusions:

i. Innovation and Performance Improvement are the leading values offered to the users of IoT products and services.
ii. Convenience/Comfort and accessibility are the secondary values offered to the users of IoT products and services.
iii. Interestingly all different value propositions are considered to be bundled with the products and services; which may indicate further simplification and focus on the core value is required
iv. Price advantage, customization and risk reduction are important values but not as prioritized as other values

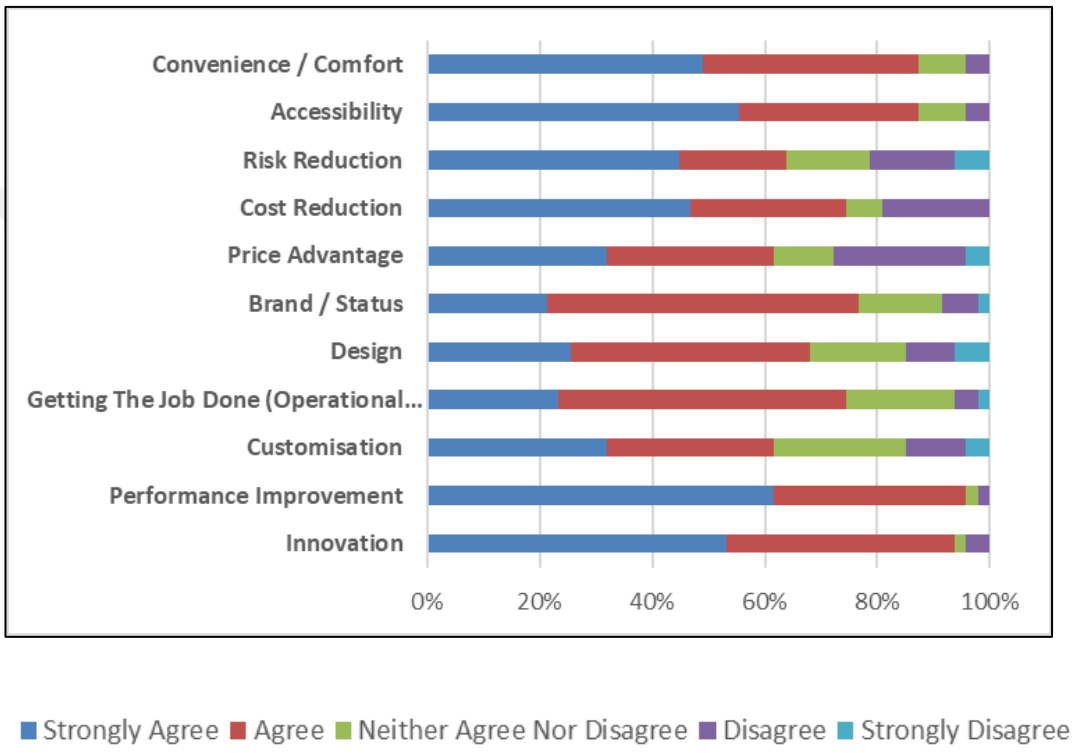
The correlations in Appendix 3.1 leads to the following points:

i. Design and getting the job done effects the brand image/status positively

ii. Performance is highly correlated with cost reduction, risk reduction, accessibility and convenience

iii. Creating price advantage is highly correlated with getting the job done, cost reduction and risk reduction

Figure 4.9: Value proposition



4.2.2.2 Customer segments

All commercial companies serve one or several customer segments. The section with 5 questions explores the focus segment of the companies supplying IoT related products and services.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.347 and 0.681 and denote a normal distribution.

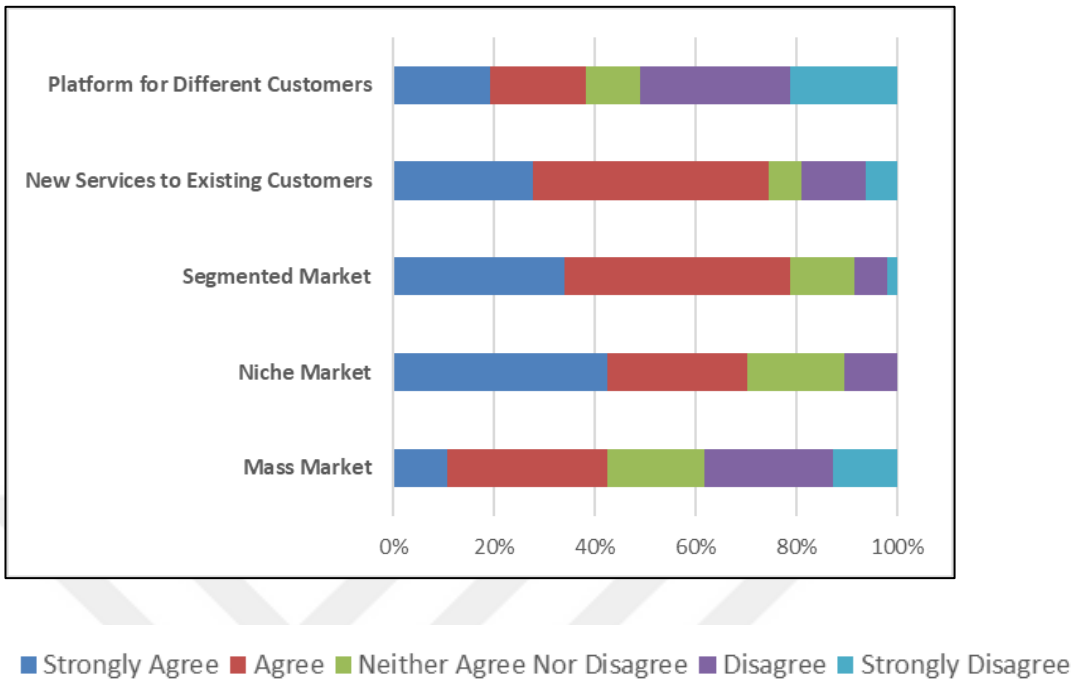
The Cronbach's Alpha in Appendix 3.2 is 0.305 indicating that internal consistency of the items is questionable. Observations from the field suggest that companies first focused on developing products and services but they missed or ignored the market insight before starting their activities. Once they started offering their portfolio to the market, they face challenges to match it with the proper buyer groups.

The results reveal the following conclusions:

i. The products and services satisfy specific needs therefore mass supply is not an option. So, we see the reflection of this reality in the market segmentation. Companies target selected groups of the market.
ii. Offering new products and services by cross sales to the existing customer base is also a preferred approach
iii. Mass segment marketing is not an option. The new technologies bring customization opportunities to both suppliers and buyers and this new era will probably change the marketing practices as well.
iv. Creating a platform economy with IoT products and services does not seem to be an option at the moment.

The correlations are listed in Appendix 3.1. Although there are some correlations among variables, no significant point for a reasonable business explanation is discovered.

Figure 4.10: Customer segments



4.2.2.3 Channels

Value propositions, in other words products and services, are delivered to customers through distribution and sales channels. The section with 5 questions explores the mostly preferred method to reach the customer and to distribute the value.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.347 and 0.681 and denote a normal distribution.

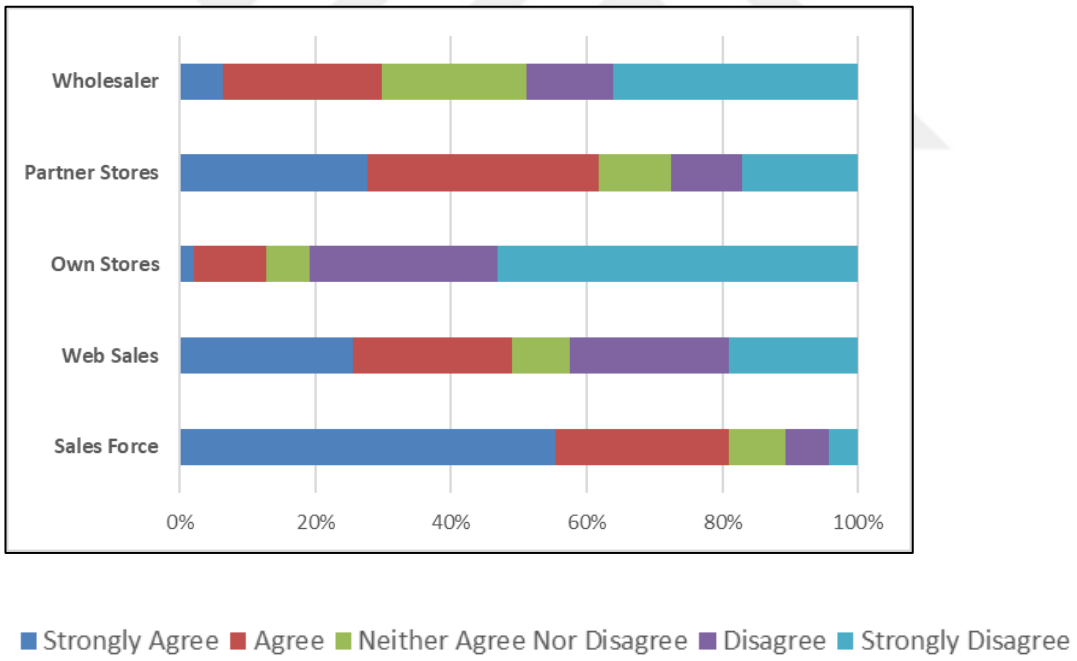
The Cronbach's Alpha in Appendix 3.2 is 0.900 suggesting that the items have relatively high internal consistency.

The results reveal the following conclusions:

i. Sales force is mostly preferred channel followed by partner stores and web channel. The choice is quite reasonable since the market is immature and there is a need to create awareness in the market and to convince the potential buyers; which can only be achieved by direct and controlled activities.
ii. Although wholesaler is an option, it may require some time to use it effectively due to the reasons mentioned above.
iii. Directly owned stores are not preferred at this market maturity level.

The correlations are listed in Appendix 3.1. Although there are some correlations among variables, no significant point for a reasonable business explanation is discovered.

Figure 4.11: Channels



4.2.2.4 Customer relationships

Customer relationships are established and maintained with each customer segment for a sustainable business and long-lasting activity. The section with 6 questions explores how the customer relationship management is handled.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.347 and 0.681 and denote a normal distribution.

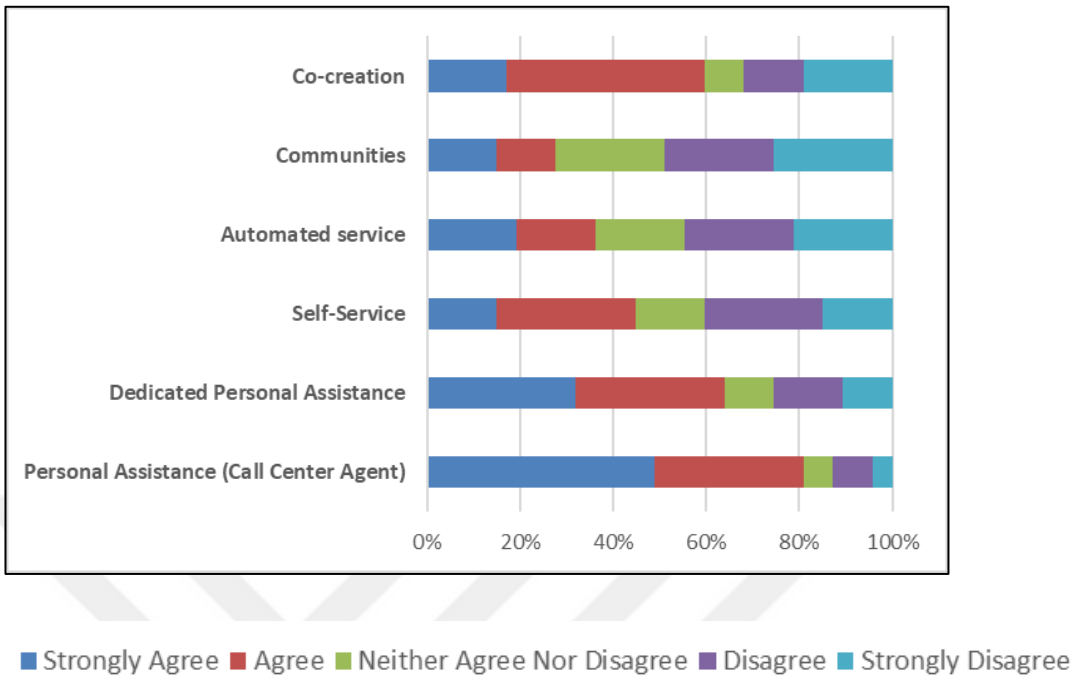
The Cronbach's Alpha in Appendix 3.2 is 0.428 indicating that internal consistency of the items is questionable. Observations from the field suggest that companies focused on product development at the first stage and they just started acquiring customers and managing the relationship with them. This dimension is not clear from their perspectives and they are still trying to find the best methods to serve their customers.

The results reveal the following conclusions:

i. Companies prefer mostly dedicated personal assistance by call center agent or sales representative. This choice is quite reasonable considering that products and services are quite new and buyers need support to gain experience and understand how to benefit from them.
ii. As noted in customers segment section, some providers offer new products and services to the existing customer base which explains why co-creation is a strong option.
iii. Using Self-service channels may need some time until customers get acquainted with the products and services.
iv. Managing the relationship by establishing communities is not a real option at this market maturity level.

The correlations are listed in Appendix 3.1. Although there are some correlations among variables, no significant point for a reasonable business explanation is discovered.

Figure 4.12: Customer relationships



4.2.2.5 Key resources

Key resources are the assets required to produce/develop and deliver the previously described values to the customer groups. The section with 4 options explores which resources are mostly used.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.350 and 0.688 and denote a normal distribution.

The Cronbach's Alpha in Appendix 3.2 is 0.613 indicating that internal consistency of the items is somehow questionable. Observations from the field suggest that know-how is the basis to start all business activities but it needs to be supported with other resources.

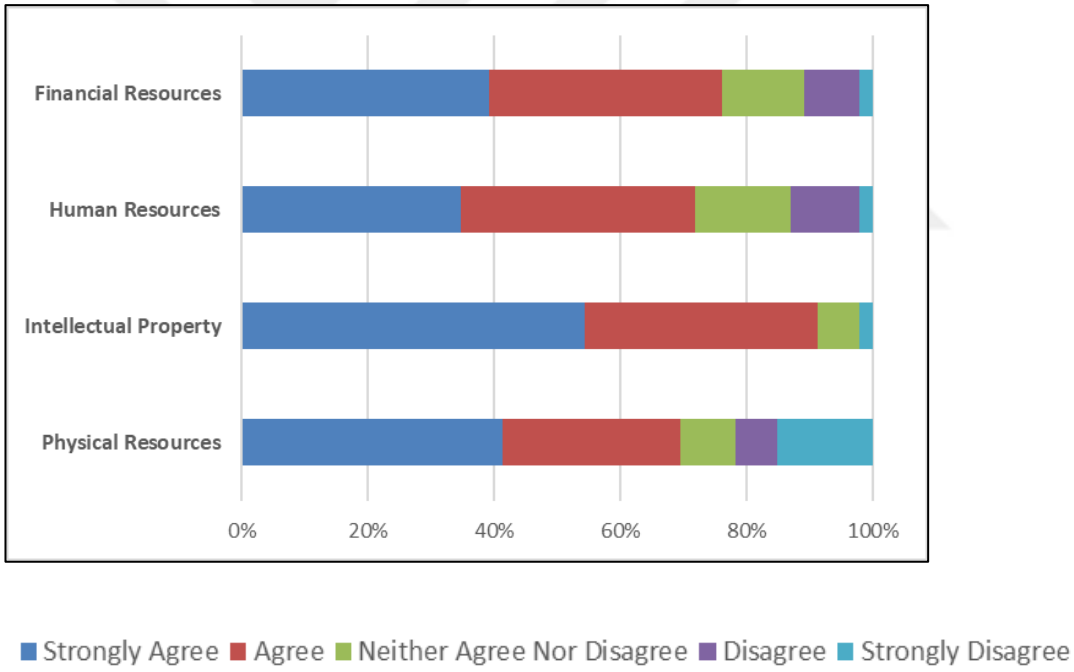
The results reveal the following conclusions:

i. Intellectual Property (know-how) comes first and all business focus on leveraging that asset.
ii. Other resources are also strongly required in order to create value and to build on Intellectual Property.

The correlations in Appendix 3.1 leads the following point:

i. Financial resources are important to acquire human and physical resources and create value from intellectual property.

Figure 4.13: Key resources



4.2.2.6 Key activities

Companies perform various tasks by using the input (key resources) in order to produce/develop products and services offered to the market. The section with 5 options explores the ranking of key activities by its effort intensity.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.350 and 0.688 and denote a normal distribution.

The answers of the survey brought the following ranking by its effort intensity:

1. Software / Platform / Product Development
2. Sales and Marketing Efforts
3. After Sales Support
4. Finding Business Partner / Supplier
5. Logistics

The results are in line with the field observations and IoT market life cycle. Suppliers of the industry have been working on developing/producing products and services and they have just started offering their portfolio to the market. Therefore, after sales support, finding business partners/suppliers and issues with logistics are new topics for them.

The correlations are listed in Appendix 3.1. Although there are some correlations among variables, no significant point for a reasonable business explanation is discovered.

4.2.2.7 Key partners

Organizations prefer outsourcing some activities or benefit from expertise from the business partners in the market. The section with 4 questions explores what kind of partnerships are mainly used in the market.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.350 and 0.688 and denote a normal distribution.

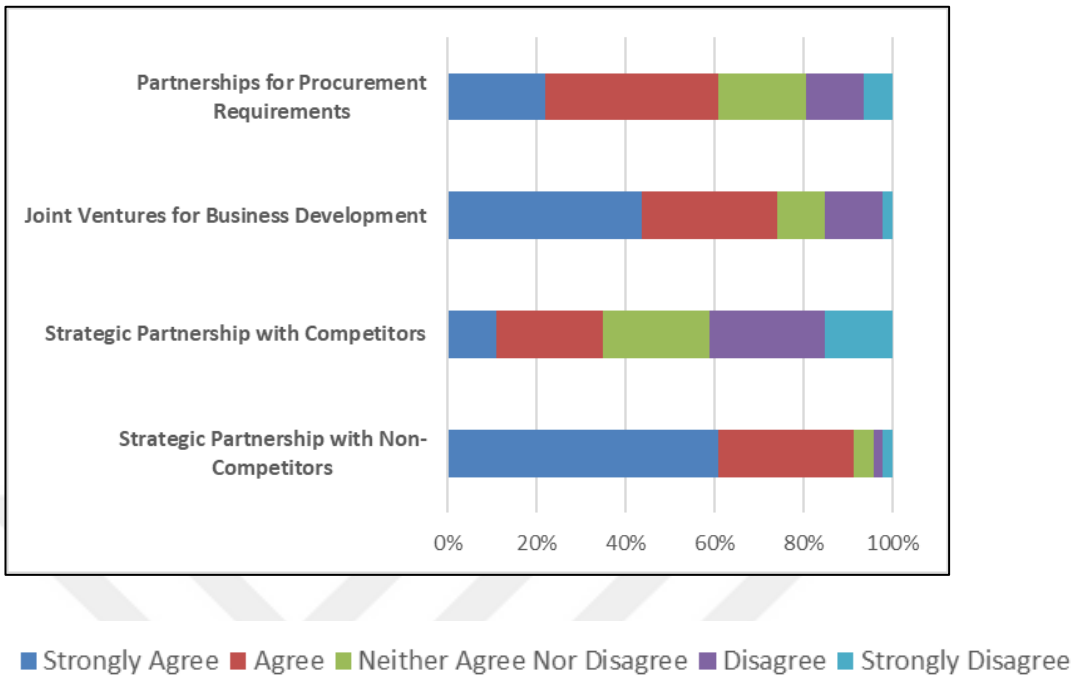
The Cronbach's Alpha in Appendix 3.2 is 0.472 indicating that internal consistency of the items is questionable. Observations from the field suggest that companies are aware of the fact that they need support from their eco-system, in other words from their partners. But this is a new business question for them and they seem to be assessing the available options.

