



**T.R.
ONDOKUZ MAYIS UNIVERSITY
INSTITUTE OF GRADUATE STUDIES
ENTREPRENEURSHIP AND INNOVATION**

**THE EFFECT OF COVID-19 PANDEMIC ON
DIGITALIZATION OF SMEs IN IRAN**

Master's Thesis

HADİ AMİRİ

Supervisor
Prof. Dr. Kürşat DEMİRYÜREK

SAMSUN
2024

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ONDOKUZ MAYIS UNIVERSITY
INSTITUTE OF GRADUATE STUDIES
GİRİŞİMCİLİK VE YENİLİKÇİLİK ANA BİLİM DALI



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.ACCEPTANCE AND APPROVAL OF THE THESIS

The study entitled “**THE EFFECT OF COVID-19 PANDEMIC ON DIGITALIZATION OF SMEs IN IRAN**” prepared by **HADI AMIRI.**, and supervised by **Prof. Dr. KURŞAT DEMİRYÜREK** , was found successful and unanimously accepted by committee members as Master thesis, following the examination on the date 16.8.2024 .

	Title Name SURNAME University Department/Art	Final Decision
Chairman	Assoc. Prof. Dr. Senem GÜRKAN Ondokuz Mayıs University Department of Health Science	☒ Accept ☐ Reject
Member	Prof. Dr. İsmet BOZ Ondokuz Mayıs University Department of Agriculture Economy	☒ Accept ☐ Reject
Member	Prof. Dr. Kürşat DEMİRYÜREK Ondokuz Mayıs University Department of Agriculture Economy	☒ Accept ☐ Reject

This thesis has been approved by the committee members that already stated above and determined by the Institute Executive Board.

Prof. Dr. Ahmet TABAK
Head of Institute of Graduate Studies

DECLARATION OF COMPLIANCE WITH SCIENTIFIC ETHIC

I hereby declare and undertake that I complied with scientific ethics and academic rules in all stages of my Master's Thesis , that I have referred to each quotation that I use directly or indirectly in the study and that the works I have used consist of those shown in the sources, that it was written in accordance with the institute writing guide and that the situations stated in the article 3, section 9 of the Regulation for TÜBİTAK Research and Publication Ethics Board were not violated.

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20 /07 / 2024
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DECLARATION OF THE THESIS STUDY ORIGINALITY REPORT

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ÖZET

KOVID-19 PANDEMİSİ ESNASINDA KOBİ'LERİN DİJİTALLEŞMESİNE ETKİ EDEN FAKTÖRLER, İRAN ÜLKESİ ÖRNEĞİ

Hadi AMİRİ

Ondokuz Mayıs Üniversitesi

Lisansüstü Eğitim Enstitüsü

Girişimcilik Ve Yenilikçilik Ana Bilim Dalı

Yüksek Lisans, Ağustos/2024

Danışman: Prof. Dr. Kürşat DEMİRYÜREK

Bu tez, KOVID-19 pandemisinin İran'daki küçük ve orta ölçekli işletmelerin (KOBİ'ler) dijitalleşme çabalarına etkisini araştırarak dijital dönüşümün hızlanmasını, karşılaşılan zorlukları ve bu süreçte hükümet desteğinin rolünü kapsamlı bir şekilde anlamayı amaçlamaktadır. Dijitalleşme, iş operasyonlarına dijital teknolojilerin entegrasyonu yoluyla verimlilik ve üretkenliği artırma süreci olarak tanımlanır ve pandemi, bu sürecin küresel olarak ivme kazanmasına neden olmuştur. Birçok ekonomide kritik öneme sahip olan KOBİ'ler, sınırlı kaynaklar nedeniyle bu geçişte önemli engellerle karşılaşmıştır. Bu çalışmanın amaçları arasında pandemi öncesi dijital kullanımın değerlendirilmesi, pandeminin neden olduğu değişikliklerin incelenmesi, dijital dönüşüm girişimlerinin analiz edilmesi, hükümet desteğinin değerlendirilmesi, faydalar ve zorlukların incelenmesi, gelecekteki dijital eğilimlerin öngörülmesi ve paydaşlar için öneriler sunulması yer almaktadır. Tanımlayıcı bir araştırma yaklaşımı benimsenmiş olup, 400 KOBİ'ye dağıtılan yapılandırılmış bir anket ve literatür incelemeleri, sektör raporları ve hükümet yayınlarından elde edilen ikincil veriler kullanılmıştır. Bulgular, pandemi sonrasında dijital teknoloji kullanımında önemli bir artış olduğunu göstermekte, e-ticaret platformları, sanal iş birliği araçları, dijital pazarlama ve bulut depolama alanlarında kayda değer bir benimseme oranı ortaya koymaktadır. Ayrıca, dijital harcamalarda %54'lük bir artış gözlemlenmiş olup, bu durum dijital çözümlere stratejik bir kayma olduğunu yansıtmaktadır. Bölgesel analizler, Tahran'ın %75'lik en yüksek dijital benimseme oranına sahip olduğunu, bunu %60 ile İsfahan ve %52 ile Meşhed'in takip ettiğini ortaya koymaktadır. Yüksek dijital benimseme oranına sahip KOBİ'ler daha iyi gelir artışı bildirmiş olup, dijital dönüşümün iş dayanıklılığı ve başarısı için önemini vurgulamaktadır. KOBİ'lerin %55'i hükümet girişimlerini yararlı bulmuş olsa da, iyileştirme için hala alan bulunmaktadır. Bu tez, dijital benimsemenin kesintiye uğratan olaylar sırasında iş sürekliliği ve büyümesini sağlama konusundaki kritik rolünü vurgulamakta ve farklı bölgelerde dijital altyapı ve becerileri geliştirmek için sürekli destek ve özelleştirilmiş stratejilere duyulan ihtiyacı vurgulamaktadır.

Anahtar Sözcükler: Digitalization, SME, IRAN, Factor

ABSTRACT

THE EFFECT OF COVID-19 PANDEMIC ON DIGITALIZATION OF SMEs in IRAN

Hadi AMİRİ

Ondokuz Mayıs University

Institute of Graduate Studies

Department of Entrepreneurship and innovation Program

Master, August/2024

Supervisor: Prof. Dr. Kürşat DEMİRYÜREK

This dissertation investigates the impact of the COVID-19 pandemic on the digitization efforts of small and medium-sized enterprises (SMEs) in Iran, aiming to comprehensively understand the acceleration of digital transformation, the challenges encountered, and the role of government support in this process. Digitalization, the integration of digital technologies into business operations to enhance productivity and efficiency, has gained global momentum, with the pandemic acting as a catalyst. SMEs, crucial to many economies, faced significant hurdles in this transition due to limited resources. This study's objectives include assessing pre-pandemic digital utilization, evaluating pandemic-induced changes, analyzing digital transformation initiatives, assessing government support, examining benefits and challenges, predicting future digital trends, and providing recommendations for stakeholders. A descriptive research approach was employed, involving a structured questionnaire distributed to 400 SMEs across Iran, complemented by secondary data from literature reviews, industry reports, and government publications. Findings indicate a substantial increase in digital technology adoption post-pandemic, with significant adoption rates of e-commerce platforms, virtual collaboration tools, digital marketing, and cloud storage. Additionally, average digital spending surged by 54%, reflecting a strategic shift towards digital solutions. Regional analysis revealed Tehran's highest digital adoption rate at 75%, followed by Isfahan at 60% and Mashhad at 52%. SMEs with higher digital adoption reported better revenue growth, emphasizing the importance of digital transformation for business resilience and success. Government initiatives were perceived as helpful by 55% of SMEs, though there is room for improvement. This dissertation underscores the critical role of digital adoption in ensuring business continuity and growth during disruptive events and highlights the need for continuous support and tailored strategies to enhance digital infrastructure and skills across different regions.