The results reveal the following conclusions:

i. They are eager to build strategic partnerships with non-competitors and to establish joint ventures for business development.
ii. They avoid from partnership with competitors probably because to protect their intellectual property.
iii. They are open to partnerships for procurement requirements.

The correlations are listed in Appendix 3.1. Although there are some weak correlations among variables, no significant point for a reasonable business explanation is discovered.

Figure 4.14: Key partners



4.2.2.8 Revenue streams

Revenue is generated from value propositions successfully offered to customers. The section with 7 options explores which revenue models are used in order to monetize the products and services.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.350 and 0.688 and denote a normal distribution.

The Cronbach's Alpha in Appendix 3.2 is 0.502 indicating that internal consistency of the items is questionable. Observations from the field suggest that companies have just started monetizing their portfolio in the market, as a result of discussed reasons above.

They are still looking for ways how to develop the optimum commercial models and pricing points. This may be the main reason for inconsistent answers in this section.

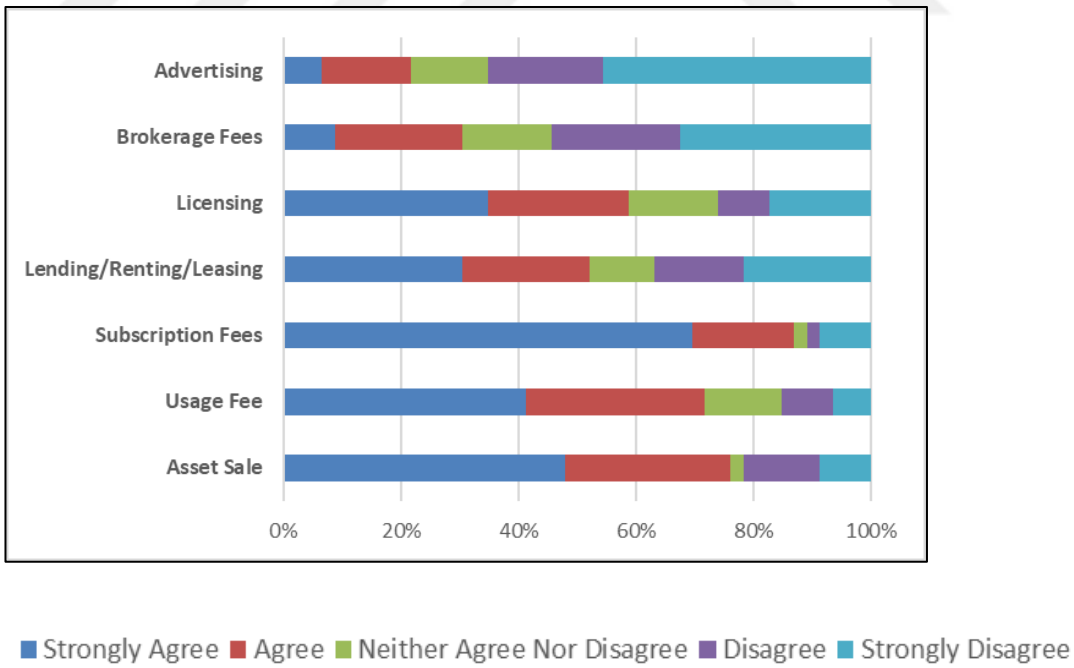
The results reveal the following conclusions:

i. Subscription Fee is the most preferred method considering the nature of physical assets. It should be noted that services related to IoT products are quite limited in the market and the answers in this section mostly refers to the use of physical assets in the operations.
ii. Asset Sale and Usage Fee follows as the dominant options.
iii. Brokerage Fees and Advertising Revenue models has not developed yet.

The correlations in Appendix 3.1 leads the following points:

i. There is a high correlation between Revenue Subscription Fee, and Revenue Lending Fee
ii. Revenue Usage Fee and Revenue Subscription Fee are highly correlated

Figure 4.15: Revenue streams



4.2.2.9 Cost structure

The business models incur cost as a result of using the input (key resources) in order to produce/develop products and services offered to the market. The section with 5 options explores the ranking of key cost elements by the budget spent.

Tests of skewness and kurtosis were run to measure the asymmetry and peakedness of the sample distribution. The Kolmogorov-Smirnov test and the Shapiro–Wilk test were used to analyse normality. The Shapiro Wilk test results are presented in Appendix 3.4. According to the p-values it can be concluded that the data is normally distributed.

The skewness and kurtosis test results are displayed in Appendix 3.3. Kurtosis and Skewness values of +/-1 is considered very good for most uses, but +/-2 is also usually acceptable. The results are between 0.350 and 0.688 and denote a normal distribution.

The Cronbach's Alpha in Appendix 3.2 is indicating that internal consistency of the items is questionable. It may be suggested to deviate from the original Business Model Canvas for this section for further researches since some elements are interrelated.

The answers of the survey brought the following ranking by key cost elements in terms of the budget spent:

1. Service/Product Development
2. Human Resources Cost
3. IT Cost
4. Sales and Marketing
5. Logistics

The correlations are listed in Appendix 3.1. Although there are some correlations among variables, no significant point for a reasonable business explanation is discovered.

5. CONCLUSION

As explained throughout the study; rapid changes in technology have a deep impact on business world today. However; the new context requires companies to examine the IoT concept more closely and to respond to changed dynamics. It is a pre-requisite to acquire these new technologies and implement them to the business processes in order to be competitive and to be able to continue operations. Nevertheless, current business practices are limited, strategies are not clear and literature has not yet provided usable approaches for businesses. The buzz is loud in the business world, academicians are curious, but there are many questions to be answered in the coming days.

Internet of Things (IoT) is an attractive area for research and there are some researches especially in the domain of consumer acceptance but research at the company level is very limited. The study will contribute to the literature by examining factors influencing intentions to implement and to use the new technological developments in the market and the maturity level of companies in the transformation process.

The study "Assessment of Strategic Intentions and Business Readiness for Digital Era on IoT Wave: An Exploratory Study of Turkish Market" reached its aims by exploring the phenomena under four dimensions:

i. Understanding the maturity level of the market
   The concept of IoT is a very new concept in the market and there is an excitement in the business world to monetize the opportunities. The research explores the reflection of this hype to the demand side in the market.

ii. Understanding the motivation and the approach of suppliers in the market
   It can be considered that those companies identified in the research are the pioneers in this new dimension. Many companies especially entrepreneurs are entering to the market with the claim that they are leading the digital transformation. The research identifies the companies (excluding companies with 250+ employees or 125 million TL revenue) and assesses basic capabilities.

iii. Understanding the readiness of the eco-system in the process of supplying IoT related products and services

The nature of the IoT business depends on a well-functioning eco-system with various companies in the value change and the effectiveness of the supply side is closely related their team-work. The research answers how well the eco-system functions in a basic set-up.

iv. Available Business Models (within Business Model Canvas context) in the market

Since the IoT business is still at its infancy stage, business models are unclear and suppliers are looking for ways to monetize the opportunities. The research highlights the existing models in 9 building blocks described by Business Model Canvas.

5.1 IMPLICATIONS

The latest developments in the technology enables to connect devices with computing capabilities over the communication networks, also named as "Internet of Things" (IoT), so companies have more efficient and effective production processes and create new values. However, the emergence of commercial opportunities often require support from an ecosystem partner.

But it may be assumed that academic literature just started to accumulate since it is a new topic of recent years. IoT is an attractive area for academic research, and there are some researches especially in the domain of consumer acceptance, but research at the company level is very limited.

From academic perspective, this study contributes by revealing the literature gap on “IoT business opportunities” and “the market realities”. It can be used as a starting point of future research on IoT business models and implementations. It is one of the few studies that intensively explores the factors and provides explanations from the field observations with quantitative results.

From business perspective, the results of the research supports professionals in formulating their decisions on how to develop their commercial plans for their future evolving business. The study summarizes early findings of the initial IoT implementations and serves as a tool in IoT technology set-ups.

The contributions of the research may be listed as follows:

i. Possibly the first academic research examining the IoT Business Models in Turkey
ii. One of the very few academic works on IoT and its implications
iii. It implies a new measurement instrument on Market Maturity Assessment
iv. It provides a clear snapshot on commercial reflection to the market of IoT capabilities, which is a very valuable insight for business world interested in making investment on this area.
v. The research is fed directly by the previous work of the author to show the broad picture of the current situation and brings the business field researches to the interest of the academic world besides the study topic. In addition to the academic literature review, the introduction is strengthened with the following authentic works:
    a. Turkey Entrepreneurship Landscape Research - 2018
    b. Textile Sector Industry 4.0 Research - 2018
    c. Smart Cities Research - 2019

5.1.1 The Theory Implications

The study makes three major contributions to the theory:

Firstly; although there are many Technology Acceptance Model works in the academic world, there are not many scholar studies focusing on Internet of Things (IoT). Available researches are especially in the domain of consumer acceptance but research at the company level is very limited.

Researches have paid little attention to business models although highly emphasized in entrepreneurial business practice (Morris et al., 2005). As an example; only a few studies have explored IoT in the marketing field. Many areas are still untouched; challenges are not identified; and stakeholders are not investigated. Marketing itself should find ways to embrace IoT and shape itself (Nguyen and Simkin, 2017).

In addition; acceptance of the technology does not necessarily guarantee that value can be created by sustainable business models successfully. The research points out the gap between the acceptance at the demand side and the capability at the supply side.

The Business Model Canvas is a acceptable model widely used in business practices and the study shows that it may be developed academically further to analyze the factors affecting the value creation process. Business Model Canvas may lack many areas but can evolve as a powerful measurement instrument since the analysis of data shows that it draws clear conclusions.

Secondly, the Market Maturity Model, which is a measurement instrument developed by the Author previously, successfully helps to explore the market demand and maturity of the market players. Although the assessment of the market maturity measurement instrument is beyond the scope of this study, the validity and reliability of the results proves that it can be used in other researches as well.

Lastly, theory formulation starts with basic observations, analyses, and conclusions of the situation. IoT potential and implementations are new topics and data have just started to accumulate. The study reveals initial market realities to the academic world's interest to build further literature on that basis. The IoT phenomena is new with various dimensions and the study have many clues to start with. In a research perspective, the job of the study is also to provide interesting and perhaps promising areas to work on.

5.1.2 The Managerial Implications

Technology demands for digital experience and engagement to transform the business but change has never happened as quickly as it is happening now. Business Leaders needs to update their business model to survive and to surf on the wave of IoT. The implications for business model innovation are vast and using well-known frameworks and existing

business models will not be enough to survive. Companies need to re-asses their orthodoxies about how to create and capture value (Hui, 2014)

The study lays out the building blocks of the IoT opportunities in detail by using the Business Model Canvas Framework. Considering that the pioneers of this domain are usually from technical side of the business and their managerial capabilities are not as advanced as their technical capabilities, the study reminds them of the commercial points that require attention.

Market information is the key to develop successful propositions and to establish a successful business. Unfortunately, data on this new investment area is scarce or hidden within corporate competition games. The study shares a snapshot of the IoT business in Turkey by collecting data from the half of the universe in Turkey. Almost all participants of the survey kindly asked the results of the survey when the research is finalized, which is a good indication that managers are eager to use this academic work to formulate their future decisions.

Although there is a hype around IoT in academic and business world, the topic is not sufficiently analysed, discussed, or understood. The research definitely contributes the debate in both worlds.

5.2 FURTHER STUDY

After concluding this study, there may be future answers for further studies. These studies may be:

i. Re-conducting of the survey over years;

   The technology has been changing very rapidly and business models are subject to update accordingly. So trends, changes on the model, deviations from the constructed models and validity of the assumptions and initial findings should be monitored closely by repeating the survey constantly over years (Slavik and Bednár, 2014).

ii. Conducting of a similar research for companies of 250+ employee size;

Companies with 250+ employees are usually big and financially strong institutions. They play the market maker role in the implementation of new technologies. It may be very useful to understand the strategic intensions of those companies as well.

iii. Conducting of a similar research with a narrower scope (industry specific);

Different industries may have different implementations and business models in order to meet industry specific requirements. Therefore, single sector researches would provide more accurate and to-the-point conclusions.

iv. Conducting of a similar research in different countries;

Countries have different policies and support programs in order to accelerate the digital transformation process and to gain a competitive advantage in the global market. As a result, there may be different implementations and business models in line with public policies. Therefore, researches in different countries would provide benchmarking opportunities in different regions.

v. Conducting of similar research by the usage of other business model frameworks;

The Business Mode Canvas is only one of the frameworks; many academicians and consultants use other frameworks for their studies; therefore, it would worth to conduct similar researches with different frameworks and comparing the findings.

vi. Following closely the developments in B2C market;

Although the study aimed to differentiate B2C and B2B markets and analyze data accordingly, the responses did not allow such analysis since the concentration of

the supply side is corporate segments. It is quite reasonable considering that the demand generates mainly from business side since corporates can assess and monetize the value of IoT technologies. But the consumer business has a great potential and should be followed closely over the years.

5.3 LIMITATIONS

Since the research topic is quite new and academic literature is still accumulating, it should be noted that there are many limitations of this study by its nature. But it should not be considered as a handicap because the situation brings lots of opportunities to explore and each limit means another research in the future.

i. Methodological Limitations

Business Model Canvas was the core of the survey but it is not developed as an academic measurement instrument, there is a need to question results carefully. The model fails reliability tests but other statistics and observations from the field proves that it still leads to meaningful conclusions.

ii. Interview Limitations

Single representatives from only four companies were interviewed. This may lead biased results and directly impact the quality of the survey. Therefore, further field researches and interviews would improve the basis of the business model framework and the future measurement instruments.

iii. Survey Limitations

Data analysis were carried out with only 43 cases. It would have been better if the sample size is higher; however, it can be still strongly argued that the results are significant by considering the market universe is around 100 players.

All respondents were contacted via online channels and it was assumed that they are the right contact person and they have the knowledge and the experience to answer the survey.

Some sections especially in The Business Model Canvas could have been unclear to respondents and providing personal assistance to clarify the questions they may have was not possible.

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APPENDICES

APPENDIX 1: TURKISH QUESTIONNAIRE

Nesnelerin Interneti (IoT) Türkiye Pazarı Araştırması

Sayfa 1: GİRİŞ

Sayın Katılımcı;

Sizi Bahçeşehir Üniversitesi – Sosyal Bilimler Enstitüsü doktora çalışmaları kapsamında Türkiye'deki IoT şirketleri, pazarda var olan iş modelleri ve pazarının olgunluk seviyesi üzerine yapılan araştırmaya davet etmek istiyoruz. Çalışma tamamlandığında Türkiye pazarını dünyanın diğer coğrafyalarındaki iş modelleri ve uygulamalar ile karşılaştırma imkanı yakalayacağız.

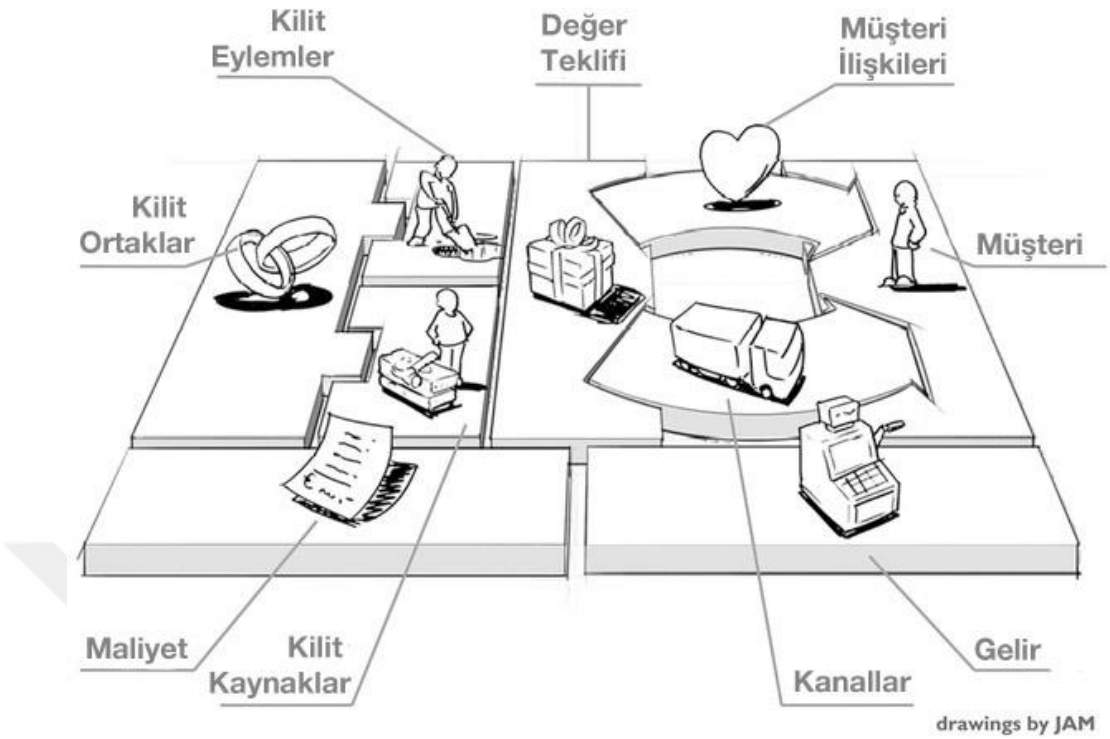
Anketin tamamlanması internet üzerinden yaklaşık 10 dakika almaktadır ve sorular içerisinde ticari bilgi veya detaya yönelik sorular bulunmamaktadır. Çalışmanın Türkiye'de ilk ve dünyada sınırlı çalışmalar içerisinde yer alacağı öngörülmektedir.

Bu çalışmaya katıldığınız için çok teşekkür ederiz...

E. Emre Kanaat
0 (542) 561 1644
emre.kanaat@rdtbusiness.com

Sayfa 2: İŞ MODELİ KANVAS

İş Modeli Kanvas, Alex Osterwalder tarafından geliştirilmiş bir İş Planı Hazırlama aracıdır. Kullanım kolaylığı ve yalınlığı neticesinde bugün birçok işletme tarafından yönetim/strateji geliştirme aracı olarak tercih edilmektedir. Araştırma soruları bu model temel alınarak oluşturulmuştur.



Question 1.

Değer Önerisi; müşterilerin ürün/servis seçimlerinde bir şirketi diğerine tercih etme sebepleridir. Her Değer Önerisi müşterinin bir problemini çözer veya ihtiyacına cevap verir.

Ürün ve servislerinizi düşündüğünüzde (nesnelerin interneti -IoT- teknolojilerini kullanan) hangi değeri sunuyorsunuz?

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
Yenilik					
Performans İyileştirme					
Kişiselleştirme					
İşi Yaptırmak (Operasyonel Destek)					
Tasarım					
Marka/Statü					
Fiyat Avantajı					
Maliyet Azaltma					
Risk Azaltma					
Erişim Kolaylığı					
Kolaylık/Rahatlık					

Question 2.

Müşteri Segmentleri; bir işletmenin ulaşmak ve hizmet vermek istediği kurum veya grupları temsil eder.

Ürün ve servislerinizi düşündüğünüzde (nesnelerin interneti -IoT- teknolojilerini kullanan) aşağıda yer alan müşteri segmentlerinden hangisine/hangilerine hizmet veriyorsunuz?