Keywords: Digitalization, SME, IRAN, Factor

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SYMBOLS AND ABBREVIATIONS

IoT	: Internet of Things
E-commerce	: Electronic commerce
ERP	: Enterprise Resource Planning
ICCIMA	: Isfahan Chamber of Commerce, Industries, Mines and Agriculture
NIN	: National Information Network
SMEs	: Small and medium-sized Enterprise
TAM	: Technology Acceptance Mode
RBV	: Resource-Based View
ISIPO	: Industries and Industrial Towns of Iran
Les	: larger enterprises
JSPOA	: Joint Comprehensive Plan of Action

FIGURES LEGENDS

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1. INTRODUCTION

1.1. Background and context of a study

The rapid acceleration of digital transformation has reshaped global business landscapes, altering how companies operate and compete. This phenomenon has been particularly evident during the COVID-19 pandemic, which forced businesses to adapt to new ways of working and interacting with customers. Small and Medium-sized Enterprises (SMEs), which are crucial to the Iranian economy by providing significant employment and contributing extensively to GDP, have not been immune to these changes. The digitalization of SMEs in Iran, accelerated by the pandemic, has become a critical area of study to understand not only the survival strategies of these businesses but also their growth trajectory in a post-pandemic world

For example, a study by Alexander and Rutter (2022) highlights the importance of digital transformation for sustainability and customer experience. Additionally, Eller et al. (2020) discuss the antecedents, consequences, and challenges of SME digitalization, providing a comprehensive overview of the factors influencing this transition. The OECD's Digital Economy Outlook (2017) also offers valuable insights into the broader economic impacts of digitalization, emphasizing its role in enhancing productivity and competitiveness.

Moreover, the COVID-19 pandemic has intensified the need for SMEs to embrace digital tools and platforms. Studies such as Akbari and Ahmadi (2022) have identified the challenges faced by Iranian SMEs during their digital transformation journey amid the pandemic. These challenges include limited access to digital infrastructure, lack of digital skills, and financial constraints. Similarly, research by Abuhussein et al. (2023) on SMEs in Jordan provides empirical evidence on the effects of COVID-19 on these enterprises, highlighting the importance of government support and policy measures in facilitating digital adoption.

So, the digitalization of SMEs in Iran is not only crucial for their survival in the face of global disruptions like COVID-19 but also for their long-term growth and competitiveness in an increasingly digital economy. The studies cited provide a robust framework for understanding the multifaceted impact of digital transformation on SMEs and underscore the need for targeted strategies to support this critical sector.

This study aims to fill the gap in comprehensive research focusing on the digital transformation efforts undertaken by SMEs in Iran during this period of heightened economic and social disruption.

1.2. Research Questions and Objectives

The study is guided by several key research questions:

How digitally integrated were SMEs in Iran before the COVID-19 pandemic?

What digital technologies, platforms, and procedures were predominantly used by these enterprises?

What has been the impact of the pandemic on the digital operations of SMEs?

What governmental support was available, and how did it influence the digitization of SMEs?

Objectives:

To assess the pre-pandemic digital landscape of SMEs in Iran.

To evaluate the digital transformation initiatives undertaken by SMEs in response to the pandemic.

To analyze the role of governmental support in facilitating digital adoption among SMEs.

To predict future trends in digital technology adoption among SMEs in a post-pandemic context.

1.3. Significance of the Study

This study is significant for several reasons. It provides:

Insightful Data for Policymakers: By detailing the current state and progression of digital adoption among SMEs, the findings can help policymakers tailor future digital economy policies and support programs.

Strategic Guidance for SMEs: The study offers valuable insights for SME owners and managers on effective digital transformation strategies and potential pitfalls.

Academic Contributions: This research contributes to the scholarly discussion on digital transformation, offering a unique perspective on the challenges and opportunities within the context of Iranian SMEs during a global crisis.

Foundation for Future Research: The findings will serve as a baseline for subsequent studies on digital transformation trends in emerging markets, particularly in the Middle East.

1.4. Structure of the Thesis

The thesis is structured as follows:

Chapter 1: Introduction- Provides the background, research questions, objectives, and significance of the study.

Chapter 2 : Background info about the Study- review the researches before this reseach and summarize info.

Chapter 3: Literature Review- Reviews existing literature on digital transformation, focusing on its impact on SMEs globally and within Iran.

Chapter 4: Methodology- Details the research design, data collection methods, and analytical techniques used in the study.

Chapter 5: Findings- Presents the findings from the data collected, analyzed in relation to the study's research questions and objectives.

Chapter 6: Discussion- Interprets the findings, discussing their implications for SMEs, policymakers, and other stakeholders.

Chapter 7: Conclusions and Recommendations- Summarizes the study's findings and suggests recommendations for SMEs, policymakers, and future research.

2. BACKGROUND INFO ABOUT THE STUDY

2.1. Digitalization in the world

The term "digitalization" describes the use of digital technologies with the intention of improving an organization's business operations and model productivity and effectiveness. Since some time ago, the move toward digitalization has picked up speed (Alexander & Rutter, 2022; Craig, 2016). This is because technological advancements have made it possible for firms to automate processes, boost efficiency, and provide customers better service.

Lockdowns and social isolation policies that were put in place in response to the COVID-19 epidemic forced businesses to use remote labor and internet operations. Small and medium-sized firms (SMEs), although being the backbone of many economies, have been hit especially hard by this change (Arthur-Nyarko et al., 2020) because they lack the resources needed to properly implement digitalization.

Iran has achieved considerable strides in digitization in recent years thanks to the government's aggressive promotion of the national adoption of the digital economy. However, it's possible that Iran's small and medium-sized businesses will struggle to keep up with the quick pace of digital transformation in the wake of the recent COVID-19 pandemic. In order to provide tools to aid in this process, this research will look at how the pandemic has affected Iranian small and medium-sized enterprises' (SMEs) digitization process (Progoulakis et al., 2023).

Over the past two decades, there has been a significant shift toward digitization in the corporate sector. A few examples of the digital technologies that have changed how companies function and compete in the market today are the utilization of cloud computing, big data analytics, artificial intelligence, and the Internet of Things (IoT) (Brynjolfsson & McAfee, 2014).

In order to boost productivity, save costs, and enhance customer service, many organizations have started embracing digital methods. Businesses now have the opportunity to automate tasks that formerly required a lot of human labor, enhance the effectiveness of their supply chains, and better manage their inventories thanks to digitalization. Additionally, it has made it easier for companies to keep a database of customer information and use that database to alter their marketing tactics and create

new goods and services to satisfy specific needs (Alexander & Rutter, 2022; Arthur-Nyarko et al., 2020).

The growth of platform-based businesses and the sharing economy are two further outcomes of the expansion of digitalization. Companies like Uber, Airbnb, and Amazon have disrupted previously established sectors by creating distinctive value propositions and expanding their clientele via the use of digital technology (Brynjolfsson & McAfee, 2014; Craig, 2016).

Lockdowns and social isolation policies that were put in place in response to the COVID-19 epidemic forced businesses to use remote labor and internet operations. As a direct consequence of this phenomena, e-commerce, digital collaboration tools, and digital communication channels have all seen tremendous growth (Chen et al., 2020; Röth et al., 2023).

In spite of the fact that the pace of digitization varies by country and sector. Small businesses and developing nations may not have the infrastructure and resources needed to fully embrace digitalization. This is because cultural and regulatory barriers have prevented the healthcare and educational sectors from adopting digital technologies quickly (Röth et al., 2023).

In addition to the many advantages that digitalization has brought to businesses, society as a whole has also benefited greatly from it. It has changed how people communicate and access information, and it has given individuals new possibilities to actively involved in the civic and political life of their communities (Bezrukov et al., 2022).

Thanks to the widespread use of digital technologies, people from all over the world are now more able to communicate with one another and collaborate on projects by exchanging knowledge and ideas. Online education platforms have democratized access to information and skills, while social media sites like Facebook and Twitter have encouraged political engagement and social movements (Latysheva et al., 2020).

But as digitalization has grown, worries about social inequality, public safety, and individual privacy have emerged. There has been talk about imposing limitations on data collection and use as a result of the technology corporations' purchase and use of customer information. Due to many cyberthreats, including identity theft and cyberattacks, worries have been expressed about the security of digital infrastructure.

Along with highlighting social differences, the digital divide between the affluent and the poor has also brought attention to racial inequality (Gobble, 2018).

Due to the many advantages it offers to businesses and the general public, digitalization is becoming more and more relevant on a global scale. Some of the strongest reasons (Craig, 2016; OECD, 2017) in support of the switch to digital forms are as follows:

Digitalization may allow for an improvement in productivity and efficiency since technology allows companies to standardize their processes, automate formerly labor-intensive jobs, and reduce human error. This is because firms can reduce human error thanks to digitization. Employees are given the chance to focus on tasks that have a greater value, which eventually leads to improved production and efficiency.

Businesses may be able to save money in a variety of ways, including by reducing or eliminating the requirement for physical infrastructure, simplifying supply networks, doing away with paper-based processes, and optimizing supply chains. The likelihood that profit margins and market share will increase as a consequence is present.

Businesses may perform more focused marketing and provide consumers a better overall experience because to digitalization's ability to gather and analyze data about customers. It's possible that this will lead to more content customers who stay involved with your business.

New types of businesses have emerged as a result of the development of digital technology, such as those that operate on online platforms or take part in the "sharing economy." New consumer value propositions have been developed as a consequence of these breakthroughs, which have also upended traditional business strategies.

Education is now accessible to everyone, regardless of geography or socioeconomic status, as a result of the growth of digital learning platforms (Akkad & Mouselli, 2023; Röth et al., 2023).

Making relationships with others and taking part in social and political activities have never been easier thanks to the widespread usage of digital technologies. The organization of social movements and the spread of ideas have benefited from the numerous social media platforms.

It is conceivable that as technology develops and has an impact on both our daily lives and the locations where we work, digitalization will become an even more crucial engine of economic development and innovation in the years to come.

2.1.1. Benefits of Digitalization

The impact of digitization on both businesses and society at large has been extensive and is expected to persist. The subsequent text provides a synopsis of the foremost advantages resulting from the ubiquitous implementation of digital technology (Arthur-Nyarko et al., 2020; Röth et al., 2023):

The implementation of digitalization in businesses may result in several benefits such as the automation of repetitive tasks, the optimization of processes, and the reduction of error rates. These advantages may provide long-term benefits for enterprises. The increased availability of time and cognitive resources among employees is expected to lead to improved productivity and output, owing to their heightened capacity to concentrate on critical tasks(Sanchez-Riofrio et al., 2022).

The utilization of digitalization can result in a significant increase in productivity and effectiveness, which are among the primary advantages. Organizations have the ability to leverage digital technology to automate previously manual processes and optimize workflows, resulting in reduced time wastage, decreased error rates, and enabling personnel to concentrate on higher-value tasks(Sanchez-Riofrio et al., 2022).

Automated data collecting systems may be employed by companies as a substitute for manual data entry into spreadsheets or databases. These systems automatically collect data. These systems have the capability to collect data from diverse sources, such as online forms and sensors. As a consequence of this, there will be a reduced necessity for human data entry, leading to both temporal efficiencies and a decreased probability of errors arising from human involvement(Hoe, 2019).

The advent of digitalization has enabled businesses to streamline the automation of corporate processes such as document management, billing, and inventory monitoring, leading to a reduction in their overall complexity. Consequently, this could potentially assist enterprises in conserving resources in the form of time and effort that would have otherwise been expended on said undertakings, thereby enabling employees to engage in more profitable tasks such as enhancing product

offerings and augmenting customer satisfaction. Consequently, this could potentially result in a reduction of resources expended by companies towards such tasks(Hoe, 2019).

Digitization may lead to an increase in productivity due to the feasibility of remote work. The advent of technological advancements such as cloud computing, video conferencing, and other forms of virtual collaboration has enabled employees to work remotely, thereby reducing time and cost expenditures associated with commuting to a physical workplace(Okkonen et al., 2019).

The likelihood of a company achieving greater competitiveness and cost savings is positively correlated with its ability to improve both operational output and efficiency. By leveraging digital technology to automate laborious processes and optimize workflows, corporations can improve their operational efficiency and allocate greater attention towards innovating new products and services. This enables businesses to allocate additional time and resources.(Copestake et al., 2024)

There exists a possibility that enterprises may curtail expenditures owing to the digitization of their operations. This can be attributed to the substitution of manual processes with electronic ones, the reduction in the necessity for physical infrastructure, and the amelioration of supply chains. This potentiality emerges due to the ability of firms to reduce expenses through the replacement of manual procedures with digital alternatives. Consequently, there exists a possibility that the business's competitiveness and profitability may be enhanced(Añón Higón & Bonvin, 2024).

The advent of digitalization has brought about significant benefits, among which the potential for financial savings is considered to be of utmost importance. Organizations have at their disposal a range of potential channels through which they may achieve cost reductions by leveraging digital technology (Akkad & Mouselli, 2023; Sanders et al., 2019).

The employment of digitalization and its associated technologies has the potential to eliminate paper-based procedures such as billing, record-keeping, and document management in business operations. The achievement of this objective can be facilitated by means of digitalization. Consequently, the necessity of physical paper storage and transfer has been eliminated, resulting in reduced expenses related to paper, printing, and storage (Briguglio, 2016; Sajadi & Hartley, 2022).

The adoption of digital processes by businesses may potentially lead to a decrease in the demand for physical spaces such as offices, warehouses, and retail storefronts. E-commerce businesses have the ability to sell their merchandise through online channels, thereby eliminating the necessity of physical storefronts and the associated expenses such as rent, electricity, and maintenance. This offers a prospect for cost reduction for the enterprise (Cannavale et al., 2020).

The implementation of digital technologies for the purpose of supply chain optimization has the potential to enable businesses to curtail expenses in domains such as inventory management, shipping, and warehousing. The set of technological instruments encompasses digital sensors, data analysis techniques, and artificial intelligence. Enhancing the efficacy of the supply chain could potentially enable the achievement of this objective. By utilizing consumer demand and stock level data, businesses can make adjustments to their estimates, potentially reducing the need for excess inventory (Abuhussein et al., 2023; Didier et al., 2021).

The streamlining of work processes through digitization of business operations, including accounting, invoicing, and customer service, has the potential to yield cost and time savings for firms, while also simplifying the associated procedures within these domains of the organization. There exists a possibility of achieving cost savings in various domains such as rent, labor, and marketing, with the aim of attracting new clientele (Ahmed, 2020; Kano & Oh, 2020).

One of the significant advantages of digitalization is the potential for cost reduction. The implementation of digital technology presents a promising opportunity for businesses to enhance their financial standing and augment their profitability. The implementation of this technology enables the elimination of paper-based operations, reduction in physical infrastructure requirements, enhancement of supply chain efficiency, and optimization of workflows. It is plausible that this could assist enterprises in maintaining their competitive advantage in the constantly changing and evolving digital realm (Gil-Alana & Monge, 2021).

Thirdly, the capacity of enterprises to gather and scrutinize data regarding customer inclinations and behaviors could potentially lead to enhanced customer experiences. The reason for this is that the process of digitalization allows enterprises to gather information pertaining to their clientele. The aforementioned data can be utilized to modify advertising strategies and service provision, potentially leading to

heightened consumer satisfaction. This phenomenon possesses the capability to enhance the level of contentment that consumers derive from their interaction with the product or service, and concurrently augment their allegiance to the brand.