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
Kitlesel Pazar					
Niş Pazar					
Segmentlere Ayrılmış Pazar					
Mevcut müşteri gruplarına ek/yeni hizmet olarak sunulması (Çeşitlilik Arz Eden Pazar)					
Farklı müşterilerin buluşması için Platform oluşturulması					

Sayfa 3: İŞ MODELİ KANVAS

Question 3.

Kanallar; bir işletmenin müşteri segmentleriyle nasl iletişim kuracağını ve o segmente nasıl ulaşacağını tarif eder.

Ürün ve servislerinizi düşündüğünüzde (nesnelerin interneti -IoT- teknolojilerini kullanan) aşağıda yer alan kanallardan hangisini/hangilerini kullanıyorsunuz?

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
Satış Ekibi					
Web Satışı					
Kendi Mağazalarınız					
İş Ortağı Mağazaları					
Toptancılar					

Question 4.

Müşteri İlişkileri Yönetimi; bir işletmenin müşterileriyle kuracağı ilişkilerin nasıl olacağını tarif eder. İlişkiler kişiselden başlayarak otomatikleşmiş sistemlere kadar uzanan bir skalaya yayılabilir.

Müşteri İlişkileri Yönetimin'de aşağıda yer alan hangi model/modelleri kullanıyorsunuz?

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
Kişisel (Canlı Müşteri Temsilcisi) Hizmet					
Kişiye Özel Müşteri Temsilcisi					
Self Servis (Otomatik Hizmetler)					
Kişiye Özel Self Servis (Otomatik Hizmetler)					
Kullanıcı Toplulukları Üzerinden					
Müşteriler ile Ortak Yaratılan Hizmet					

Sayfa 4: İŞ MODELİ KANVAS

Question 5.

Temel Kaynaklar; iş modelinin yürümesi, ürün/servisin üretilmesi için ihtiyaç duyulan varlıkları ifade eder.

Ürün ve servislerinizi düşündüğünüzde (nesnelerin interneti -IoT- teknolojilerini kullanan) aşağıdaki kaynaklardan hangisi/hangilerini kullanıyorsunuz?

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
Fiziksel (Üretim tesisleri, makinalar, ...)					
Fikri (Bilgi, patent,...)					
Beşeri					
Finansal					

Question 6.

Temel Faaliyetler; iş modelinin yürümesi, ürün/servisin üretilmesi için gereken eylemleri ifade eder.

Ürün ve servislerinizi (nesnelerin interneti -IoT- teknolojilerini kullanan) sunarken harcadığınız eforu düşünerek aşağıdaki faaliyetleri en yoğundan başlayarak sıralar mısınız?

	Sıralama
Yazılım / Platform / Ürün Geliştirme	
İş Ortağı / Tedarikçi Bulma	
Satış ve Pazarlama Faaliyetleri	
Satış Sonrası Hizmet / Destek	
Lojistik	

Question 7.

Temel Ortaklıklar; iş modelinin işleyişini sağlayan tedarikçi ve ortaklardan meydana gelen ağı tarif eder.

Ürün ve servislerinizi (nesnelerin interneti -IoT- teknolojilerini kullanan) sunmak için aşağıdaki ortaklık türlerinden faydalanıyor musunuz?

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
Rakip Konumunda Olmayan Şirketlerle Kurulan Stratejik İttifaklar					
Rakipler Arasında Kurulan Stratejik Ortaklıklar					
Yeni İşler Geliştirmek İçin Kurulan Ortak Girişimler					
Tedarikte Sıkıntı Olmaması İçin Kurulan Alıcı-Satıcı İlişkileri					

Sayfa 5: İŞ MODELİ KANVAS

Question 8.

Gelir Akışı; bir şirketin müşterilerine sunduğu hizmet karşılığında aldığı nakdi değeri tarif eder.

Ürün ve servislerinizi (nesnelerin interneti -IoT- teknolojilerini kullanan) sunarken aşağıdaki hangi ticari modelleri kullanıyorsunuz?

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
Varlık (Fiziksel Ürün) Satışı					
Kullanım Bedeli					
Abonelik Ücretleri					
Kiralama/Ödünç Verme/Leasing					
Lisanslı Kullanım					
Aracılık Komisyonu					
Hizmet Sırasında Alınan Reklam					

Question 9.

Maliyet Yapısı; bir şirketin operasyonları esnasında ortaya çıkan tüm masraf kalemlerini tarif eder.

İş modeliniz içindeki temel maliyet kalemlerini bütçeniz içerisindeki en yüksek harcamadan başlayarak sıralar mısınız?

	Sıralama
Hizmet/Servis Geliştirme	
IT Maliyetleri	
İnsan Kaynağı Maliyetleri	
Lojistik	
Satış & Pazarlama	

Sayfa 6: PAZARIN OLGUNLUK SEVİYESİ

Question 10.

Faaliyet gösterdiğimiz pazarı düşündüğümüzde potansiyel müşterilerin çoğunluğu …

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
IoT teknolojilerinin farkındadır					
IoT teknolojileriniyle ilgili bilgi almak istemektedirler					
IoT teknolojilerini günlük yaşamlarında kullanmaktadırlar.					
IoT teknolojilerinin kendilerine sağladığı faydaları anlamıştır					
IoT ürün ve hizmetlerni satın almaya hazırdırlar					
Bizim pazarlama faaliyetlerimiz dışında kendileri bize ulaşır					

Question 11.

IoT üzerine operasyonel faaliyetlerimiz sırasında ...

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
ihtiyaç duyduğumuz iş ortaklarını kolaylıkla bulabiliriz					
çalıştığımız iş ortakları bizi destekleyecek bilgi birikimine sahiptir					
çalıştığımız iş ortakları bizi destekleyecek tecrübeye sahiptir					
çalıştığımız iş ortaklarından yeterli derecede faydalanıyoruz					
çalıştığımız iş ortaklarımız vizyon ve stratejileri geliştirmek konusunda bizi yeterince desteklemektedir					

Question 12.

Firmanızın Organizasyonel Hazırlığı Hakkında Düşüncelerinizi Paylaşır mısınız?

	Kesinlikle Katılmıyorum	Katılmıyorum	Karasızım	Katılıyorum	Kesinlikle Katılıyorum
Organizasyonumuz şirketimizin faydalanabileceği IoT teknolojileri hakkında iyi bilgi sahibidir					
Organizasyonumuz IoT teknolojilerinin potansiyel faydaları hakkında net fikir sahibidir					
Üst Yönetim ekibimiz IoT alanındaki faaliyetlerimizi desteklemektedir					
IoT faaliyetlerimizden beklentilerimiz nettir					
Şirketimiz IoT faaliyetlermizi desteklemek için için yeterli insan kaynağına sahiptir					
Şirketimiz IoT faaliyetlermizi desteklemek için için yeterli finansal kaynağa sahiptir					
Şirketimiz IoT faaliyetlermizi desteklemek için için yeterli teknolojik kabiliyete sahiptir					
Şirketimiz IoT faaliyetlermizi desteklemek için için yeterli bilgi birikimine sahiptir					
Organizasyonel kültürümüz innovasyon motivasyonunu desteklemektedir					
Yöneticilerimiz teknolojik gelişmeler doğrultusunda orgazinasyonel değişim için hazır ve isteklidir					
Üst Yönetim Ekibi yeni teknolojilerin denenmesi konusunda heyecanlı ve isteklidir					
Şirketimiz yeni teknolojilerin geliştirilmesi konusunda proaktif bir yaklaşım gösterir					

Sayfa 7: TEMEL BİLGİLER

Question 13.

Firma Ticaret Modeli

	Seçiniz
Firmadan Tüketicilere (B2C - Business to Consumer)	
Firmadan Firmaya (B2B - Business to Business)	
Her İkisi	

Question 14.

Sektör:

	Seçiniz
Hızlı Tüketim	
Medya	
Enerji	
Eğitim	
Teknoloji	
Danışmanlık Hizmet Şirketi	
Telekomünikasyon	
Perakende	
Finans	
Dayanıklı Tüketim	
Otomotiv	
Medikal	
Diğer	

Question 15.

Şirket Büyüklüğü

	Seçiniz
0-10	
11-50	
51-250	
250+	

Sayfa 8: İLETİŞİM BİLGİLERİ

Question 16.

İsminiz	
Ünvanınız	
Telefon Numarası	
E-mail Adresi	

APPENDIX 2: ENGLISH QUESTIONNAIRE

Internet of Things (IoT) – Turkish Market Research

Page 1: INTRODUCTION

Dear Participant;

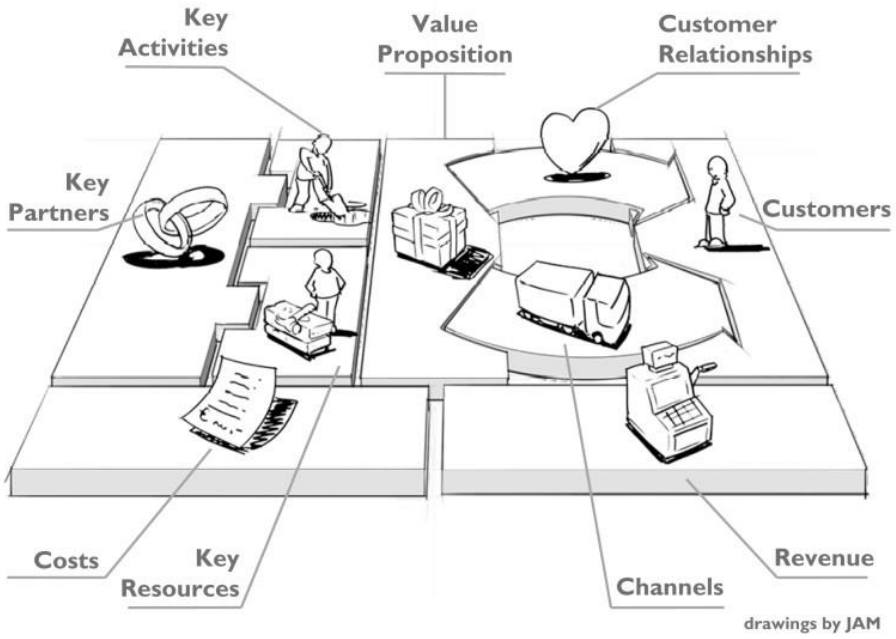
We would like to invite you to an academic study conducted by Bahcesehir University - Institute of Social Sciences. The study focuses on companies and explores business models for IoT related product/services and the market maturity. When the work is complete, we will have the opportunity to compare business models and practices in Turkey and elsewhere in the world market.

The completion of the questionnaire takes approximately 10 minutes on the internet and there are no questions about commercial details. The study is expected to be the first one in Turkey and it is among limited studies in the world.

Thank you for participating in this study ...
E. Emre Kanaat
0 (542) 561 1644
emre.kanaat@rdtbusiness.com

Page 2: BUSINESS MODEL CANVAS

"A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. It is a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams" (Osterwalder et al., 2005)



Question 1.

Value Proposition explains the product and service pack that creates value for a particular Customer Segment. Value proposition is aiming to make company or product more preferable from customer sides. This is the reason why customers change their decisions.

What value do you offer when you think about your products and services?

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Innovation					
Performance Improvement					
Customisation					
Getting The Job Done (Operational Support)					
Design					
Brand / Status					
Price Advantage					
Cost Reduction					
Risk Reduction					
Accessibility					
Convenience / Comfort					

Question 2.
Customer Segments; represents the organizations or groups that an entity wishes to reach and serve.

When you think about your products and services (which use the Internet of Things - IOT technologies), which of the following customer segments do you serve?

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
A mass market					
A niche market					
A segmented market					
A diversified market					
Multi-sided markets (Platforms)					

Page 3: BUSINESS MODEL CANVAS

Question 3.

Channels; describe how an organization communicates with customer segments and accesses that segment.

Which of the following channels do you use when you think about your products and services?

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Sales Force					
Web Sales					
Own Stores					
Partner Stores					
Wholesaler					

Question 4.

Customer relations management; describe how the relationships a company will establish with its customers. Relationships can range from personal to automated systems.

Which models / models do you use in Customer Relationship Management?

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Personal Assistance (Call Center Agent)					
Dedicated Personal Assistance					
Self-Service					
Automated service					
Communities					
Co-creation					

Page 4: BUSINESS MODEL CANVAS

Question 5.

Key Resources, in the business model, refers to the assets needed to produce the product / service.

When you think about your products and services (which use the Internet of Things - IOT technologies) which of the following sources do you use?

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Physical Resources					
Intellectual Property					
Human Resources					
Financial Resources					

Question 6.

Key Activities, in the business model, refers to the actions required to produce the product / service.

Can you list the following activities from the most intense by considering the effort that you spend in offering your products and services (using the Internet of Things - IOT technologies)?

	Ranking
Software / Platform / Product Development	
Finding Business Partner / Supplier	
Sales and Marketing Efforts	
After Sales Support	
Logistics	

Question 7.

Key Partnerships; describe the network of suppliers and partners that ensure the functioning of the business model.

Do you use the following types of partnerships to offer your products and services (using the Internet of Things - IOT technologies)?

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Strategic Partnership with Non-Competitors					
Strategic Partnership with Competitors					
Joint Ventures for Business Development					
Partnerships for Procurement Requirements					

Page 5: BUSINESS MODEL CANVAS

Question 8.

Revenue describes the cash value received by a company for its services to its customers.

Which commercial models do you use when you offer your products and services (using the Internet of Things - IOT technologies)?

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Asset Sale					
Usage Fee					
Subscription Fees					
Lending/Renting/Leasing					
Licensing					
Brokerage Fees					
Advertising					

Question 9.

Cost Structure describes all costs incurred during a company's operations.

Can you sort the basic cost items within your business model from the highest expenditure in your budget?

	Ranking
Software / Platform / Product Development	
Finding Business Partner / Supplier	
Sales and Marketing Efforts	
After Sales Support	
Logistics	

Page 6: MARKET MATURITY LEVEL

Question 10.

When we think about the market in which we operate, …

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
The market is aware of IoT technologies					
The market is willing to acquire more info on IoT technologies					
IoT technologies are used in daily life					
The market is aware of the benefits of IoT technologies					
The market is ready to buy IoT related products and services					
The customers reach us beyond our marketing efforts					

Question 11.

During our operational activities on IoT ...

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
We can find business partners when required					
Our business partners has the required know-how to support us					
Our business partners has the required experience to support us					
We can utilize our business partners satisfactorily					
Our business partners sufficiently support us to develop vision and mission					

Question 12.

Do you share your thoughts about the organizational readiness of your company?

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Our organisation knows IoT technologies that can be utilized					
Our organisation is aware of the potential benefits of IoT technologies					
Our top management supports IoT related initiatives					
Our expectations are clear from IoT initiatives					
Our company has the required human resources					
Our company has the required financial resources					
Our company has the required technological capabilities					
Our company has the required know-how					
Our corporate culture supports innovation					
Our management is ready and keen to organisational change					
Our Top Management is ready and keen to try new technologies					
Our company has a proactive approach for the development of new technologies					

Page 7: COMPANY INFORMATION

Question 13.

Your Commercial Model:

	Selection
B2C	
B2B	
Both	

Question 14.

Your Sector:

	Selection
FMCG	
Media	
Energy	
Education	
Technology	
Consultancy	
Telecommunication	
Retail	
Finance	
Durable Consumer Goods	
Otomative	
Medical	
Other	

Question 15.

Your Company Size

	Selection
0-10	
11-50	
51-250	
250+	

Page 8: COMMUNICATION DETAILS

Question 16.

Name	
Title	
Phone	
E-mail	

APPENDIX 3: RESULTS DATA ANALYSIS

3.1 Validity Statistics – Pearson Correlation

Correlations

		Q1_Value_Innovation	Q1_Value_Performance	Q1_Value_Customisation	Q1_Value_Job_Done	Q1_Value_Design	Q1_Value_Brand	Q1_Value_Price_Adv	Q1_Value_Cost_Reduc	Q1_Value_Risk_Reduc	Q1_Value_Accessibility	Q1_Value_Convenience	Q1
Q1_Value_Innovation	Pearson Correlation	1	.265	.256	.168	.502**	.440**	.221	.141	.216	.580**	.419**	.634**
	Sig. (2-tailed)		.071	.082	.258	.000	.002	.136	.343	.145	.000	.003	.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Performance	Pearson Correlation	.265	1	.308*	.290*	-.082	.197	.338*	.389**	.450**	.447**	.399**	.608**
	Sig. (2-tailed)	.071		.035	.048	.582	.185	.020	.007	.001	.002	.006	.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Customisation	Pearson Correlation	.256	.308*	1	-.027	.061	.178	-.083	-.045	.053	.243	.043	.310*
	Sig. (2-tailed)	.082	.035		.857	.683	.232	.580	.764	.725	.099	.776	.034
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Job_Done	Pearson Correlation	.168	.290*	-.027	1	.250	.525**	.479**	.172	.350*	.383**	.319*	.618**
	Sig. (2-tailed)	.258	.048	.857		.091	.000	.001	.248	.016	.008	.029	.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Design	Pearson Correlation	.502**	-.082	.061	.250	1	.581**	.165	.005	.036	.209	.145	.462**
	Sig. (2-tailed)	.000	.582	.683	.091		.000	.268	.976	.809	.159	.330	.001
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Brand	Pearson Correlation	.440**	.197	.178	.525**	.581**	1	.240	-.144	.070	.450**	.266	.574**
	Sig. (2-tailed)	.002	.185	.232	.000	.000		.104	.333	.640	.002	.071	.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Price_Adv	Pearson Correlation	.221	.338*	-.083	.479**	.165	.240	1	.508**	.442**	.184	.247	.642**
	Sig. (2-tailed)	.136	.020	.580	.001	.268	.104		.000	.002	.216	.095	.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Cost_Reduc	Pearson Correlation	.141	.389**	-.045	.172	.005	-.144	.508**	1	.528**	.244	.156	.518**
	Sig. (2-tailed)	.343	.007	.764	.248	.976	.333	.000		.000	.099	.296	.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Risk_Reduc	Pearson Correlation	.216	.450**	.053	.350*	.036	.070	.442**	.528**	1	.367*	.219	.640**
	Sig. (2-tailed)	.145	.001	.725	.016	.809	.640	.002	.000		.011	.138	.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Accessibility	Pearson Correlation	.580**	.447**	.243	.383**	.209	.450**	.184	.244	.367*	1	.595**	.703**
	Sig. (2-tailed)	.000	.002	.099	.008	.159	.002	.216	.099	.011		.000	.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1_Value_Convenience	Pearson Correlation	.419**	.399**	.043	.319*	.145	.266	.247	.156	.219	.595**	1	.555**
	Sig. (2-tailed)	.003	.006	.776	.029	.330	.071	.095	.296	.138	.000		.000
	N	47	47	47	47	47	47	47	47	47	47	47	47
Q1	Pearson Correlation	.634**	.608**	.310*	.618**	.462**	.574**	.642**	.518**	.640**	.703**	.555**	1
	Sig. (2-tailed)	.000	.000	.034	.000	.001	.000	.000	.000	.000	.000	.000	
	N	47	47	47	47	47	47	47	47	47	47	47	47