The emergence of digitization has yielded a third significant advantage, namely, an enhancement in the mode of customer engagement employed by businesses. Organizations possess the capability to enhance their marketing endeavors and service standards for their customers by gathering and scrutinizing real-time data pertaining to consumer preferences and behaviors via digital platforms. Enterprises have the ability to collect and analyze this data. This phenomenon holds the promise of augmenting both consumer satisfaction and brand loyalty (Alsamhi et al., 2022; Ming et al., 2016).

Through the examination of client data such as purchase history, browsing behavior, and social media engagement, enterprises can devise marketing tactics that cater to the specific demands and preferences of individual customers. These strategies have the capability to effectively address the needs and preferences of particular customers. The aforementioned has the capacity to enhance customer engagement, consequently elevating the efficacy of marketing endeavors (Song, 2009).

Furthermore, enterprises have the potential to utilize digital technology to offer patrons a uniform and personalized encounter throughout all touchpoints with the organization. The employment of customer relationship management software has the potential to achieve this objective. The facilitation of timely assistance and communication between enterprises and their clientele can be executed through a variety of mediums. Several communication channels are available for organizations to engage with their audience, such as chatbots, social media platforms, and mobile applications, among others. It is probable that this measure will result in a decrease in the duration of addressing customer grievances, while concurrently elevating the overall levels of contentment (Yang & Kang, 2008; Zheng & Zhang, 2021).

Furthermore, digitalization has the potential to assist corporations in providing state-of-the-art products and services that more accurately meet the needs and demands of customers. By means of scrutinizing customer data, enterprises can identify problematic aspects within their operations, subsequently enabling them to devise novel products and services aimed at resolving those issues. As a result, there

exists a potential for an escalation in the quantity of consumers, coupled with positive verbal promotion.

In the present digital economy, companies can enhance and sustain their competitiveness in the market by prioritizing the delivery of exceptional customer service. Consequently, this phenomenon has the potential to enhance customer satisfaction, commitment, and promotion of the enterprise in question. Organizations that leverage digital technology can acquire a comprehensive understanding of their clientele, thereby gaining a competitive edge and fostering enduring customer relationships.

The advent of novel forms of business enterprises represents the fourth transformation that can be ascribed to the impacts of digitalization. Instances of this phenomenon can be observed in the realm of the "sharing economy" and in enterprises that are founded on digital platforms. The emergence of novel consumer value propositions can be attributed to the direct impact of the disruption that has been inflicted upon long-standing industries.

The proliferation of digital technology has given rise to a multitude of novel business models that were previously unfeasible. The sharing economy and platform-based businesses are emerging business models that have gained significant traction in recent times (Harel, 2021; Ibrahim et al., 2013)

The sharing economy is a phenomenon that revolves around the utilization of digital marketplaces to enable the transfer of commodities and services among individuals within a given community. Airbnb provides an opportunity for property owners to generate income by leasing their residences to visitors, while Uber allows individuals to convert their personal cars into taxicabs by becoming drivers. The advent of these platforms has resulted in the disruption of established industries, such as hotels and taxi services, by providing customers with cost-effective and adaptable alternatives. The taxi services have also been impacted by the current situation(Ibrahim et al., 2013).

Platform-based businesses serve as intermediaries in online marketplaces, facilitating transactions between buyers and merchants. These transactions can occur in various settings, ranging from physical markets to digital ones. The utilization of networks has the capacity to accelerate a company's penetration into novel customer

bases, consumer markets, and vendor bases, all of which are fundamental to the triumph of a firm. Amazon and Upwork are instances of corporate entities that operate as platform intermediaries. Amazon facilitates the creation of online stores by third-party businesses, whereas Upwork serves as a platform connecting independent contractors with clients. Both of these entities facilitate the exchange of services(Croxson et al., 2022).

The adoption of contemporary business methodologies has resulted in the obsolescence of conventional business domains, thereby creating opportunities for novel forms of advancement and development. Moreover, they have facilitated enterprises in acquiring novel forms of funding through enabling inventive forms of customer and supplier engagement, which has been made possible by leveraging digital technology. The task has been successfully completed(Jia et al., 2023).

The advent of innovative business practices is accompanied by the emergence of a fresh array of hazards. The concentration of power within a limited number of dominant companies has been a topic of concern in the realm of platform-based businesses. However, in the sharing economy, safety and regulation have emerged as significant issues. The resolution of these challenges will be imperative for enterprises and governing bodies, given the increasing prevalence of these novel business models, to fully capitalize on the potential advantages of digitalization, while simultaneously constraining the associated risks(Gebauer et al., 2020).

The proliferation of online educational platforms and other digital technologies has democratized access to knowledge and skills, thereby promoting greater equity. The phenomenon referred to as the democratization of information and skills is being observed. The aforementioned phrase refers to the process of making information and skills more accessible to a wider range of individuals (Ibrahim et al., 2013; Mothe & Thi, 2010).

The widespread adoption of digital technology yields several advantages, including enhanced accessibility to knowledge and expertise. The widespread availability of digital technology has enabled individuals of diverse ages, backgrounds, and geographic locations to acquire novel knowledge and competencies. The proliferation of digital technology has been facilitated by the expansion of online education platforms.(Gierlich et al., 2019)

Individuals possess the capability to acquire novel proficiencies from any geographical location worldwide, at their own preferred tempo, and at any hour of the day or night that is most suitable for them by utilizing resources such as web-based courses and instructional materials. This mode of education is particularly beneficial for individuals who face barriers to enrollment in conventional academic institutions, such as financial constraints and limited accessibility. This encompasses individuals who aspire to pursue higher education but face financial constraints that impede their ability to do so (Bauer et al., 2021).

Digital tools such as coding platforms, design software, and collaboration tools have enabled individuals to showcase their abilities irrespective of their geographical location or access to traditional career opportunities. Furthermore, individuals have the capacity to do so irrespective of their access to conventional employment opportunities. Individuals who face limitations in accessing conventional educational or occupational avenues may find this approach advantageous as it could aid them in achieving parity in competition (Maiorova, 2021).

The potential impact of the democratization of knowledge and skills extends beyond individuals to communities. The aforementioned consequences have the potential to impact both singular persons and collectives. Digitization has the potential to eliminate the geographical and financial obstacles that have traditionally hindered access to education. Additionally, there exists the potential for heightened levels of social and economic mobility, a decrease in disparities, and an enlargement of inventive and imaginative pursuits (Bouncken et al., 2021).

Due to the extensive accessibility of digital technology, individuals are now able to engage in more efficient social and political interactions than ever before in history. The proliferation of social media platforms has facilitated improved coordination of social movements and dissemination of information, resulting in enhanced ease of interpersonal interaction (Rachinger et al., 2018).

The widespread adoption of digital technology has facilitated increased participation in political and social spheres by a larger demographic. Individuals are presently capable of engaging in dialogues and participating in political and social affairs in manners that were previously unimaginable. Previously, these actions were deemed unattainable (Rachinger et al., 2018).

The utilization of diverse social media platforms enables individuals to engage in communication, exchange information, and mobilize backing for various social and political movements. Facebook, Twitter, and Instagram are among the websites that belong to this particular classification. The widespread availability of various forms of media has facilitated improved connectivity among individuals and enhanced coordination of social movements on a global level(Rachinger et al., 2018).

The progress made in digital technology has eliminated the limitations previously imposed on individuals and organizations in terms of accessing information and communication. This has been achieved by circumventing the conventional gatekeepers of information and communication, such as government agencies and the mainstream media. The reason for this phenomenon is that both individuals and organizations currently possess greater agency in determining the information and communication they receive. The implementation of this measure has resulted in heightened levels of transparency and accountability within governmental and institutional settings, while also facilitating the dissemination and exchange of information among individuals(Gorzelany-Dziadkowiec, 2021).

Furthermore, the proliferation of digital technology has enabled individuals to engage in political participation through novel and diverse means. Electronic voting, online petitions, and crowdsourcing are among the activities that fall under this category. It is plausible that involvement in politics through these non-traditional means may enhance the transparency and availability of politics to individuals who would otherwise be precluded from participating (Homayoun et al., 2023).

The emergence of digitization has facilitated a significant advantage whereby a greater populace can participate in political and societal affairs. The potential for social and political transformation, as well as enhanced transparency and accountability in government and other institutions, may be facilitated by heightened communication, information exchange, and activity. The aforementioned outcomes could potentially be attributed to the advancement of digital technology, which facilitated the feasibility of engaging in said activities(Homayoun et al., 2023).

The implementation of digitization has the potential to augment the capacity of enterprises to gather and scrutinize data pertaining to various facets of their activities. Consequently, this may enhance the ability of enterprises to make informed judgments regarding diverse facets of their activities. This data has the potential to

provide valuable insights for decision-making across various domains, including advertising campaign management and supply chain operations(Legner et al., 2017).

The implementation of digitalization yields a significant benefit in the form of improved decision-making capabilities. Contemporary organizations possess the capacity to leverage digital technology to gather and analyze data from all aspects of their business activities, thereby enabling them to make more informed decisions.

Businesses have the potential to enhance their marketing and product development endeavors through the collection and analysis of data pertaining to customer preferences, market trends, and competitor activity. Organizations may monitor internal metrics, such as sales performance, inventory levels, and supply chain efficiency, to inform strategic decision-making regarding potential areas for improvement and cost reduction(Apostolov & Coco, 2021).

Real-time data analysis enables companies to identify changing market conditions and evolving customer expectations, allowing them to respond promptly and efficiently to these developments. As a result of this phenomenon, there exists a possibility that your agility and promptness may experience an upsurge, thereby conferring upon you a noteworthy edge over the other enterprises functioning within your industry (Devinney et al., 2010; Ferreira & Otley, 2009).

Artificial intelligence and machine learning are digital technologies that can aid organizations in identifying significant patterns and trends within extensive datasets, potentially resulting in more precise predictions and projections. Artificial intelligence and machine learning can aid organizations in identifying patterns and trends. The technologies mentioned above are classified as "disruptive technologies," which have the capacity to fundamentally transform the operations of organizations. The precision of one's forecasts holds great importance in sectors such as banking and healthcare, wherein the impact of such projections extends beyond the economy and affects the larger society.(Ferreira & Otley, 2009)

Digitization technology has brought about numerous benefits, one of which is the potential for improved decision-making quality. The utilization of digital technology holds promise for enabling enterprises to make better-informed decisions that are informed by data, thereby enhancing their operational efficacy, competitive edge, and profitability. Simplification of the process of collecting and analyzing data

on a wide range of operational factors is a potential approach (Giovannoni & Pia Maraghini, 2013).

Digitization has been observed to enhance a firm's ability to adapt to changes in the industry or business operations, thereby increasing its responsiveness. It is plausible that this could facilitate the adaptation of businesses to changing customer preferences and market conditions.

Digital systems offer significant advantages in terms of their speed and adaptability, which are crucial benefits to consider. Digital systems offer a significant advantage. It is possible for enterprises to attain a competitive edge by leveraging the rapidity afforded by digital technology to promptly respond and effectively adjust to the evolving needs of their customers and the market environment (Giovannoni & Pia Maraghini, 2013).

The advent of cloud computing and other digital technologies has facilitated the ability of individuals to fulfill their obligations from nearly any place and at nearly any time. As a consequence, enterprises have gained increased mobility and agility, enabling them to more effectively adapt to the swift transformations transpiring in the marketplace (Giovannoni & Pia Maraghini, 2013).

Digitalization has the potential to automate tasks that have traditionally been labor-intensive for businesses, leading to enhanced workflows and potential savings in time and resources. Consequently, enterprises could potentially enhance their ability to promptly adapt to fluctuating market dynamics and the continuously changing demands of their customer base (Melnik et al., 2014).

Moreover, digital technologies, including data analytics and artificial intelligence, have the potential to assist companies in identifying patterns in consumer behavior and market conditions. This would confer a substantial advantage. This provides the organization with the ability to enhance their readiness for fluctuations in these domains and effectively adjust to them in real-time (Dai et al., 2021).

The expectation is that digitalization will increasingly serve as a key catalyst for economic expansion and creativity in the future, especially given the ongoing influence of technological progress on individuals' daily pursuits. The prevailing expectation is that the inclination towards augmenting digitalization will persist,

given that it has already established itself as a fundamental catalyst for economic growth and innovative advancements (Dai et al., 2021).

2.1.2. The challenges associated with the process of digitalization.

The advent of digitalization has brought forth a plethora of prospects, yet it has also engendered a range of predicaments for both corporations and the broader community. The subsequent enumeration outlines several noteworthy challenges that arise from the process of digitization, ranging from 4 to 10.

1. The emergence of a digital divide between individuals who possess access to digital technology and those who lack it has the capacity to exacerbate pre-existing inequalities. The process of digitalization possesses the capability to bring about significant changes. The proliferation of digitalization may pose challenges for individuals residing in low-income regions or rural areas to obtain access to educational opportunities, career prospects, and other benefits(Almeida et al., 2020).

2. The extensive utilization of digital technologies has raised apprehensions regarding safety and confidentiality, specifically in relation to the collection and retention of data. Both individuals and organizations bear the responsibility of safeguarding the data they collect, and individuals ought to be cognizant of the potential hazards associated with divulging personal information online(Ivanova et al., 2019).

3. The reliance of individuals and institutions on digital technology has led to an escalation in the risk of cyber attacks and data breaches, thereby emphasizing the significance of cybersecurity. This underscores the necessity for heightened cybersecurity protocols. Individuals and organizations alike bear the obligation to implement protective measures for their personal data and digital resources and infrastructures(Kovalevska et al., 2022).

4. The phenomenon of technological obsolescence is becoming increasingly prevalent as digital technologies continue to advance rapidly. In order to remain competitive, companies are compelled to invest in state-of-the-art technology. Conversely, this may expedite the phenomenon of technical obsolescence, wherein antiquated technology becomes outdated and less efficacious(Habrat, 2020).

5. The advent of digitalization has given rise to fresh legal and regulatory predicaments, particularly in the domains of data privacy, intellectual property, and

competition law. Overcoming these obstacles is imperative for businesses to ensure adherence to relevant rules and regulations(Habrat, 2020).

6. The phenomenon of digital technology addiction has been observed, and it has been noted that this behavior can lead to adverse consequences such as decreased productivity, diminished social interaction, and heightened levels of anxiety and despondency. It is imperative for individuals to possess an awareness of the potential hazards associated with excessive utilization of digital devices(Gjellebæk et al., 2020).

In the broad sense, it is imperative to devise remedies for the challenges posed by digitalization to ensure the complete realization of its benefits while concurrently mitigating the attendant risks. Collaboration between businesses and governments is necessary to address these challenges and establish a framework for responsible and environmentally sustainable digitization.

2.1.3. The impact of digitalization on society is a topic of significant academic interest.

The impact of digital technology on society has been significant, encompassing both advantageous and detrimental aspects. The subsequent enumeration outlines several significant societal impacts resulting from the emergence of digitalization (Craig, 2016; Röth et al., 2023).

1. The proliferation of digital technology has enabled global individuals to engage in communication, thereby promoting the exchange of concepts, data, and cultural customs.

2. The advent of digitalization has facilitated the accessibility of information across a wide range of subjects, thereby simplifying the process for individuals to obtain such information. The scope of the information encompasses a wide range of topics, spanning from contemporary happenings and updates to scholastic materials and recreational alternatives.

3. The advent of digitalization has led to significant economic disruption, causing a fundamental shift in traditional sectors and business models. This has resulted in the displacement of jobs and a restructuring of labor practices.

4. The adoption of digitalization has enabled organizations to automate previously manual processes and streamline workflows, resulting in enhanced efficiency and productivity.