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

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

Correlations

		Q2_Cust_mass	Q2_Cust_niche	Q2_Cust_segmented	Q2_Cust_diversified	Q2_Cust_Multi_sided	Q2
Q2_Cust_mass	Pearson Correlation	1	-.119	-.037	.033	.086	.408**
	Sig. (2-tailed)		.425	.807	.826	.567	.004
	N	47	47	47	47	47	47
Q2_Cust_niche	Pearson Correlation	-.119	1	.217	.218	-.012	.436**
	Sig. (2-tailed)	.425		.142	.141	.935	.002
	N	47	47	47	47	47	47
Q2_Cust_segmented	Pearson Correlation	-.037	.217	1	.328*	.049	.524**
	Sig. (2-tailed)	.807	.142		.025	.746	.000
	N	47	47	47	47	47	47
Q2_Cust_diversified	Pearson Correlation	.033	.218	.328*	1	.130	.640**
	Sig. (2-tailed)	.826	.141	.025		.382	.000
	N	47	47	47	47	47	47
Q2_Cust_Multi_sided	Pearson Correlation	.086	-.012	.049	.130	1	.574**
	Sig. (2-tailed)	.567	.935	.746	.382		.000
	N	47	47	47	47	47	47
Q2	Pearson Correlation	.408**	.436**	.524**	.640**	.574**	1
	Sig. (2-tailed)	.004	.002	.000	.000	.000	
	N	47	47	47	47	47	47

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

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

Correlations

		Q3_Channel_Sales	Q3_Channel_Web	Q3_Channel_Own	Q3_Channel_Partner	Q3_Channel_Wholesaler	Q3
Q3_Channel_Sales	Pearson Correlation	1	-.157	.052	-.235	-.115	.132
	Sig. (2-tailed)		.291	.731	.112	.441	.376
	N	47	47	47	47	47	47
Q3_Channel_Web	Pearson Correlation	-.157	1	-.064	.073	.220	.497**
	Sig. (2-tailed)	.291		.671	.626	.137	.000
	N	47	47	47	47	47	47
Q3_Channel_Own	Pearson Correlation	.052	-.064	1	.317*	.256	.554**
	Sig. (2-tailed)	.731	.671		.030	.083	.000
	N	47	47	47	47	47	47
Q3_Channel_Partner	Pearson Correlation	-.235	.073	.317*	1	.345*	.627**
	Sig. (2-tailed)	.112	.626	.030		.017	.000
	N	47	47	47	47	47	47
Q3_Channel_Wholesaler	Pearson Correlation	-.115	.220	.256	.345*	1	.698**
	Sig. (2-tailed)	.441	.137	.083	.017		.000
	N	47	47	47	47	47	47
Q3	Pearson Correlation	.132	.497**	.554**	.627**	.698**	1
	Sig. (2-tailed)	.376	.000	.000	.000	.000	
	N	47	47	47	47	47	47

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

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

Correlations

		Q4_CRM_PA	Q4_CRM_DPA	Q4_CRM_SelfService	Q4_CRM_Automated Service	Q4_CRM_Communities	Q4_CRM_Co_creation	Q4
Q4_CRM_PA	Pearson Correlation	1	.090	-.305*	-.339*	-.140	-.348*	-.077
	Sig. (2-tailed)		.546	.037	.020	.350	.017	.606
	N	47	47	47	47	47	47	47
Q4_CRM_DPA	Pearson Correlation	.090	1	-.038	.234	-.128	-.002	.382**
	Sig. (2-tailed)	.546		.799	.114	.393	.991	.008
	N	47	47	47	47	47	47	47
Q4_CRM_SelfService	Pearson Correlation	-.305*	-.038	1	.582**	.349*	.156	.602**
	Sig. (2-tailed)	.037	.799		.000	.016	.294	.000
	N	47	47	47	47	47	47	47
Q4_CRM_Automated Service	Pearson Correlation	-.339*	.234	.582**	1	.377**	.316*	.756**
	Sig. (2-tailed)	.020	.114	.000		.009	.031	.000
	N	47	47	47	47	47	47	47
Q4_CRM_Communities	Pearson Correlation	-.140	-.128	.349*	.377**	1	.556**	.691**
	Sig. (2-tailed)	.350	.393	.016	.009		.000	.000
	N	47	47	47	47	47	47	47
Q4_CRM_Co_creation	Pearson Correlation	-.348*	-.002	.156	.316*	.556**	1	.594**
	Sig. (2-tailed)	.017	.991	.294	.031	.000		.000
	N	47	47	47	47	47	47	47
Q4	Pearson Correlation	-.077	.382**	.602**	.756**	.691**	.594**	1
	Sig. (2-tailed)	.606	.008	.000	.000	.000	.000	
	N	47	47	47	47	47	47	47

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

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

Correlations

		Q5_Resources_Physical	Q5_Resources_Intellectual	Q5_Resources_HR	Q5_Resources_Financial_Resour	Q5
Q5_Resources_Physical	Pearson Correlation	1	.341*	.099	.327*	.715**
	Sig. (2-tailed)		.020	.511	.027	.000
	N	46	46	46	46	46
Q5_Resources_Intellectual	Pearson Correlation	.341*	1	.352*	.360*	.675**
	Sig. (2-tailed)	.020		.016	.014	.000
	N	46	46	46	46	46
Q5_Resources_HR	Pearson Correlation	.099	.352*	1	.419**	.637**
	Sig. (2-tailed)	.511	.016		.004	.000
	N	46	46	46	46	46
Q5_Resources_Financial_Resour	Pearson Correlation	.327*	.360*	.419**	1	.742**
	Sig. (2-tailed)	.027	.014	.004		.000
	N	46	46	46	46	46
Q5	Pearson Correlation	.715**	.675**	.637**	.742**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	46	46	46	46	46

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

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

Correlations

		Q7_Partnership_Non_Competitors	Q7_Partnership_Competitors	Q7_Partnership_Joint_Ventures	Q7_Partnership_Procurement	Q7
Q7_Partnership_Non_Competitors	Pearson Correlation	1	.253	.318*	.180	.631**
	Sig. (2-tailed)		.090	.031	.232	.000
	N	46	46	46	46	46
Q7_Partnership_Competitors	Pearson Correlation	.253	1	.203	-.003	.612**
	Sig. (2-tailed)	.090		.175	.986	.000
	N	46	46	46	46	46
Q7_Partnership_Joint_Ventures	Pearson Correlation	.318*	.203	1	.235	.699**
	Sig. (2-tailed)	.031	.175		.116	.000
	N	46	46	46	46	46
Q7_Partnership_Procurement	Pearson Correlation	.180	-.003	.235	1	.572**
	Sig. (2-tailed)	.232	.986	.116		.000
	N	46	46	46	46	46
Q7	Pearson Correlation	.631**	.612**	.699**	.572**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	46	46	46	46	46

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

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

Correlations

		Q8_Revenue_Asset_Sale	Q8_Revenue_Usage_Fee	Q8_Revenue_Subscription_Fees	Q8_Revenue_Lending	Q8_Revenue_Licensing	Q8_Revenue_Brokerage	Q8_Revenue_Advertising	Q8
Q8_Revenue_Asset_Sale	Pearson Correlation	1	.304*	.015	.217	-.160	.054	-.018	.395**
	Sig. (2-tailed)		.040	.922	.148	.289	.720	.905	.007
	N	46	46	46	46	46	46	46	46
Q8_Revenue_Usage_Fee	Pearson Correlation	.304*	1	.483**	.185	-.061	-.144	.334*	.556**
	Sig. (2-tailed)	.040		.001	.219	.687	.341	.023	.000
	N	46	46	46	46	46	46	46	46
Q8_Revenue_Subscription_Fees	Pearson Correlation	.015	.483**	1	.442**	.252	.081	.055	.641**
	Sig. (2-tailed)	.922	.001		.002	.092	.592	.716	.000
	N	46	46	46	46	46	46	46	46
Q8_Revenue_Lending	Pearson Correlation	.217	.185	.442**	1	.167	.095	-.158	.581**
	Sig. (2-tailed)	.148	.219	.002		.267	.528	.294	.000
	N	46	46	46	46	46	46	46	46
Q8_Revenue_Licensing	Pearson Correlation	-.160	-.061	.252	.167	1	.455**	-.056	.482**
	Sig. (2-tailed)	.289	.687	.092	.267		.001	.712	.001
	N	46	46	46	46	46	46	46	46
Q8_Revenue_Brokerage	Pearson Correlation	.054	-.144	.081	.095	.455**	1	.191	.511**
	Sig. (2-tailed)	.720	.341	.592	.528	.001		.204	.000
	N	46	46	46	46	46	46	46	46
Q8_Revenue_Advertising	Pearson Correlation	-.018	.334*	.055	-.158	-.056	.191	1	.358*
	Sig. (2-tailed)	.905	.023	.716	.294	.712	.204		.014
	N	46	46	46	46	46	46	46	46
Q8	Pearson Correlation	.395**	.556**	.641**	.581**	.482**	.511**	.358*	1
	Sig. (2-tailed)	.007	.000	.000	.000	.001	.000	.014	
	N	46	46	46	46	46	46	46	46

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

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

Correlations

		Q10_Market_Aware	Q10_Market_Req_Info	Q10_Market_Daily_Use	Q10_Market_Knows_Benefit	Q10_Market_Ready_to_Buy	Q10_Market_Pro_Reach	Q10
Q10_Market_Aware	Pearson Correlation	1	.436**	.625**	.546**	.459**	.451**	.780**
	Sig. (2-tailed)		.003	.000	.000	.002	.002	.000
	N	43	43	43	43	43	43	43
Q10_Market_Req_Info	Pearson Correlation	.436**	1	.356*	.189	.217	.185	.483**
	Sig. (2-tailed)	.003		.019	.226	.162	.236	.001
	N	43	43	43	43	43	43	43
Q10_Market_Daily_Use	Pearson Correlation	.625**	.356*	1	.655**	.660**	.590**	.862**
	Sig. (2-tailed)	.000	.019		.000	.000	.000	.000
	N	43	43	43	43	43	43	43
Q10_Market_Knows_Benefit	Pearson Correlation	.546**	.189	.655**	1	.774**	.489**	.811**
	Sig. (2-tailed)	.000	.226	.000		.000	.001	.000
	N	43	43	43	43	43	43	43
Q10_Market_Ready_to_Buy	Pearson Correlation	.459**	.217	.660**	.774**	1	.619**	.826**
	Sig. (2-tailed)	.002	.162	.000	.000		.000	.000
	N	43	43	43	43	43	43	43
Q10_Market_Pro_Reach	Pearson Correlation	.451**	.185	.590**	.489**	.619**	1	.759**
	Sig. (2-tailed)	.002	.236	.000	.001	.000		.000
	N	43	43	43	43	43	43	43
Q10	Pearson Correlation	.780**	.483**	.862**	.811**	.826**	.759**	1
	Sig. (2-tailed)	.000	.001	.000	.000	.000	.000	
	N	43	43	43	43	43	43	43

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

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

Correlations

		Q11_Partner_Supp_Find_Easy	Q11_Partner_Supp_Knowledge	Q11_Partner_Supp_Experience	Q11_Partner_Supp_Can_Benefit	Q11_Partner_Supp_Can_Support	Q11
Q11_Partner_Supp_Find_Easy	Pearson Correlation	1	.541**	.424**	.430**	.264	.702**
	Sig. (2-tailed)		.000	.005	.004	.087	.000
	N	43	43	43	43	43	43
Q11_Partner_Supp_Knowledge	Pearson Correlation	.541**	1	.707**	.550**	.408**	.832**
	Sig. (2-tailed)	.000		.000	.000	.007	.000
	N	43	43	43	43	43	43
Q11_Partner_Supp_Experience	Pearson Correlation	.424**	.707**	1	.435**	.528**	.797**
	Sig. (2-tailed)	.005	.000		.004	.000	.000
	N	43	43	43	43	43	43
Q11_Partner_Supp_Can_Benefit	Pearson Correlation	.430**	.550**	.435**	1	.696**	.794**
	Sig. (2-tailed)	.004	.000	.004		.000	.000
	N	43	43	43	43	43	43
Q11_Partner_Supp_Can_Support	Pearson Correlation	.264	.408**	.528**	.696**	1	.743**
	Sig. (2-tailed)	.087	.007	.000	.000		.000
	N	43	43	43	43	43	43
Q11	Pearson Correlation	.702**	.832**	.797**	.794**	.743**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	43	43	43	43	43	43

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

Correlations

		Q12_Org_Knows_Benefit	Q12_Org_Aware	Q12_Org_Support_Functions	Q12_Org_Clear_Expectations	Q12_Org_have_HR	Q12_Org_have_FinRes	Q12_Org_have_Tech_Cap	Q12_Org_have_knowledge	Q12_Org_motivation	Q12_Org_ready_change	Q12_Org_excited	Q12_Org_proactive	Q12
Q12_Org_Knows_Benefit	Pearson Correlation	1	.865**	.716**	.743**	.459**	.269	.672**	.735**	.646**	.463**	.517**	.626**	.885**
	Sig. (2-tailed)		.000	.000	.000	.002	.082	.000	.000	.000	.002	.000	.000	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_Aware	Pearson Correlation	.865**	1	.746**	.722**	.473**	.252	.646**	.714**	.507**	.479**	.548**	.676**	.874**
	Sig. (2-tailed)	.000		.000	.000	.001	.103	.000	.000	.001	.001	.000	.000	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_Support_Functions	Pearson Correlation	.716**	.746**	1	.714**	.486**	.203	.476**	.492**	.355*	.442**	.658**	.714**	.786**
	Sig. (2-tailed)	.000	.000		.000	.001	.191	.001	.001	.020	.003	.000	.000	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_Clear_Expectations	Pearson Correlation	.743**	.722**	.714**	1	.463**	.223	.639**	.728**	.365*	.504**	.556**	.534**	.823**
	Sig. (2-tailed)	.000	.000	.000		.002	.150	.000	.000	.016	.001	.000	.000	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_have_HR	Pearson Correlation	.459**	.473**	.486**	.463**	1	.660**	.349*	.345*	.275	.318*	.302*	.344*	.674**
	Sig. (2-tailed)	.002	.001	.001	.002		.000	.022	.024	.074	.038	.049	.024	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_have_FinRes	Pearson Correlation	.269	.252	.203	.223	.660**	1	.114	.082	.045	-.017	.036	.037	.399**
	Sig. (2-tailed)	.082	.103	.191	.150	.000		.468	.603	.777	.913	.821	.816	.008
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_have_Tech_Cap	Pearson Correlation	.672**	.646**	.476**	.639**	.349*	.114	1	.784**	.492**	.389**	.397**	.594**	.770**
	Sig. (2-tailed)	.000	.000	.001	.000	.022	.468		.000	.001	.010	.008	.000	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_have_knowledge	Pearson Correlation	.735**	.714**	.492**	.728**	.345*	.082	.784**	1	.515**	.393**	.413**	.566**	.788**
	Sig. (2-tailed)	.000	.000	.001	.000	.024	.603	.000		.000	.009	.006	.000	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_motivation	Pearson Correlation	.646**	.507**	.355*	.365*	.275	.045	.492**	.515**	1	.408**	.425**	.451**	.618**
	Sig. (2-tailed)	.000	.001	.020	.016	.074	.777	.001	.000		.007	.004	.002	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_ready_change	Pearson Correlation	.463**	.479**	.442**	.504**	.318*	-.017	.389**	.393**	.408**	1	.661**	.432**	.601**
	Sig. (2-tailed)	.002	.001	.003	.001	.038	.913	.010	.009	.007		.000	.004	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_excited	Pearson Correlation	.517**	.548**	.658**	.556**	.302*	.036	.397**	.413**	.425**	.661**	1	.512**	.654**
	Sig. (2-tailed)	.000	.000	.000	.000	.049	.821	.008	.006	.004	.000		.000	.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12_Org_proactive	Pearson Correlation	.626**	.676**	.714**	.534**	.344*	.037	.594**	.566**	.451**	.432**	.512**	1	.736**
	Sig. (2-tailed)	.000	.000	.000	.000	.024	.816	.000	.000	.002	.004	.000		.000
	N	43	43	43	43	43	43	43	43	43	43	43	43	43
Q12	Pearson Correlation	.885**	.874**	.786**	.823**	.674**	.399**	.770**	.788**	.618**	.601**	.654**	.736**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.008	.000	.000	.000	.000	.000	.000	
	N	43	43	43	43	43	43	43	43	43	43	43	43	43

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

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

3.2 Reliability Statistics - Cronbach's Alpha

Question Group 1

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.769	.795	11

Question Group 2

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.305	.329	5

Question Group 3

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.900	.916	12

Question Group 4

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.428	.375	6

Question Group 5

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.613	.649	4

Question Group 7

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.472	.496	4

Question Group 8

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.502	.512	7

Question Group 10

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.852	.849	6

Question Group 11

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.828	.832	5

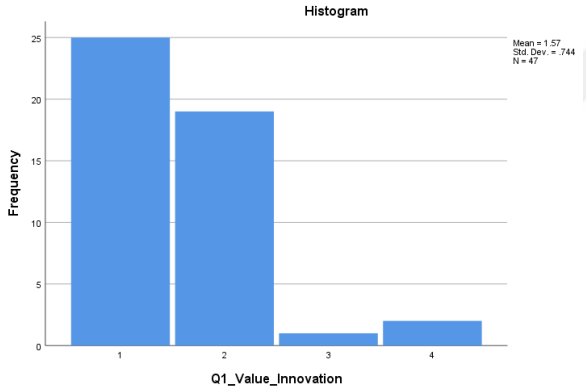
Question Group 12

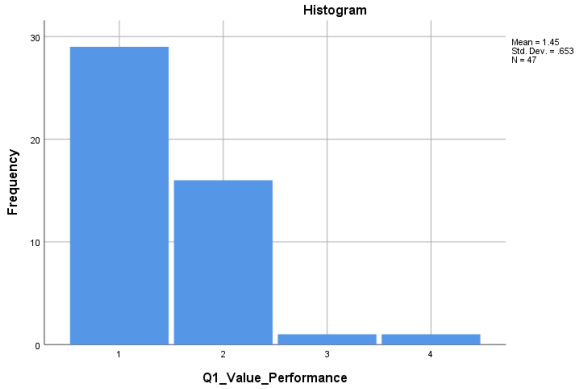
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.900	.916	12

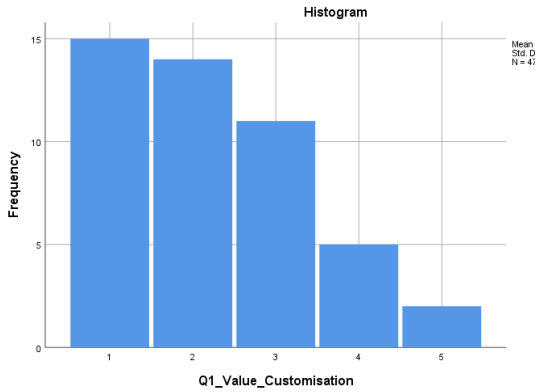
3.3 Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q1_Value_Innovation	47	1	4	1.57	.744	1.550	.347	2.981	.681
Q1_Value_Performance	47	1	4	1.45	.653	1.672	.347	3.736	.681
Q1_Value_Customisation	47	1	5	2.26	1.151	.634	.347	-.376	.681
Q1_Value_Job_Done	47	1	5	2.11	.890	.943	.347	1.446	.681
Q1_Value_Design	47	1	5	2.28	1.136	.908	.347	.277	.681
Q1_Value_Brand	47	1	5	2.13	.900	1.049	.347	1.526	.681
Q1_Value_Price_Adv	47	1	5	2.38	1.278	.469	.347	-1.116	.681
Q1_Value_Cost_Reduc	47	1	4	1.98	1.151	.846	.347	-.758	.681
Q1_Value_Risk_Reduc	47	1	5	2.19	1.329	.735	.347	-.771	.681
Q1_Value_Accessibility	47	1	4	1.62	.822	1.322	.347	1.302	.681
Q1_Value_Convenience	47	1	4	1.68	.810	1.171	.347	1.106	.681
Valid N (listwise)	47								



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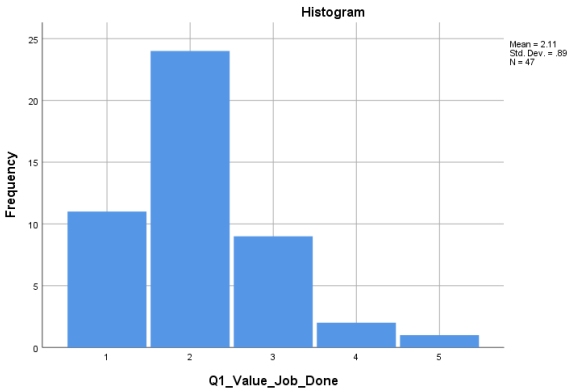
Mean
Std. D
N = 47
Frequency
Q1_Value_Customisation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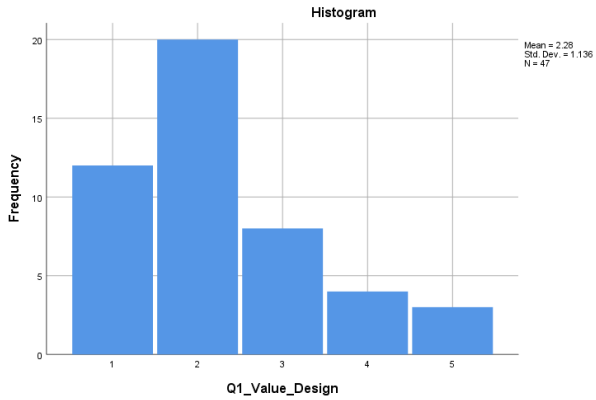
Std. Dev. = .89
N = 47
Frequency
Q1_Value_Job_Done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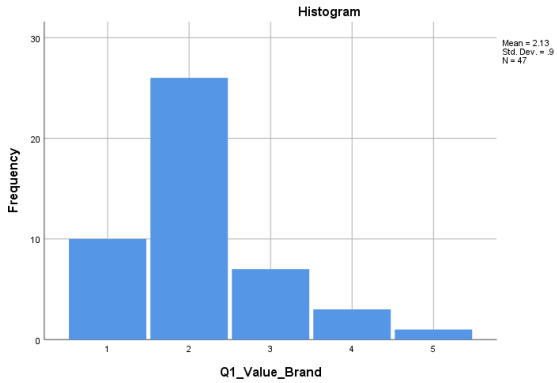
N = 47
Frequency
Q1_Value_Design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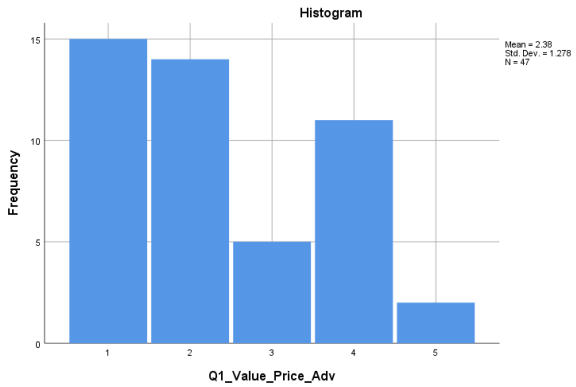
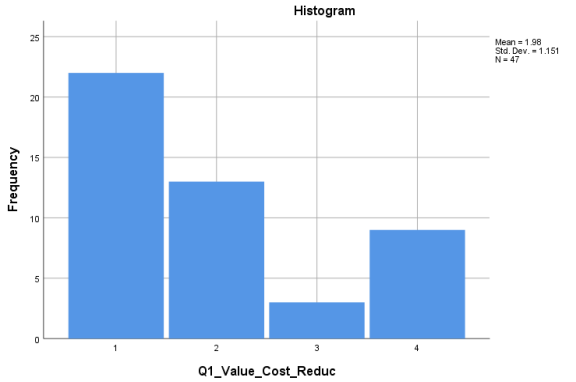
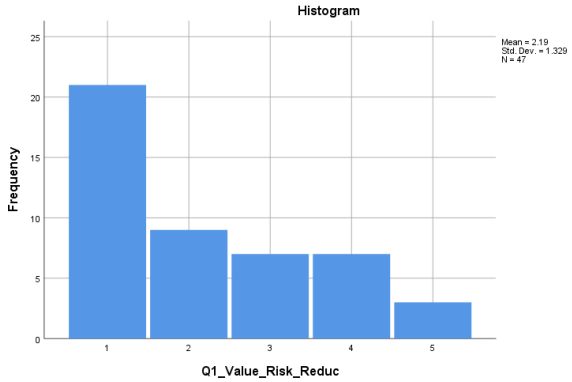
Std. Dev. = .9
N = 47
Frequency
Q1_Value_Brand


Histogram
Mean = 2.38
Std. Dev. = 1.278
N = 47
Frequency
15
10
5
0
1
2
3
4
5
Q1_Value_Price_Adv


Histogram
Mean = 1.98
Std. Dev. = 1.151
N = 47
Frequency
25
20
15
10
5
0
1
2
3
4
Q1_Value_Cost_Reduc


Histogram
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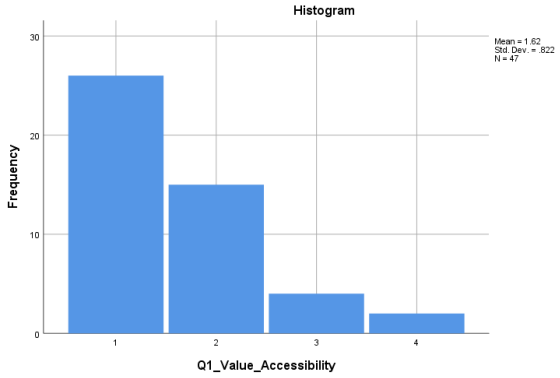
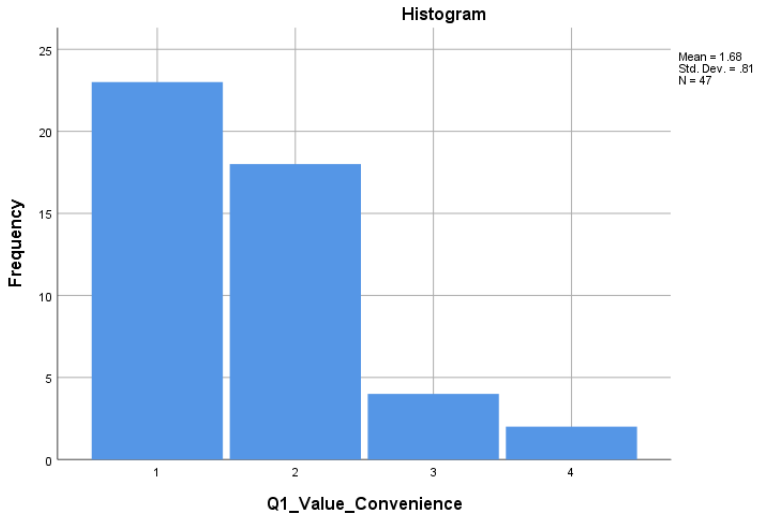
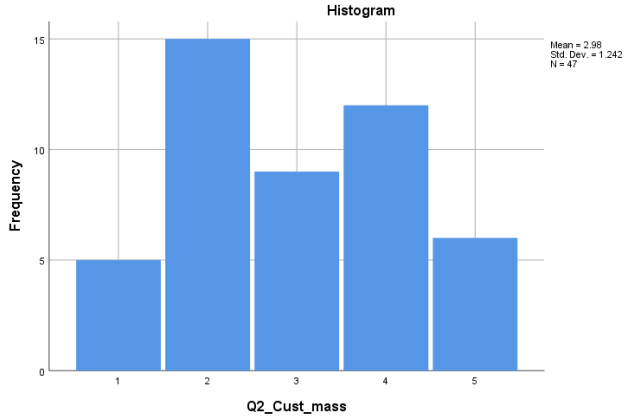
Std. Dev. = 1.329
N = 47
Frequency
Q1_Value_Risk_Reduc

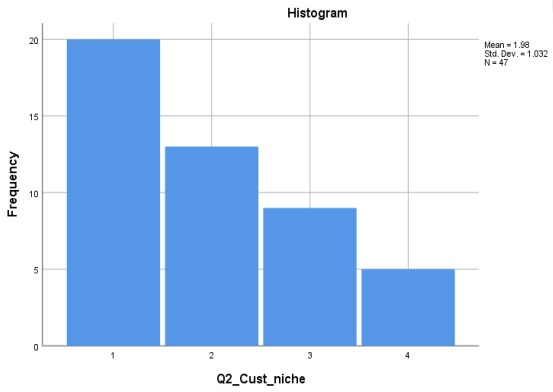

Histogram
Mean = 1.62
Std. Dev. = .822
N = 47
Frequency
Q1_Value_Accessibility

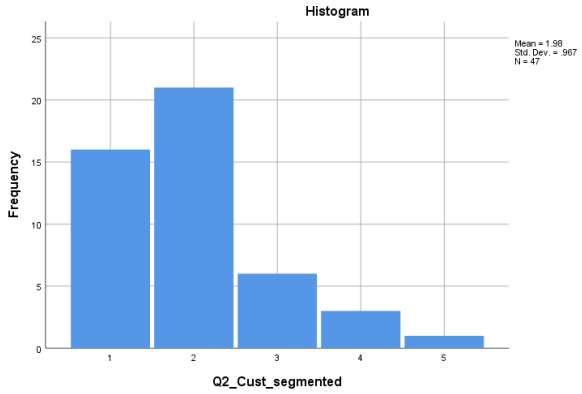

Histogram
Mean = 1.68
Std. Dev. = .81
N = 47
Frequency
Q1_Value_Convenience

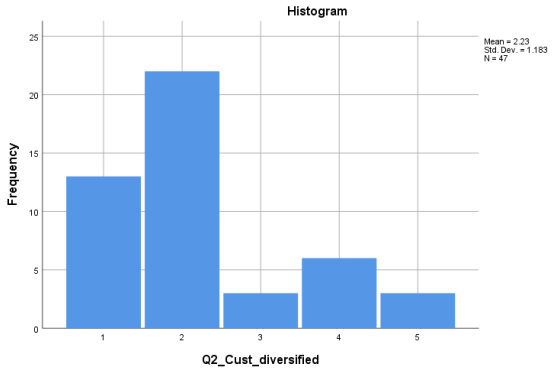
Descriptive Statistics

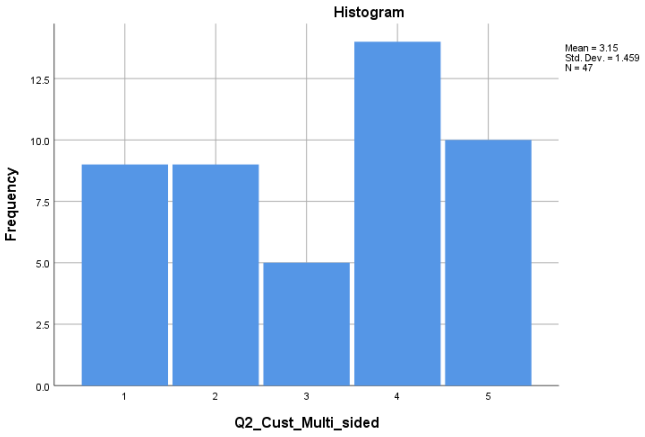
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q2_Cust_mass	47	1	5	2.98	1.242	.113	.347	-1.088	.681
Q2_Cust_niche	47	1	4	1.98	1.032	.664	.347	-.768	.681
Q2_Cust_segmented	47	1	5	1.98	.967	1.100	.347	1.181	.681
Q2_Cust_diversified	47	1	5	2.23	1.183	1.002	.347	.143	.681
Q2_Cust_Multi_sided	47	1	5	3.15	1.459	-.226	.347	-1.391	.681
Valid N (listwise)	47								





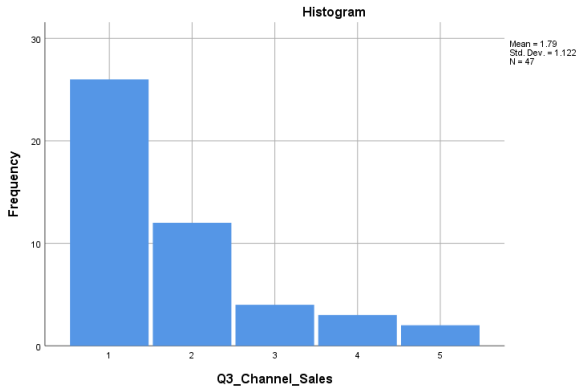

Histogram
Mean = 1.98
Std. Dev. = .967
N = 47
Frequency
Q2_Cust_segmented

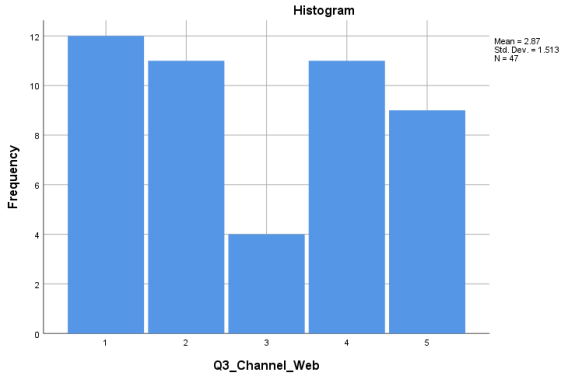

Histogram
Mean = 2.23
Std. Dev. = 1.183
N = 47
Frequency
Q2_Cust_diversified

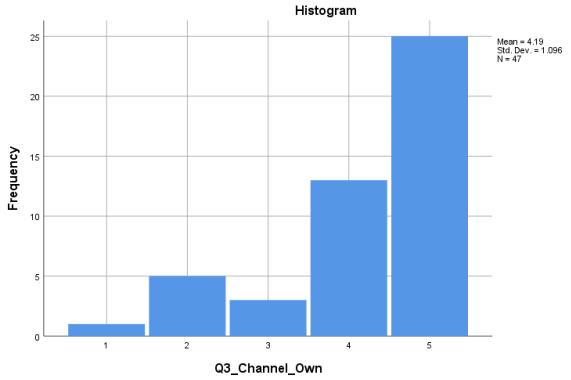

Histogram
Mean = 3.15
Std. Dev. = 1.459
N = 47
Frequency
Q2_Cust_Multi_sided

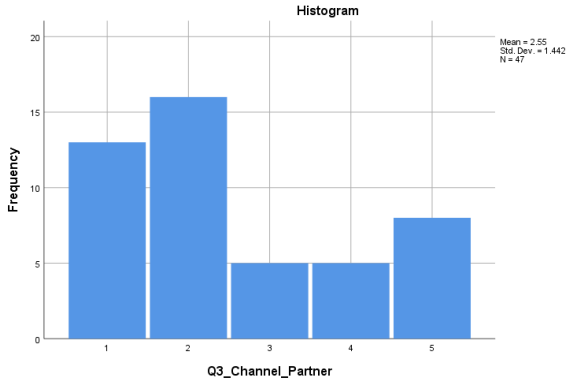
Descriptive Statistics

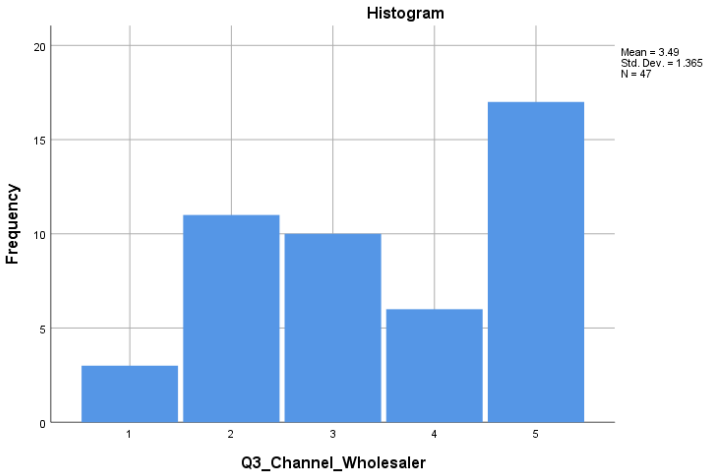
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q3_Channel_Sales	47	1	5	1.79	1.122	1.503	.347	1.546	.681
Q3_Channel_Web	47	1	5	2.87	1.513	.108	.347	-1.521	.681
Q3_Channel_Own	47	1	5	4.19	1.096	-1.329	.347	.839	.681
Q3_Channel_Partner	47	1	5	2.55	1.442	.616	.347	-.993	.681
Q3_Channel_Wholesaler	47	1	5	3.49	1.365	-.218	.347	-1.361	.681
Valid N (listwise)	47								





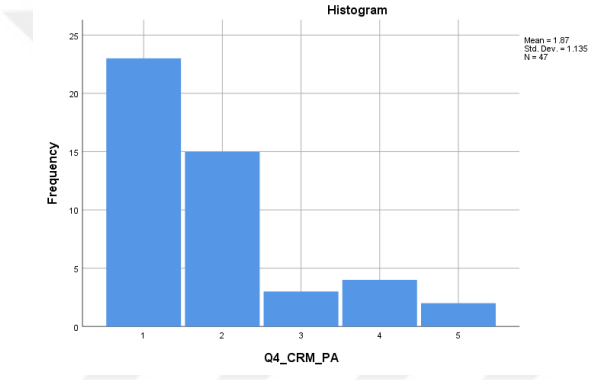

Histogram
Mean = 4.19
Std. Dev. = 1.096
N = 47
Frequency
Q3_Channel_Own

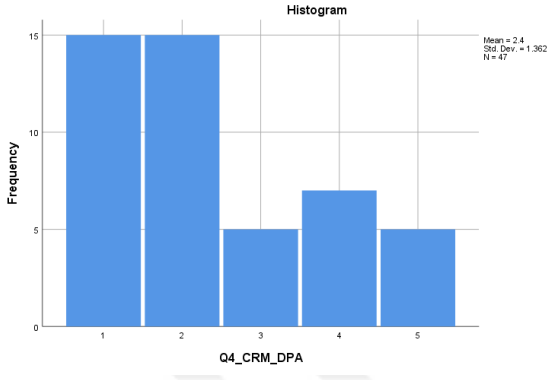

Histogram
Mean = 2.55
Std. Dev. = 1.442
N = 47
Frequency
Q3_Channel_Partner

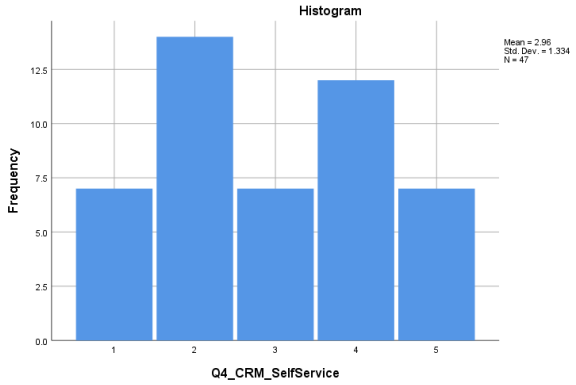

Histogram
Mean = 3.49
Std. Dev. = 1.365
N = 47
Frequency
Q3_Channel_Wholesaler

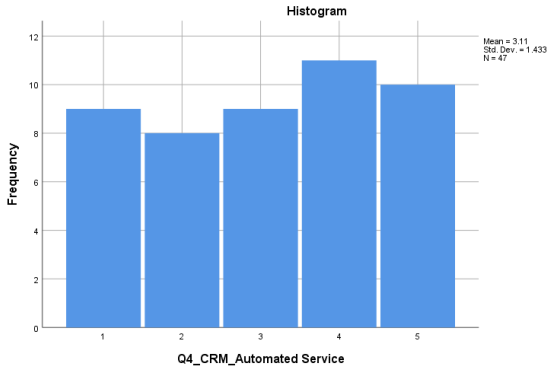
Descriptive Statistics

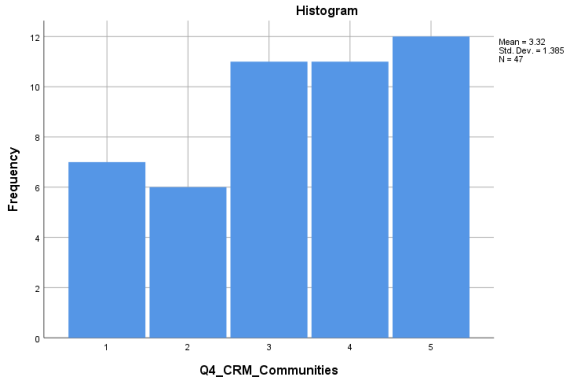
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q4_CRM_PA	47	1	5	1.87	1.135	1.380	.347	1.149	.681
Q4_CRM_DPA	47	1	5	2.40	1.362	.669	.347	-.817	.681
Q4_CRM_SelfService	47	1	5	2.96	1.334	.081	.347	-1.249	.681
Q4_CRM_Automated Service	47	1	5	3.11	1.433	-.148	.347	-1.299	.681
Q4_CRM_Communities	47	1	5	3.32	1.385	-.350	.347	-1.058	.681
Q4_CRM_Co_creation	47	1	5	2.74	1.406	.526	.347	-1.127	.681
Valid N (listwise)	47								