5. The impact of digitalization on the environment has been significant, encompassing both favorable and unfavorable outcomes. Advancements in technology have facilitated the reduction of environmental impact for both individuals and organizations through the reduction of physical infrastructure and transportation requirements. Conversely, the proliferation of technology has led to an increase in electronic waste and energy consumption.

6. The digital revolution has facilitated novel forms of social and cultural expression, including online communities and social media, leading to modifications in social and cultural norms. Furthermore, it has presented a potential danger to the established customs and principles that have been upheld in domains such as confidentiality and interpersonal communication.

7. The phenomenon of digital divide has emerged as a consequence of the digitalization process, leading to a dichotomy between individuals who possess the means to access digital technology and those who lack such resources. The aforementioned circumstance has resulted in a further amplification of pre-existing disparities.

8. The process of digitalization has facilitated enhanced transparency and information accessibility, thereby simplifying the task of holding individuals and organizations accountable for their actions. This is achieved by augmenting the volume of information that is readily available to the public. The utilization of digital technology facilitates the expeditious submission of information regarding unethical or unlawful activity by whistleblowers, and also empowers individuals to monitor the operations of their government and hold authorities accountable for their actions.

9. The advent of digitalization has facilitated novel forms of political participation and civic engagement, including but not limited to online petitions, crowdsourcing, and social media activism. The advent of digitalization has facilitated novel forms of participation. The aforementioned development has improved the accessibility and inclusivity of political procedures, particularly for individuals who may otherwise be marginalized from traditional modes of political participation. This

holds particularly true for those individuals who have been afforded the opportunity to engage in political processes as a result of heightened accessibility.

10. The emergence of digital technology has caused a significant transformation in the way people interact with each other, both in their personal and occupational spheres. The widespread adoption of digital technology has facilitated simpler and more efficient communication among individuals. However, this phenomenon has also brought forth concerns regarding the reliability and accuracy of contemporary communication.

11. The advent of digital technology has facilitated the emergence of online courses and digital textbooks, which have revolutionized the landscape of learning and education. The advancement in technology has led to increased accessibility and flexibility in education. However, concerns have been raised regarding the effectiveness and caliber of online learning.

12. The healthcare industry has undergone notable transformations due to the emergence of digitalization. These changes include the implementation of personalized medication, digitalized record-keeping, and remote consultations. The utilization of this technology possesses the capability to improve healthcare outcomes and yield cost savings. However, it also elicits concerns regarding the confidentiality and safeguarding of patient information.

The impact of digitization on society is intricate and diverse, necessitating meticulous examination and regulation to ensure that benefits are realized while risks are mitigated.

2.1.4. Impact of Digitalization on Education

Both the method by which education is delivered and its subject matter have been profoundly influenced by the rise of digitalization. Some of the most significant effects of digitalization on schools are listed below(Bejinaru, 2019).

Digitalization has expanded the accessibility of education worldwide, particularly in areas where traditional educational opportunities are limited, thereby constituting a significant advantage. The widespread availability of online courses, digital textbooks, and other digital materials has greatly expanded the educational opportunities available to individuals all over the globe(Bejinaru, 2019).

The advent of digitalization has facilitated personalized learning, enabling students to progress through academic content at their own pace and customize their education to align with their unique interests and needs. Adaptive learning is made possible by digital technology, in which students get guidance and critique tailored to their own strengths and weaknesses as learners(Bejinaru, 2019).

Students can work together more efficiently, regardless of their location or the time zone they're in, thanks to digital tools like online discussion forums, video conferencing, and collaborative software(Ronzhina et al., 2021).

One potential avenue for enhancing learning outcomes through digital technology is the provision of engaging and interactive materials, such as movies, animations, and simulations. With the use of digital resources, students may engage in projects and other forms of experiential learning that put what they have learned into practice(Ronzhina et al., 2021).

Greater productivity: By helping educators automate routine chores and simplify bureaucratic procedures, digitalization has the potential to improve the effectiveness of education delivery. Teachers may then have more time for other valuable activities, such as giving each student constructive comments and leading in-class conversations.

As a result of digitalization, education now faces new issues, such as ensuring that all students have access to computers and the internet. It also raises questions of security and privacy in the context of data gathering and online educational platforms(Arisoy, 2022).

Blended learning is an educational approach that combines traditional classroom instruction with digital tools, resulting from the process of digitalization. Blended learning allows students to take use of online learning tools and peer collaboration while still receiving the benefits of in-person teaching and instructor direction(Arisoy, 2022).

The advent of digitalization has facilitated the possibility of lifelong learning, rendering it more viable and convenient for professionals at any point in their career trajectory to persistently acquire novel skills and adjust to emerging technologies. The advent of online classes and digital tools has enabled individuals to acquire new skills at their own pace and convenience.

The emergence of digital technology has facilitated worldwide access to information and courses, enabling individuals to broaden their knowledge and comprehension of the world and its inhabitants. Learning from professionals and teachers anywhere in the globe, as well as collaborating with peers from all over the world, is now possible thanks to online courses and other digital tools(Arisoy, 2022).

Digital literacy: As the world becomes more digitized, the ability to read, write, speak, and understand the language of computers and the internet has become increasingly important. Digital literacy encompasses the ability to conduct a critical evaluation of online content, analyze data, and comprehend the ethical and social implications of technology(Islam & Jahan, 2018).

Digitalization has changed the job of instructors from information producers to learning facilitators. In contemporary times, educators are required to not only facilitate their students in acquiring technological proficiency, but also furnish them with personalized evaluations, feedback, and recommendations to enhance their educational progress (Cui et al., 2021; Sarker et al., 2022).

The effects of technology on schools are enormous and far-reaching. The emergence of digital technology has led to a transformation in the realm of education, resulting in a more personalized, accessible, and interactive learning experience. In contemporary times, it has become imperative for students to possess literacy skills and adeptness in navigating the digital landscape, which have undergone significant transformations due to the process of digitalization(Andriushchenko et al., 2021).

The advent of digitization has introduced novel challenges in the realm of education that necessitate effective management, strategic planning, and regulatory oversight. Ensuring equitable and sustained access to technology and internet connectivity, particularly among individuals residing in low-income or remote areas, presents a significant challenge. In order to achieve this objective, it is imperative to allocate resources specifically aimed at facilitating digital inclusion(Hans & Crasta, 2019).

Establishing the effectiveness and dependability of online education poses an additional challenge. In order to ensure that students receive education and support of superior quality, it is imperative that digital tools are meticulously crafted and administered, despite their capacity to offer personalized and adaptable learning.

Ensuring that instructors furnish students with personalized feedback and guidance, and that online courses and materials are both accessible and engaging, are integral components of this process(Machekhina, 2017).

In the context of digitalization and education, it is imperative to take into account the critical aspects of data privacy and security. Educational institutions bear the obligation to safeguard the confidentiality of their students by instituting regulations and procedures that ensure the secure acquisition and retention of student data(Machekhina, 2017).

The digitization process has brought about changes in the teaching profession, leading to the evolution of teachers. Contemporary educators are responsible for supporting their pupils in developing proficiency in technology, confidently navigating the digital realm, and receiving personalized feedback and guidance to advance their academic pursuits. In order to ensure the success of their students in a digital learning environment, it is imperative that instructors receive ongoing professional development and support(Ren et al., 2021).

In summary, the emergence of digital technology has brought about both benefits and drawbacks to the realm of education. The benefits of digitalization can only be realized through the implementation of appropriate measures to address the associated risks, which necessitates effective planning, management, and regulation (Rahman et al., 2020).

2.2. Digitalization in Iran

In recent years, Iran has seen rapid digitization, which can be attributed in part to the government's efforts to promote the growth of digital technologies and infrastructure. The following is a list of some of the most significant aspects of digitalization in Iran: (Akkad & Mouselli, 2023; Sanders et al., 2019)

To begin, in the last several years, the number of Iranians who have access to the internet has skyrocketed from roughly 15 million to more than 85 million. The observed change exhibits a significant escalation. At the moment, more than seventy percent of all people who use the internet also access the world wide web using a mobile device(Hassani & Babazadeh Sangar, 2024).