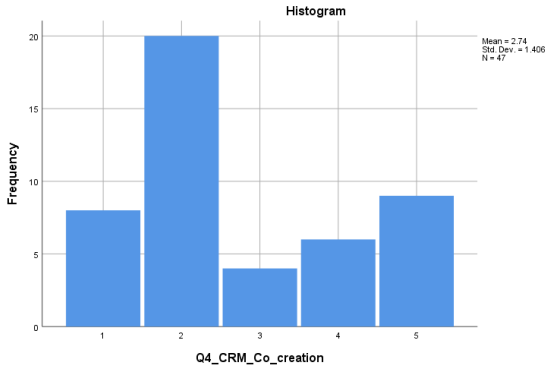





Histogram
Mean = 2.96
Std. Dev. = 1.334
N = 47
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
1
2
3
4
5
Q4_CRM_SelfService

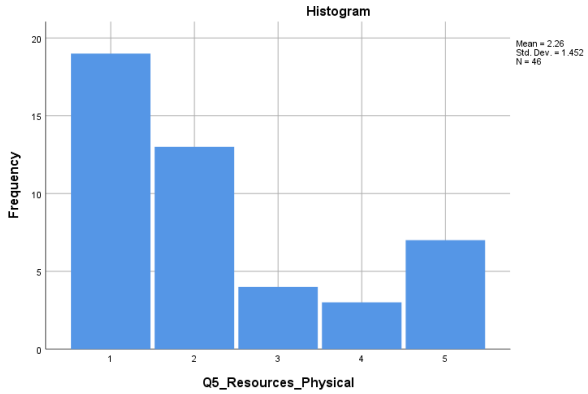

Histogram
Mean = 3.11
Std. Dev. = 1.433
N = 47
Frequency
12
10
8
6
4
2
0
1
2
3
4
5
Q4_CRM_Automated Service

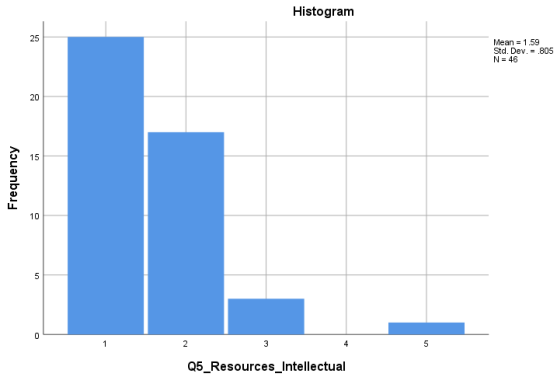


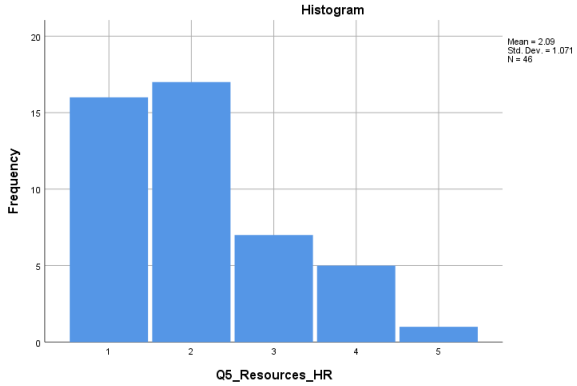


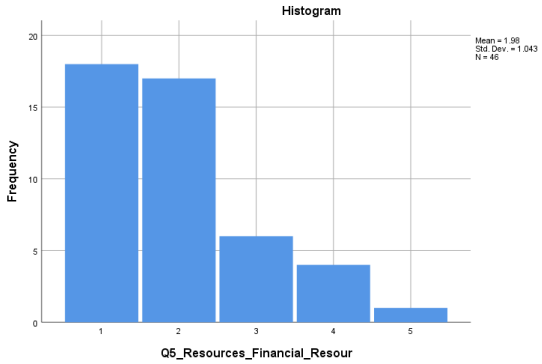
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q5_Resources_Physical	46	1	5	2.26	1.452	.933	.350	-.521	.688
Q5_Resources_Intellectual	46	1	5	1.59	.805	1.977	.350	5.933	.688
Q5_Resources_HR	46	1	5	2.09	1.071	.841	.350	-.008	.688
Q5_Resources_Financial_Resour	46	1	5	1.98	1.043	1.027	.350	.502	.688
Valid N (listwise)	46								


Histogram
Mean = 2.26
Std. Dev. = 1.452
N = 46
Frequency
Q5_Resources_Physical

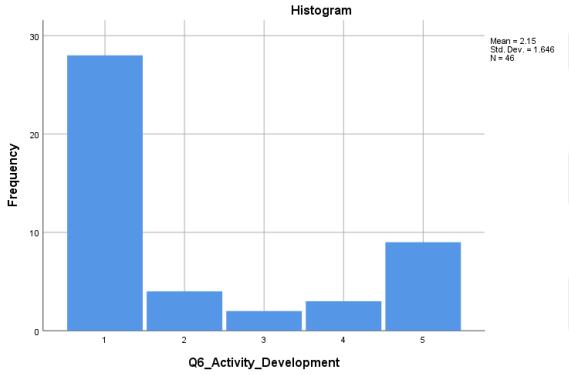

Histogram
Mean = 1.59
Std. Dev. = .805
N = 46
Frequency
Q5_Resources_Intellectual

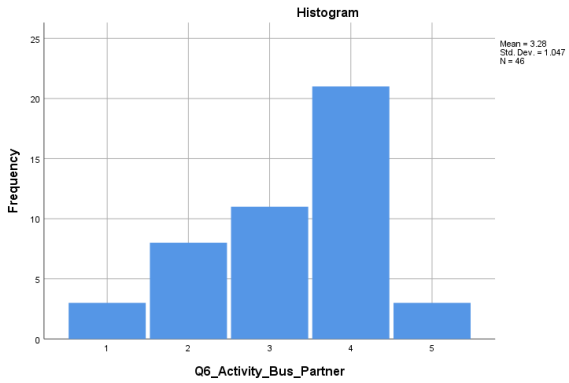

Histogram
Mean = 2.09
Std. Dev. = 1.071
N = 46
Frequency
Q5_Resources_HR

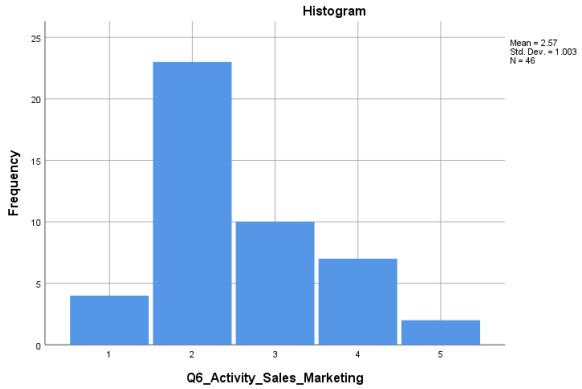

Histogram
Mean = 1.98
Std. Dev. = 1.043
N = 46
Frequency
Q5_Resources_Financial_Resour

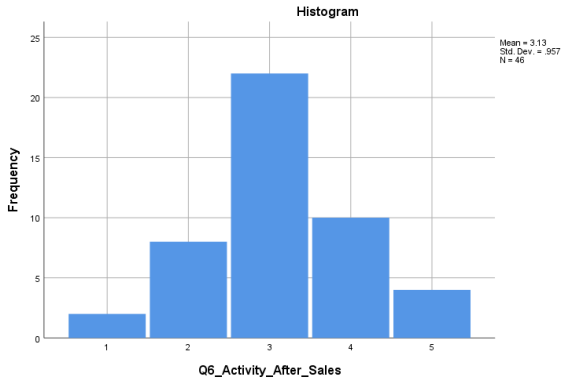
Descriptive Statistics

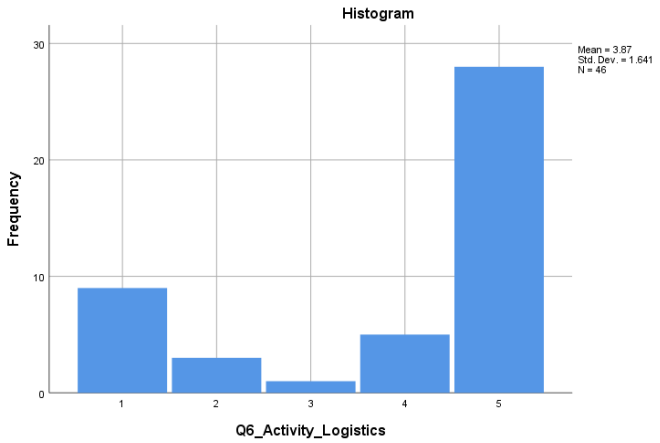
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q6_Activity_Development	46	1	5	2.15	1.646	.964	.350	-.868	.688
Q6_Activity_Bus_Partner	46	1	5	3.28	1.047	-.604	.350	-.361	.688
Q6_Activity_Sales_Marketing	46	1	5	2.57	1.003	.710	.350	-.038	.688
Q6_Activity_After_Sales	46	1	5	3.13	.957	.047	.350	.084	.688
Q6_Activity_Logistics	46	1	5	3.87	1.641	-1.011	.350	-.785	.688
Valid N (listwise)	46								





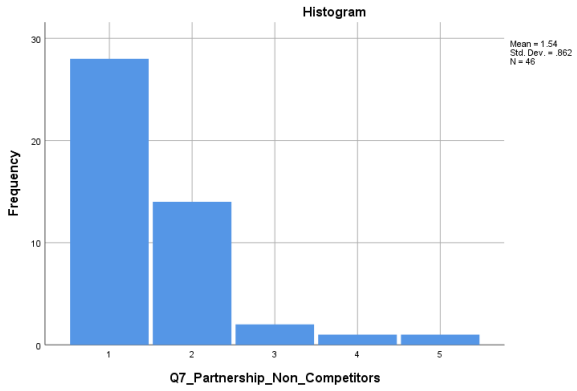

Histogram
Mean = 2.57
Std. Dev. = 1.003
N = 46
Frequency
0
5
10
15
20
25
1
2
3
4
5
Q6_Activity_Sales_Marketing

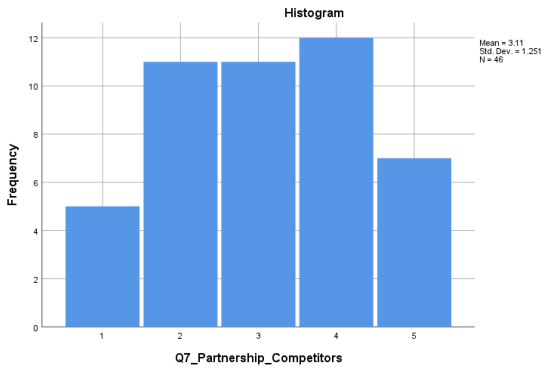

Histogram
Mean = 3.13
Std. Dev. = .957
N = 46
Frequency
0
5
10
15
20
25
1
2
3
4
5
Q6_Activity_After_Sales

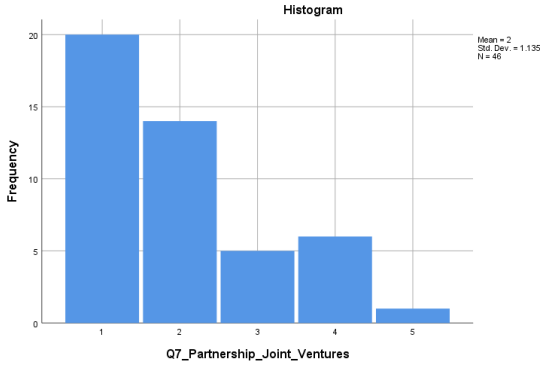

Histogram
Mean = 3.87
Std. Dev. = 1.641
N = 46
Frequency
0
10
20
30
1
2
3
4
5
Q6_Activity_Logistics

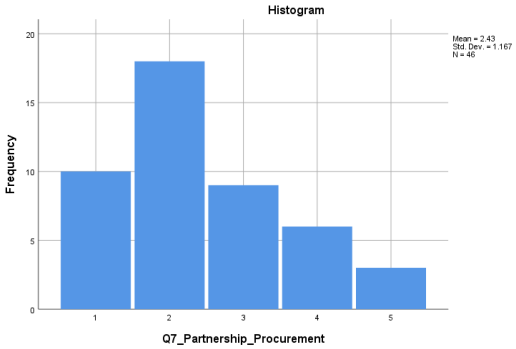
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q7_Partnership_Non_Competitors	46	1	5	1.54	.862	2.147	.350	5.596	.688
Q7_Partnership_Competitors	46	1	5	3.11	1.251	-.072	.350	-1.008	.688
Q7_Partnership_Joint_Ventures	46	1	5	2.00	1.135	.953	.350	-.123	.688
Q7_Partnership_Procurement	46	1	5	2.43	1.167	.647	.350	-.340	.688
Valid N (listwise)	46								



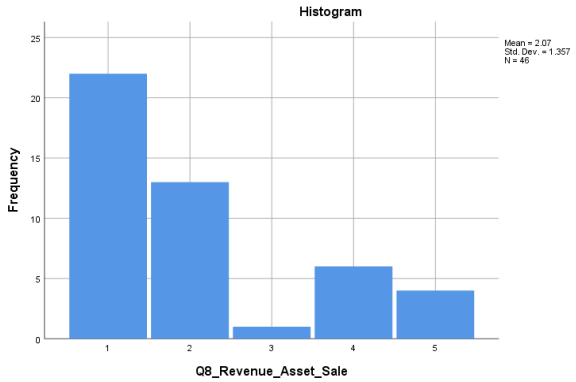


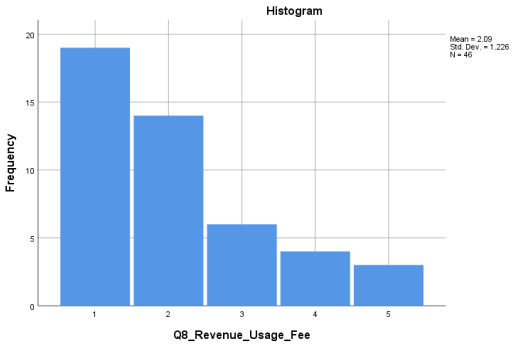


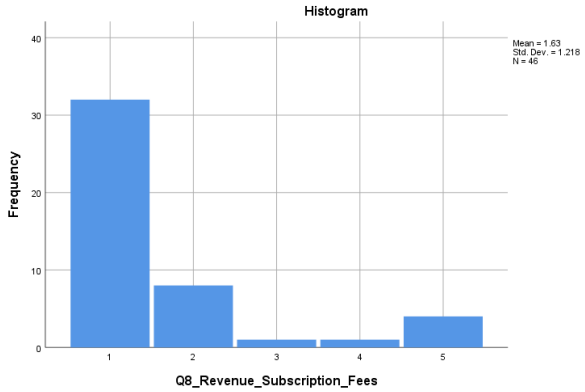


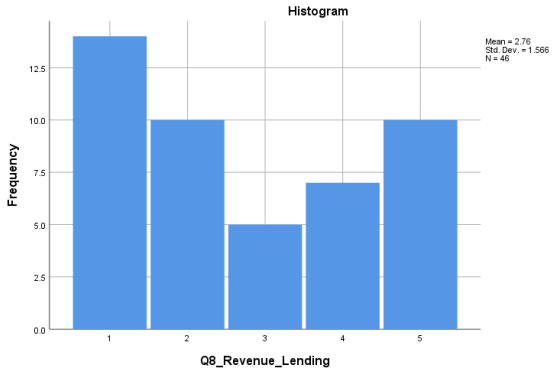
Descriptive Statistics

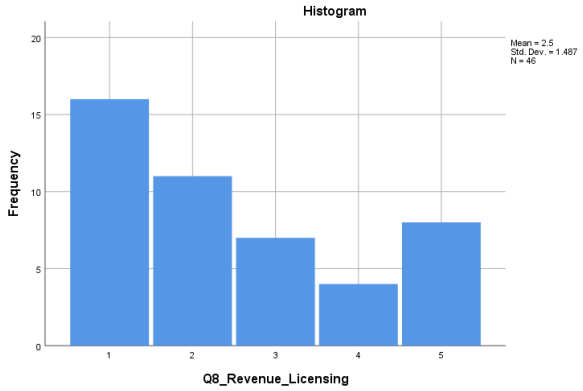
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q8_Revenue_Asset_Sale	46	1	5	2.07	1.357	1.106	.350	-.137	.688
Q8_Revenue_Usage_Fee	46	1	5	2.09	1.226	1.038	.350	.163	.688
Q8_Revenue_Subscription_Fees	46	1	5	1.63	1.218	2.076	.350	3.211	.688
Q8_Revenue_Lending	46	1	5	2.76	1.566	.271	.350	-1.498	.688
Q8_Revenue_Licensing	46	1	5	2.50	1.487	.594	.350	-1.056	.688
Q8_Revenue_Brokerage	46	1	5	3.48	1.378	-.352	.350	-1.239	.688
Q8_Revenue_Advertising	46	1	5	3.83	1.338	-.772	.350	-.743	.688
Valid N (listwise)	46								

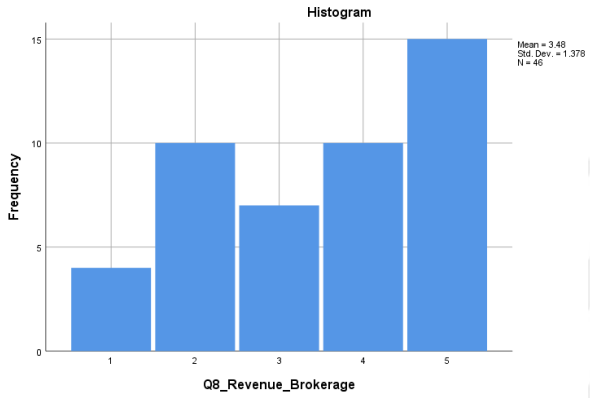


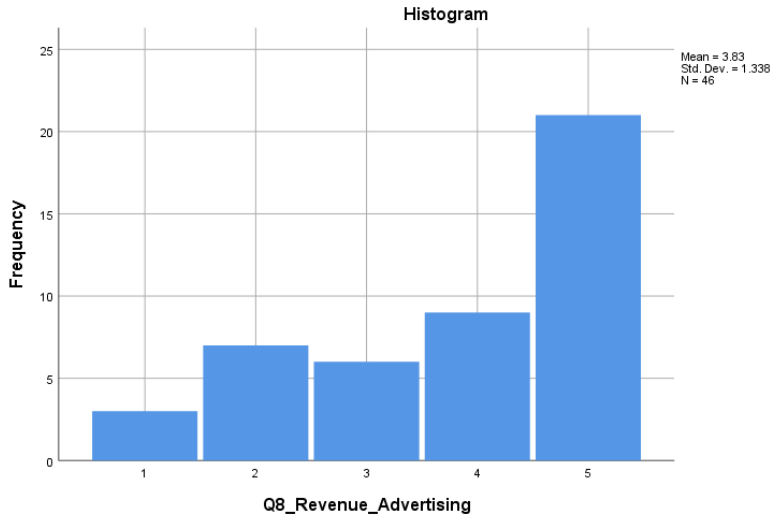



Histogram
Mean = 1.63
Std. Dev. = 1.218
N = 46
Frequency
40
30
20
10
0
1
2
3
4
5
Q8_Revenue_Subscription_Fees


Histogram
Mean = 2.76
Std. Dev. = 1.566
N = 46
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
1
2
3
4
5
Q8_Revenue_Lending

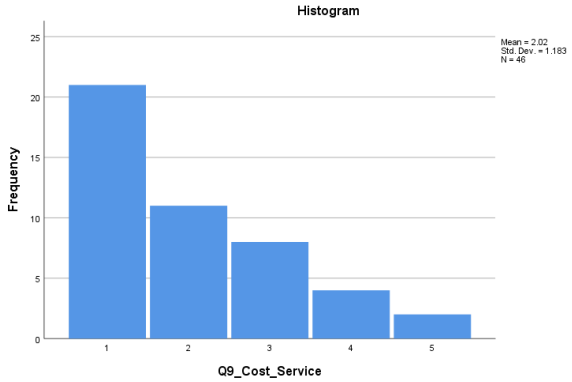

Histogram
Mean = 2.5
Std. Dev. = 1.487
N = 46
Frequency
Q8_Revenue_Licensing

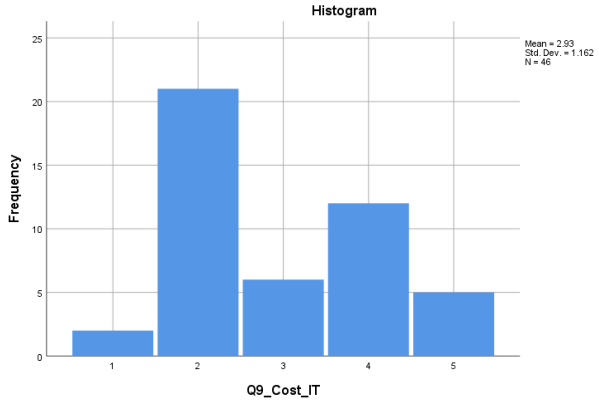

Histogram
Mean = 3.48
Std. Dev. = 1.378
N = 46
Frequency
Q8_Revenue_Brokerage

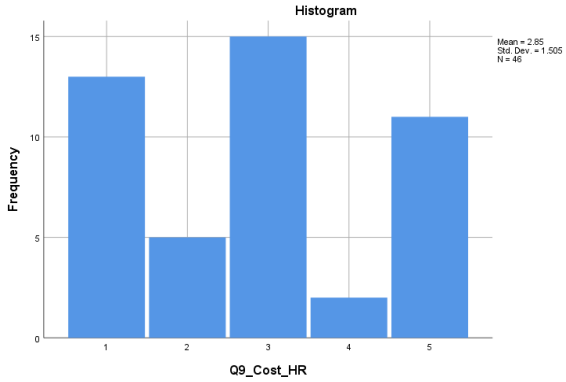

Histogram
Mean = 3.83
Std. Dev. = 1.338
N = 46
Frequency
Q8_Revenue_Advertising

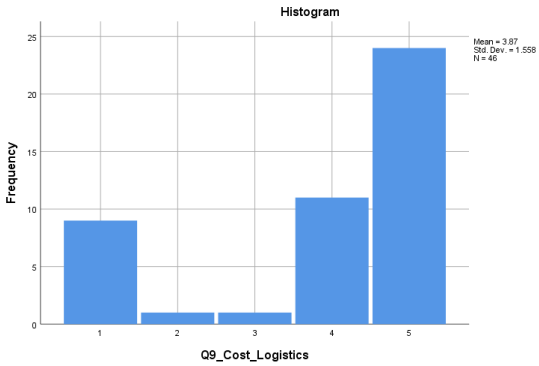
Descriptive Statistics

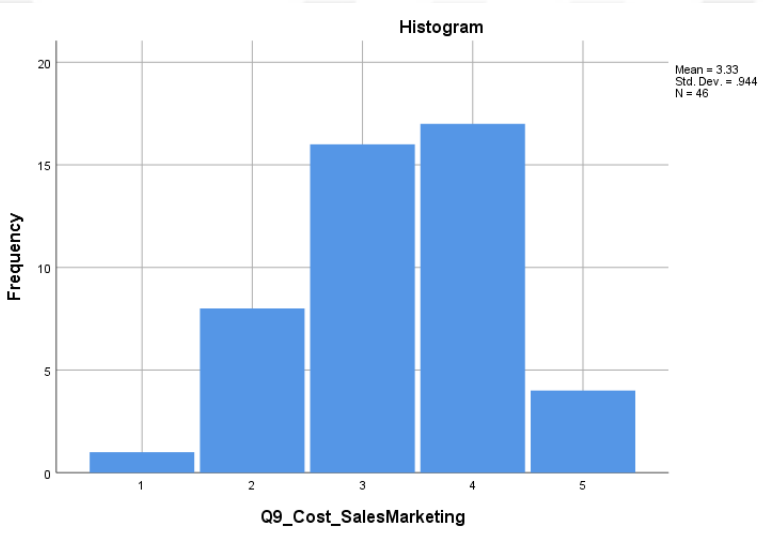
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q9_Cost_Service	46	1	5	2.02	1.183	.967	.350	.015	.688
Q9_Cost_IT	46	1	5	2.93	1.162	.398	.350	-1.118	.688
Q9_Cost_HR	46	1	5	2.85	1.505	.189	.350	-1.263	.688
Q9_Cost_Logistics	46	1	5	3.87	1.558	-1.138	.350	-.356	.688
Q9_Cost_SalesMarketing	46	1	5	3.33	.944	-.216	.350	-.363	.688
Valid N (listwise)	46								





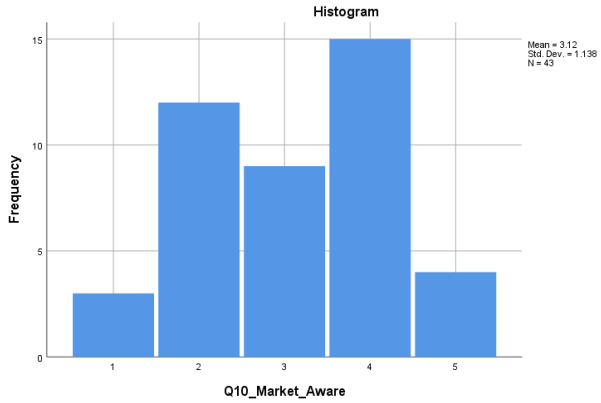


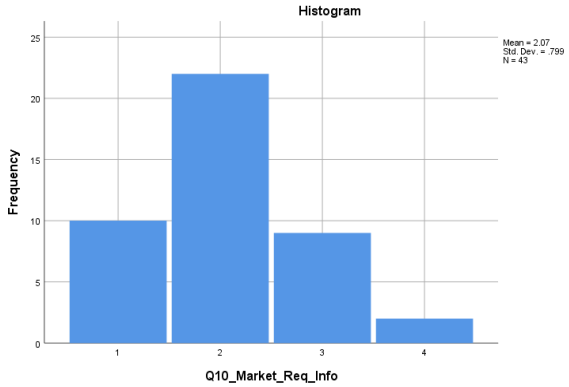


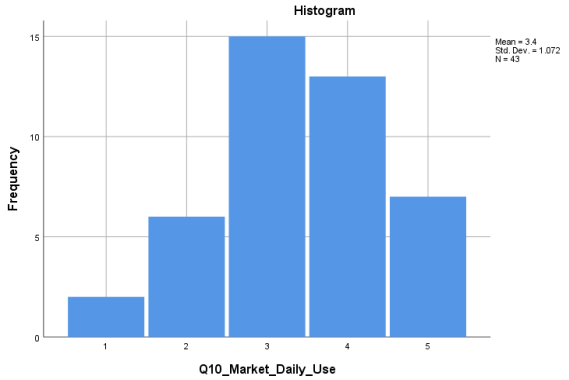


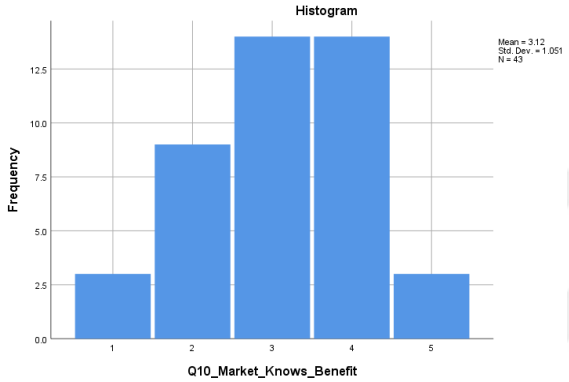
Descriptive Statistics

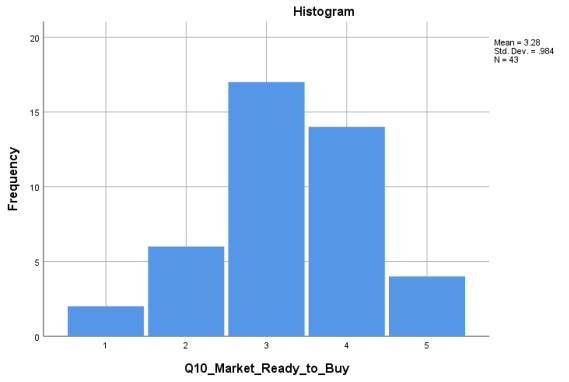
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q10_Market_Aware	43	1	5	3.12	1.138	-.136	.361	-.964	.709
Q10_Market_Req_Info	43	1	4	2.07	.799	.460	.361	-.013	.709
Q10_Market_Daily_Use	43	1	5	3.40	1.072	-.262	.361	-.377	.709
Q10_Market_Knows_Benefit	43	1	5	3.12	1.051	-.242	.361	-.518	.709
Q10_Market_Ready_to_Buy	43	1	5	3.28	.984	-.288	.361	-.031	.709
Q10_Market_Pro_Reach	43	1	5	3.16	1.214	.008	.361	-.736	.709
Valid N (listwise)	43								

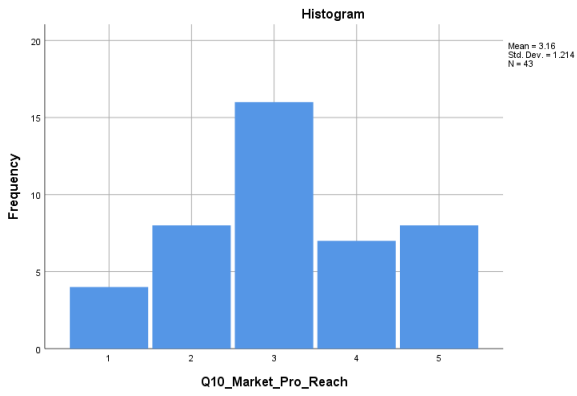

Histogram
Mean = 3.12
Std. Dev. = 1.138
N = 43
Frequency
15
10
5
0
1
2
3
4
5
Q10_Market_Aware


Histogram
Mean = 2.07
Std. Dev. = .799
N = 43
Frequency
25
20
15
10
5
0
1
2
3
4
Q10_Market_Req_Info


Histogram
Mean = 3.4
Std. Dev. = 1.072
N = 43
Frequency
Q10_Market_Daily_Use

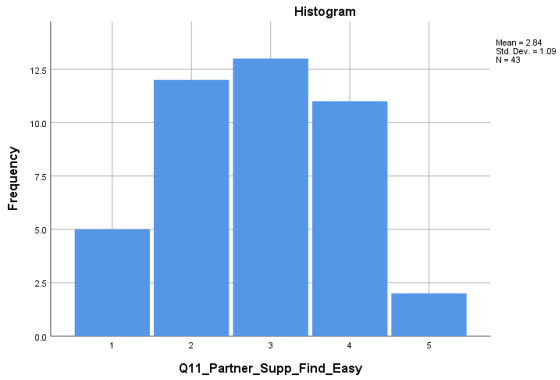

Histogram
Mean = 3.12
Std. Dev. = 1.051
N = 43
Frequency
Q10_Market_Knows_Benefit

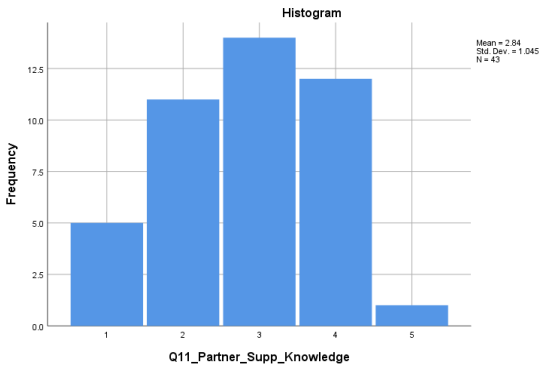

Histogram
Mean = 3.28
Std. Dev. = .984
N = 43
Frequency
Q10_Market_Ready_to_Buy

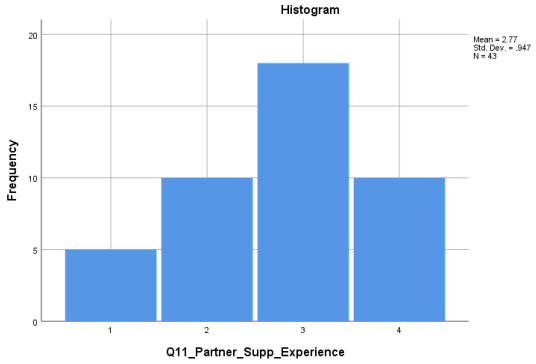

Histogram
Mean = 3.16
Std. Dev. = 1.214
N = 43
Frequency
Q10_Market_Pro_Reach

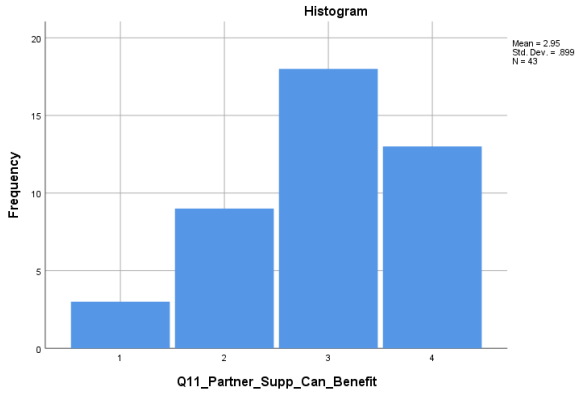
Descriptive Statistics

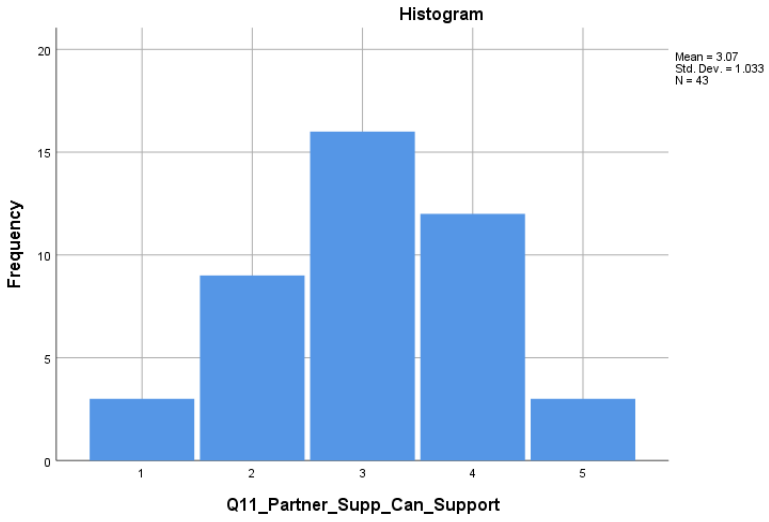
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q11_Partner_Supp_Find_Easy	43	1	5	2.84	1.090	-.009	.361	-.757	.709
Q11_Partner_Supp_Knowledge	43	1	5	2.84	1.045	-.184	.361	-.780	.709
Q11_Partner_Supp_Experience	43	1	4	2.77	.947	-.387	.361	-.653	.709
Q11_Partner_Supp_Can_Benefit	43	1	4	2.95	.899	-.525	.361	-.415	.709
Q11_Partner_Supp_Can_Support	43	1	5	3.07	1.033	-.145	.361	-.390	.709
Valid N (listwise)	43								





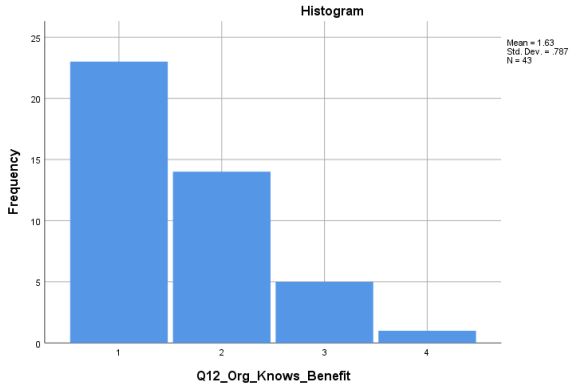

Histogram
Mean = 2.77
Std. Dev. = .947
N = 43
Frequency
Q11_Partner_Supp_Experience

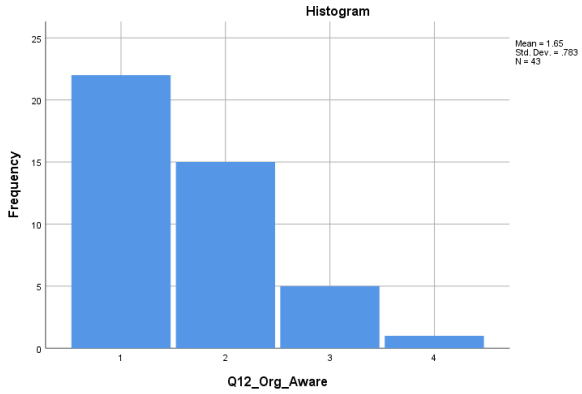

Histogram
Mean = 2.95
Std. Dev. = .899
N = 43
Frequency
Q11_Partner_Supp_Can_Benefit

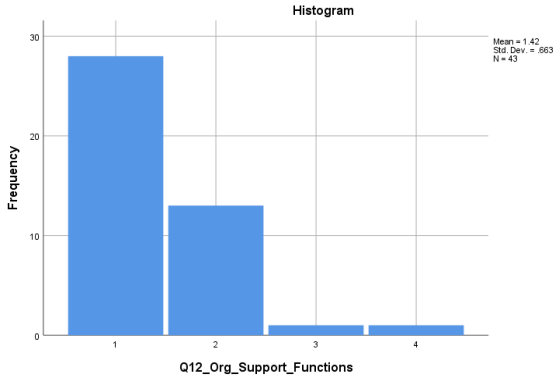

Histogram
Mean = 3.07
Std. Dev. = 1.033
N = 43
Frequency
Q11_Partner_Supp_Can_Support