Second, the growth of the internet business sector in Iran is phenomenal, with an anticipated revenue of \$2.8 billion by the year 2020. The government of Kenya has

been motivated by the triumph of Digikala and Bamilo, two prosperous e-commerce websites, to implement measures that will enhance online sales and offer support to small and medium-sized enterprises (SMEs) functioning within the nation(Salamzadeh & Dana, 2021).

The government of Iran has invested significantly in the nation's digital infrastructure, encompassing the provision of high-speed internet connectivity and mobile telecommunications networks. A number of satellite projects have also been established by the country to provide Internet connectivity in areas that are currently underserved (Abuhussein et al., 2023).

Consumers in Iran now have access to a wide choice of online payment gateways and mobile banking alternatives, which has contributed to the fast development of the fintech sector in the country. The federal government has established several initiatives with the goals of fostering the expansion of fintech and assisting small and medium-sized businesses (SMEs) in the sector(Hamidinava et al., 2021).

Iran is becoming a fertile field for the startup sector as a result of the growing number of Iranian entrepreneurs and technology enterprises that are initiating new projects. The federal government has established initiatives that aim to facilitate the expansion of new businesses by facilitating access to financing and other resources(Hamidinava et al., 2021).

Students in Iran are increasingly turning to online classes and other digital resources, and this trend is having a significant impact on the educational landscape of the country as a whole. The development of students' and teachers' digital literacy has been prioritized by the government, which has launched a number of initiatives to this end(AFSHARI, 2017).

The efforts of the government, the nation's young population that is well-versed in technology, and the powerful entrepreneurial climate in Iran are all contributing to the fast digitalization that is occurring in the country. The Iranian government has implemented several initiatives, including the National Information Network (NIN), to promote the advancement of digital technologies and infrastructure. The objective of the NIN is to establish a secure and autonomous domestic internet network, free from external influence. E-commerce, financial technology, and the formation of new

businesses from the ground up are all examples of sectors in which the government has launched initiatives to foster growth (Gil-Alana & Monge, 2021; Homayoun et al., 2023).

The fast transformation of Iran into the digital age is being fueled by the country's young population, who is also quite computer aware. The bulk of Iran's population is under 30 years old and is knowledgeable about many forms of modern technology. The number of successful digital startups and entrepreneurs has increased as a direct result of this (Boudlaie et al., 2021).

However, the advancement of digitalization in Iran is not without obstacles. It is a significant challenge to ensure that individuals, particularly those living in rural areas and those with low incomes, have access to technology. Despite the widespread usage of the Internet in Iran, there are still certain areas that lack adequate connectivity (Behboudi, 2017).

Furthermore, it is imperative to address apprehensions regarding the confidentiality and security of information. Over the past few years, Iran has experienced numerous noteworthy instances of data breaches and cyberattacks, thereby underscoring the pressing necessity for improved data safeguarding and cybersecurity regulations throughout the country (Abuhussein et al., 2023).

The implementation of digital technology in Iran has the potential to yield significant benefits for both its economy and society, despite the obstacles that must be overcome. Digital technology has the potential to enhance productivity, decrease costs, and facilitate expansion into new sectors for businesses. Moreover, they have the potential to facilitate global communication, potentially leading to enhanced creativity and productivity (Abuhussein et al., 2023; Alexander & Rutter, 2022; Kano & Oh, 2020).

The proliferation of digitalization in Iran is a potentially positive development since it may catalyze socioeconomic development and shifts. It is vital to have rigorous management in place in order to guarantee that the advantages of these technologies are achieved while also limiting the risks connected with the broad usage of them.

3. LITERATURE REVIEW

3.1. Evaluation

Increasing the use of digital tools: The epidemic of COVID-19 made small and medium-sized companies in Iran to use digital technologies more than before. This includes the use of enterprise resource management applications, online platforms for sales, and customer communication programs (Alexander & Rutter, 2022; Craig, 2016).

Some challenges to digital transformation: Despite the potential benefits, many companies faced challenges. These challenges include budget constraints, the need to train employees, and the need to maintain information security and privacy (Craig, 2016; Eller et al., 2020).

Change in work structure: With the increase of remote work, small and medium-sized companies also needed to change their work structure. Some of these changes include increased online communication, changes in working hours, and the ability of employees to work from home (Arthur-Nyarko et al., 2020; Eller et al., 2020).

Increasing the acceptance of digital payments: due to the limitations of physical contact, Iranian small and medium-sized companies are more likely to use digital payment methods. This can happen through the use of online payment programs or the use of new technologies such as blockchain (Brynjolfsson & McAfee, 2014; Progoulakis et al., 2023).

Innovation and evolution: Finally, the sudden changes caused by the COVID-19 pandemic can be a stimulus for innovation and evolution in small and medium-sized companies in Iran. Many companies may try new ways of working, adopt new technologies, or develop new products and services to better meet the needs of their customers at this time (Progoulakis et al., 2023).

3.2. Concepts

The issue of the impact of the COVID-19 pandemic on the digitalization of small and medium-sized companies in Iran includes several concepts:

Digitization: The process of converting information or processes into digital form.

Digital Transformation: structural and cultural changes in organizations in order to exploit the opportunities of digital technology.

COVID-19 Pandemic: The global pandemic caused by the corona virus that started in 2019 and affected people's economic, social and cultural life.

Remote Work: A form of work where employees can work from a location away from their office, usually from home.

Electronic commerce (E-commerce): buying and selling goods and services through the Internet.

Enterprise Resource Planning (ERP) applications: software that helps companies manage their business operations.

Digital Payment Platforms: Payment methods that are made through digital devices, such as payment through a mobile application or website.

Blockchain: A technology used to create an immutable, distributed digital ledger, typically with applications in financial and legal transactions.

Cybersecurity: A set of processes and technologies designed to protect systems, networks and applications from digital attacks (Chen et al., 2020; Gil-Alana & Monge, 2021).

3.3. Theories, Models, and approaches

In analyzing the impact of digitalization on small and medium-sized enterprises (SMEs) in Iran, several key theories, models, and approaches can provide valuable insights into this process. One of the primary theories that can help in understanding digitalization is Disruptive Innovation Theory, proposed by Clayton Christensen. This theory suggests that emerging technologies can fundamentally alter existing market structures, eventually leading to the creation of new business models and even the obsolescence of traditional ones. In Iran, digitalization, particularly accelerated by the COVID-19 pandemic, has acted as a disruptive force, compelling many traditional businesses to adopt digital technologies and alter their business models(Christensen, 2015).

Another relevant theory is the Technology Acceptance Model (TAM), introduced by Davis in 1989. This model explains how users decide to adopt or reject a particular technology based on two main factors: Perceived Ease of Use and

Perceived Usefulness. In the context of Iranian SMEs, this model can help explain how business owners and employees have reacted to the adoption and use of digital tools and new technologies, especially under the pressure of the pandemic, which forced rapid changes (Davis et al., 1989).

The Adaptive Structuration Theory is also a significant model that examines how organizational structures adapt to new technologies. This model helps us understand how Iranian SMEs have modified their organizational structures to optimally utilize digital technologies. These changes involve reevaluating organizational structures, business processes, and even organizational culture, all of which have been necessary to align with new digital demands (Gopal et al., 1992).

Resource-Based View (RBV) is another theory that is highly relevant in analyzing the digitalization of SMEs in Iran. This theory emphasizes the importance of a firm's internal resources as the primary source of competitive advantage. In the context of digitalization, Iranian SMEs must strategically manage their resources to effectively leverage digital technologies for improved performance and competitiveness. These resources include human capital (such as digital expertise and skills), financial resources (for investing in new technologies), and technological infrastructure (Lockett & Thompson, 2001).