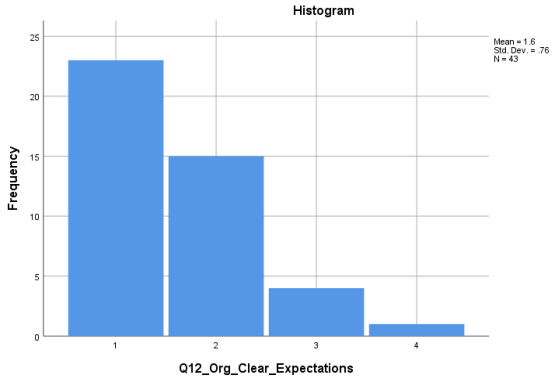
Descriptive Statistics

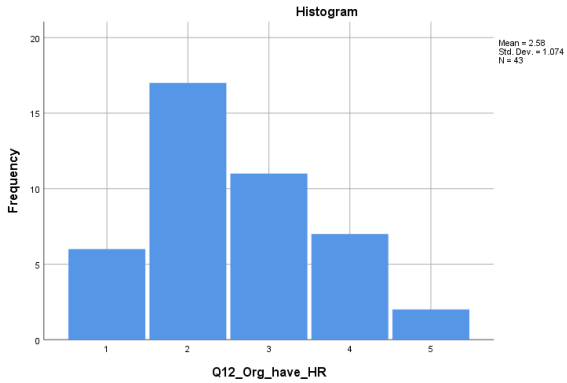
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Q12_Org_Knows_Benefit	43	1	4	1.63	.787	1.089	.361	.575	.709
Q12_Org_Aware	43	1	4	1.65	.783	1.028	.361	.507	.709
Q12_Org_Support_Functions	43	1	4	1.42	.663	1.855	.361	4.305	.709
Q12_Org_Clear_Expectations	43	1	4	1.60	.760	1.162	.361	1.008	.709
Q12_Org_have_HR	43	1	5	2.58	1.074	.444	.361	-.409	.709
Q12_Org_have_FinRes	43	1	5	2.77	1.269	.241	.361	-.875	.709
Q12_Org_have_Tech_Cap	43	1	5	2.05	1.068	1.134	.361	1.103	.709
Q12_Org_have_knowledge	43	1	5	1.86	1.060	1.424	.361	1.922	.709
Q12_Org_motivation	43	1	3	1.58	.763	.892	.361	-.673	.709
Q12_Org_ready_change	43	1	4	1.63	.787	1.089	.361	.575	.709
Q12_Org_excited	43	1	3	1.42	.626	1.238	.361	.525	.709
Q12_Org_proactive	43	1	5	1.58	.932	1.881	.361	3.711	.709
Valid N (listwise)	43								

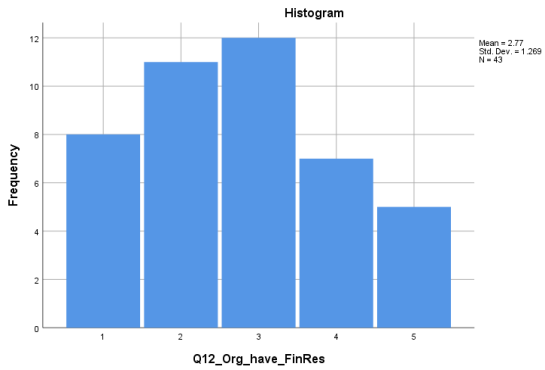


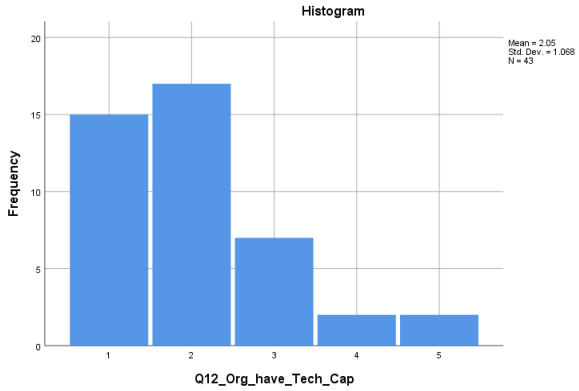


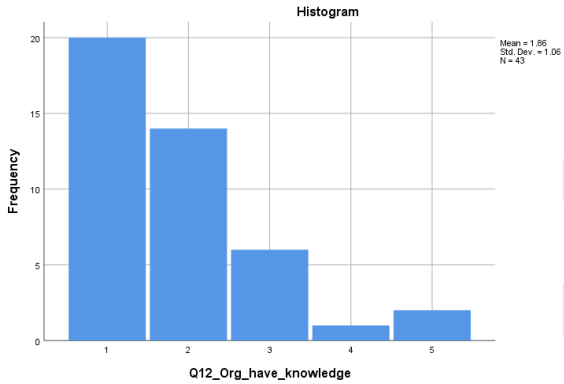

Histogram
Mean = 1.42
Std. Dev. = .663
N = 43
Frequency
Q12_Org_Support_Functions

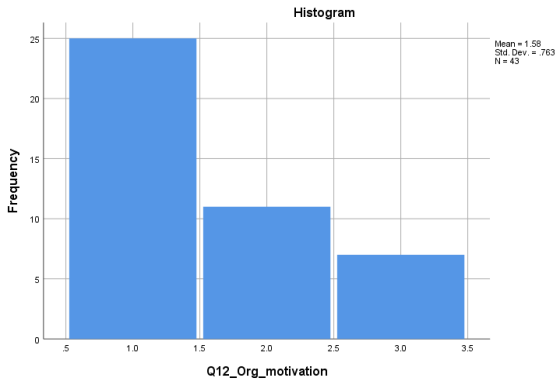

Histogram
Mean = 1.6
Std. Dev. = .76
N = 43
Frequency
Q12_Org_Clear_Expectations

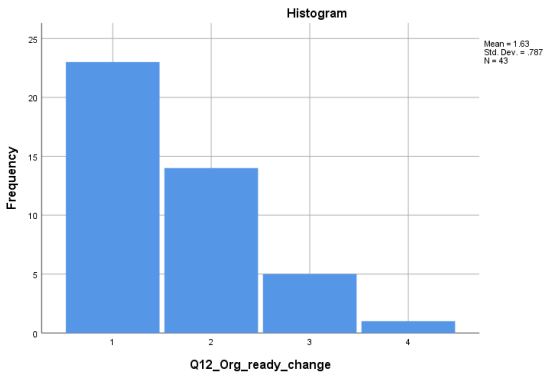

Histogram
Mean = 2.58
Std. Dev. = 1.074
N = 43
Frequency
Q12_Org_have_HR

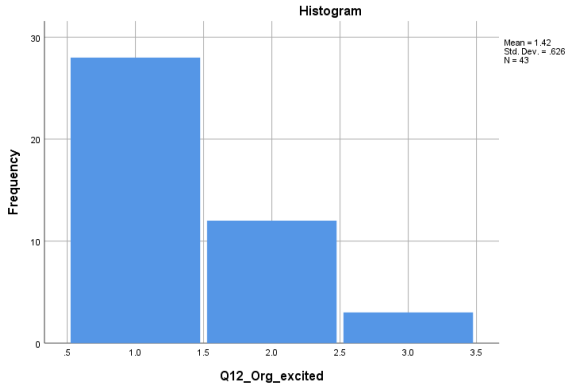

Histogram
Mean = 2.77
Std. Dev. = 1.269
N = 43
Frequency
Q12_Org_have_FinRes

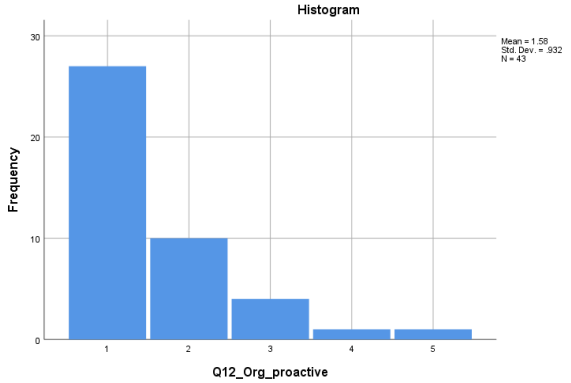

Histogram
Mean = 2.05
Std. Dev. = 1.068
N = 43
Frequency
Q12_Org_have_Tech_Cap


Histogram
Mean = 1.86
Std. Dev. = 1.06
N = 43
Frequency
Q12_Org_have_knowledge


Histogram
Mean = 1.58
Std. Dev. = .763
N = 43
Frequency
Q12_Org_motivation


Histogram
Mean = 1.63
Std. Dev. = .787
N = 43
Frequency
Q12_Org_ready_change





3.4 Tests of Normality

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q1_Value_Innovation	.312	47	.000	.698	47	.000
Q1_Value_Performance	.370	47	.000	.662	47	.000
Q1_Value_Customisation	.205	47	.000	.872	47	.000
Q1_Value_Job_Done	.292	47	.000	.838	47	.000
Q1_Value_Design	.277	47	.000	.851	47	.000
Q1_Value_Brand	.322	47	.000	.820	47	.000
Q1_Value_Price_Adv	.235	47	.000	.850	47	.000
Q1_Value_Cost_Reduc	.270	47	.000	.759	47	.000
Q1_Value_Risk_Reduc	.262	47	.000	.814	47	.000
Q1_Value_Accessibility	.327	47	.000	.733	47	.000
Q1_Value_Convenience	.289	47	.000	.762	47	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q2_Cust_mass	.210	47	.000	.902	47	.001
Q2_Cust_niche	.254	47	.000	.817	47	.000
Q2_Cust_segmented	.278	47	.000	.820	47	.000
Q2_Cust_diversified	.323	47	.000	.812	47	.000
Q2_Cust_Multi_sided	.231	47	.000	.867	47	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q3_Channel_Sales	.312	47	.000	.724	47	.000
Q3_Channel_Web	.207	47	.000	.857	47	.000
Q3_Channel_Own	.302	47	.000	.739	47	.000
Q3_Channel_Partner	.266	47	.000	.837	47	.000
Q3_Channel_Wholesaler	.227	47	.000	.851	47	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q4_CRM_PA	.268	47	.000	.751	47	.000
Q4_CRM_DPA	.255	47	.000	.844	47	.000
Q4_CRM_SelfService	.210	47	.000	.893	47	.000
Q4_CRM_Automated Service	.180	47	.001	.885	47	.000
Q4_CRM_Communities	.178	47	.001	.883	47	.000
Q4_CRM_Co_creation	.298	47	.000	.835	47	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q5_Resources_Physical	.267	46	.000	.781	46	.000
Q5_Resources_Intellectual	.311	46	.000	.691	46	.000
Q5_Resources_HR	.250	46	.000	.844	46	.000
Q5_Resources_Financial_Resour	.253	46	.000	.820	46	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q6_Activity_Development	.367	46	.000	.673	46	.000
Q6_Activity_Bus_Partner	.275	46	.000	.868	46	.000
Q6_Activity_Sales_Marketing	.300	46	.000	.856	46	.000
Q6_Activity_After_Sales	.250	46	.000	.897	46	.001
Q6_Activity_Logistics	.363	46	.000	.665	46	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q7_Partnership_Non_Competitors	.345	46	.000	.655	46	.000
Q7_Partnership_Competitors	.175	46	.001	.912	46	.002
Q7_Partnership_Joint_Ventures	.246	46	.000	.805	46	.000
Q7_Partnership_Procurement	.254	46	.000	.880	46	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q8_Revenue_Asset_Sale	.280	46	.000	.750	46	.000
Q8_Revenue_Usage_Fee	.246	46	.000	.810	46	.000
Q8_Revenue_Subscription_Fees	.393	46	.000	.569	46	.000
Q8_Revenue_Lending	.208	46	.000	.841	46	.000
Q8_Revenue_Licensing	.219	46	.000	.832	46	.000
Q8_Revenue_Brokerage	.191	46	.000	.863	46	.000
Q8_Revenue_Advertising	.266	46	.000	.806	46	.000

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q9_Cost_Service	.263	46	.000	.809	46	.000
Q9_Cost_IT	.289	46	.000	.845	46	.000
Q9_Cost_HR	.177	46	.001	.848	46	.000
Q9_Cost_Logistics	.294	46	.000	.690	46	.000
Q9_Cost_SalesMarketing	.219	46	.000	.899	46	.001

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q10_Market_Aware	.223	43	.000	.899	43	.001
Q10_Market_Req_Info	.279	43	.000	.846	43	.000
Q10_Market_Daily_Use	.179	43	.001	.910	43	.002
Q10_Market_Knows_Benefit	.195	43	.000	.910	43	.003
Q10_Market_Ready_to_Buy	.202	43	.000	.904	43	.002
Q10_Market_Pro_Reach	.205	43	.000	.906	43	.002

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q11_Partner_Supp_Find_Easy	.174	43	.002	.913	43	.003
Q11_Partner_Supp_Knowledge	.190	43	.000	.900	43	.001
Q11_Partner_Supp_Experience	.248	43	.000	.868	43	.000
Q11_Partner_Supp_Can_Benefit	.242	43	.000	.853	43	.000
Q11_Partner_Supp_Can_Support	.194	43	.000	.914	43	.003

a. Lilliefors Significance Correction

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Q12_Org_Knows_Benefit	.322	43	.000	.755	43	.000
Q12_Org_Aware	.309	43	.000	.766	43	.000
Q12_Org_Support_Functions	.387	43	.000	.642	43	.000
Q12_Org_Clear_Expectations	.322	43	.000	.748	43	.000
Q12_Org_have_HR	.241	43	.000	.899	43	.001
Q12_Org_have_FinRes	.169	43	.003	.908	43	.002
Q12_Org_have_Tech_Cap	.262	43	.000	.823	43	.000
Q12_Org_have_knowledge	.257	43	.000	.770	43	.000
Q12_Org_motivation	.358	43	.000	.714	43	.000
Q12_Org_ready_change	.322	43	.000	.755	43	.000
Q12_Org_excited	.399	43	.000	.666	43	.000
Q12_Org_proactive	.362	43	.000	.673	43	.000

a. Lilliefors Significance Correction

3.5 One Sample Test

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Q1_Value_Innovation	14.500	46	.000	1.574	1.36	1.79
Q1_Value_Performance	15.189	46	.000	1.447	1.26	1.64
Q1_Value_Customisation	13.434	46	.000	2.255	1.92	2.59
Q1_Value_Job_Done	16.218	46	.000	2.106	1.84	2.37
Q1_Value_Design	13.734	46	.000	2.277	1.94	2.61
Q1_Value_Brand	16.213	46	.000	2.128	1.86	2.39
Q1_Value_Price_Adv	12.785	46	.000	2.383	2.01	2.76
Q1_Value_Cost_Reduc	11.782	46	.000	1.979	1.64	2.32
Q1_Value_Risk_Reduc	11.303	46	.000	2.191	1.80	2.58
Q1_Value_Accessibility	13.481	46	.000	1.617	1.38	1.86
Q1_Value_Convenience	14.219	46	.000	1.681	1.44	1.92
Q2_Cust_mass	16.440	46	.000	2.979	2.61	3.34
Q2_Cust_niche	13.146	46	.000	1.979	1.68	2.28
Q2_Cust_segmented	14.034	46	.000	1.979	1.69	2.26
Q2_Cust_diversified	12.942	46	.000	2.234	1.89	2.58
Q2_Cust_Multi_sided	14.794	46	.000	3.149	2.72	3.58
Q3_Channel_Sales	10.924	46	.000	1.787	1.46	2.12
Q3_Channel_Web	13.019	46	.000	2.872	2.43	3.32
Q3_Channel_Own	26.214	46	.000	4.191	3.87	4.51
Q3_Channel_Partner	12.141	46	.000	2.553	2.13	2.98
Q3_Channel_Wholesaler	17.521	46	.000	3.489	3.09	3.89
Q4_CRM_PA	11.312	46	.000	1.872	1.54	2.21
Q4_CRM_DPA	12.103	46	.000	2.404	2.00	2.80
Q4_CRM_SelfService	15.194	46	.000	2.957	2.57	3.35
Q4_CRM_Automated Service	14.861	46	.000	3.106	2.69	3.53
Q4_CRM_Communities	16.432	46	.000	3.319	2.91	3.73
Q4_CRM_Co_creation	13.383	46	.000	2.745	2.33	3.16
Q5_Resources_Physical	10.561	45	.000	2.261	1.83	2.69
Q5_Resources_Intellectual	13.373	45	.000	1.587	1.35	1.83
Q5_Resources_HR	13.212	45	.000	2.087	1.77	2.41
Q5_Resources_Financial_Resour	12.861	45	.000	1.978	1.67	2.29
Q7_Partnership_Non_Competitors	12.149	45	.000	1.543	1.29	1.80
Q7_Partnership_Competitors	16.850	45	.000	3.109	2.74	3.48
Q7_Partnership_Joint_Ventures	11.948	45	.000	2.000	1.66	2.34
Q7_Partnership_Procurement	14.148	45	.000	2.435	2.09	2.78

Q8_Revenue_Asset_Sale	10.326	45	.000	2.065	1.66	2.47
Q8_Revenue_Usage_Fee	11.544	45	.000	2.087	1.72	2.45
Q8_Revenue_Subscription_Fees	9.082	45	.000	1.630	1.27	1.99
Q8_Revenue_Lending	11.957	45	.000	2.761	2.30	3.23
Q8_Revenue_Licensing	11.403	45	.000	2.500	2.06	2.94
Q8_Revenue_Brokerage	17.117	45	.000	3.478	3.07	3.89
Q8_Revenue_Advertising	19.389	45	.000	3.826	3.43	4.22
Q10_Market_Aware	17.952	42	.000	3.116	2.77	3.47
Q10_Market_Req_Info	16.994	42	.000	2.070	1.82	2.32
Q10_Market_Daily_Use	20.767	42	.000	3.395	3.07	3.73
Q10_Market_Knows_Benefit	19.438	42	.000	3.116	2.79	3.44
Q10_Market_Ready_to_Buy	21.856	42	.000	3.279	2.98	3.58
Q10_Market_Pro_Reach	17.089	42	.000	3.163	2.79	3.54
Q11_Partner_Supp_Find_Easy	17.075	42	.000	2.837	2.50	3.17
Q11_Partner_Supp_Knowledge	17.805	42	.000	2.837	2.52	3.16
Q11_Partner_Supp_Experience	19.161	42	.000	2.767	2.48	3.06
Q11_Partner_Supp_Can_Benefit	21.555	42	.000	2.953	2.68	3.23
Q11_Partner_Supp_Can_Support	19.493	42	.000	3.070	2.75	3.39
Q12_Org_Knows_Benefit	13.555	42	.000	1.628	1.39	1.87
Q12_Org_Aware	13.823	42	.000	1.651	1.41	1.89
Q12_Org_Support_Functions	14.030	42	.000	1.419	1.21	1.62
Q12_Org_Clear_Expectations	13.840	42	.000	1.605	1.37	1.84
Q12_Org_have_HR	15.758	42	.000	2.581	2.25	2.91
Q12_Org_have_FinRes	14.296	42	.000	2.767	2.38	3.16
Q12_Org_have_Tech_Cap	12.565	42	.000	2.047	1.72	2.38
Q12_Org_have_knowledge	11.513	42	.000	1.860	1.53	2.19
Q12_Org_motivation	13.587	42	.000	1.581	1.35	1.82
Q12_Org_ready_change	13.555	42	.000	1.628	1.39	1.87
Q12_Org_excited	14.857	42	.000	1.419	1.23	1.61
Q12_Org_proactive	11.129	42	.000	1.581	1.29	1.87

APPENDIX 4: THE BUSINESS MODEL CANVAS