The Ecosystem Approach is another valuable framework that aids in understanding the broader business environment of SMEs and how they interact with other key players in the digital ecosystem. In this approach, SMEs are viewed as part of a larger ecosystem that includes the government, customers, suppliers, and other major stakeholders. This approach can explain how interactions and collaborations within this ecosystem can accelerate digitalization and long-term success for Iranian SMEs (Kay et al., 1999).

Finally, the Evolutionary Model can also be used to analyze the digitalization trajectory of SMEs in Iran. This model views businesses as dynamic systems that are continuously evolving and adapting in response to environmental and technological changes. Given the dynamic nature of the digital economy and the impacts of the COVID-19 pandemic, this model can help in understanding how Iranian SMEs have adapted and progressed during this period.

3.4. Methodological literature

A comprehensive review on the concept of digital transformation from November 2018 to January 2022 has been conducted using Scopus and Web of Science databases to search and select literature sources and Google Scholar as a complementary source. A systematic search strategy was applied to strike a balance between sensitivity and selectivity, taking into account the limited time frame and scope of the study. For the initial search, a combination of the words "digital transformation" mentioned only in the name of the journal and only scientific articles in English or Russian languages were used. The selection criteria were chosen due to the limited time frame and the fact that the phenomenon of digital transformation has been investigated in multiple fields - such as technology, information technology, business, and organization, as well as in interdisciplinary research. The overall goal of this review is to determine comprehensive definitions to explain digital transformation. For this purpose, it has been chosen not to limit the scope of the research by discipline. The time frame was not limited to the publications in which the term "digital transformation" first appeared. After that, the definitions were classified and the typology of the definitions along with other findings of the research are presented in the next sections of this article (Didier et al., 2021; Sanders et al., 2019).

3.4.1. The impact of the COVID-19 pandemic on SMEs in Iran

Iran, like many other countries, faced many economic and social restrictions as a result of the COVID-19 pandemic. This caused an increase in unemployment, income inequality and economic stagnation. Also, the large trade and financial sanctions imposed by the United States greatly increased the economic pressure. According to statistics, the country's gross domestic product has decreased by 15% so far, and 50% of the labor force and 40% of the lowest income deciles of the population have felt the greatest impact (Chen et al., 2020; Goldfarb & Tucker, 2019).

This situation is likely to add an additional 2 million people to the number of unemployed. The COVID-19 pandemic has created uncertainty and uncertainty in Iran's economy, which seems to have had much more serious consequences compared to other developing and developed countries (Alexander & Rutter, 2022).

According to FM global resilience index in 2020, Iran is ranked 125 among 130 countries. Also, according to the Fragile Countries Index report in 2020, Iran's score was 83.4, which places this country among high-risk countries. This evidence shows that Iran has not performed properly in dealing with economic shocks (Brynjolfsson & McAfee, 2014).

With the withdrawal of the United States from the JCPOA in 2018, Iran faced major economic shocks. In the last two years, this country faced high fluctuations in the exchange rate, which created a platform for unemployment and economic stagnation. According to statistics, Iran's economic growth in 2018 and 2019 was -5.4% and -7.6%, respectively, and it is expected that by the end of 2020, the real GDP growth will reach -6% (Chen et al., 2020; Progoulakis et al., 2023).

Also, the unemployment rate increased during the years 2018-2019, and estimates indicate that due to the sanctions, as well as the effects of the COVID-19 pandemic and the imposition of quarantine on industries, this rate will reach 16.3 and 16.7 in 2020 and 2021, respectively. The percentage will increase. Due to the decline in public purchasing power caused by the economic crises and the COVID-19 pandemic in the past few years, many businesses in both the manufacturing and service sectors - especially small and medium-sized businesses - are at risk of closing. This can lead to an increase in unemployment (OECD, 2017).

In addition, the spread of the COVID-19 virus caused Iran's neighboring countries, such as Iraq, Turkey, Turkmenistan, Afghanistan, and Pakistan, to close their borders, thereby creating obstacles for Iran's trade and exports to these countries (Röth et al., 2023).

In addition, the closure of businesses in the domestic and international tourism sector - which has been one of the factors of creating employment and economic growth during the sanctions era - will exacerbate economic crises in Iran. Therefore, there will be a chain flood of bounced checks and a significant number of businesses will face the risk of bankruptcy, which will increase unemployment in Iran (Röth et al., 2023).

Small and medium-sized companies in most countries of the world, especially in developing countries, are considered a key factor in promoting economic and social development. These types of companies play a central role in providing job

opportunities with low investment, regional transformation and growth, and expansion of knowledge-based companies. In recent years, most governments, including Iran, have provided various and special programs for the growth and development of SMEs, which also support the emergence and development of this type of business (Röth et al., 2023).

According to a report published by the Ministry of Industry, Mining and Trade of Iran, small and medium companies make up 92% of all active units in Iran's industrial sector. During the first eight months of this year (March 21 to November 23, 2019), Iranian small and medium companies have exported 1.5 billion dollars of goods abroad. Also, the Organization of Small Industries and Industrial Towns of Iran (ISIPO) announced that before the spread of the corona virus, more than 33,000 small and medium-sized companies were active in Iran, of which 1,100 companies exported their products and services to other countries. This shows the great role that small and medium companies play in Iran's economy. This issue becomes more important especially considering the long duration of the sanctions imposed against Iran (Ghodsi et al., 2018).

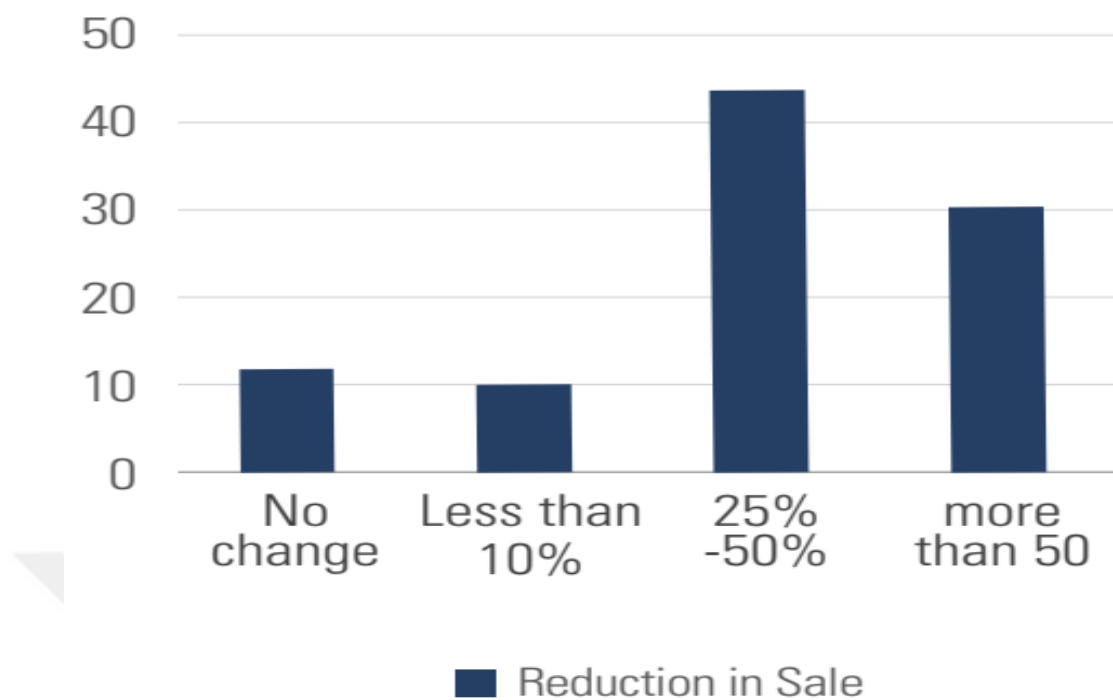


Figure 3.1 COVID-19 impact on SMEs sale (Salamzadeh & Dana, 2021)

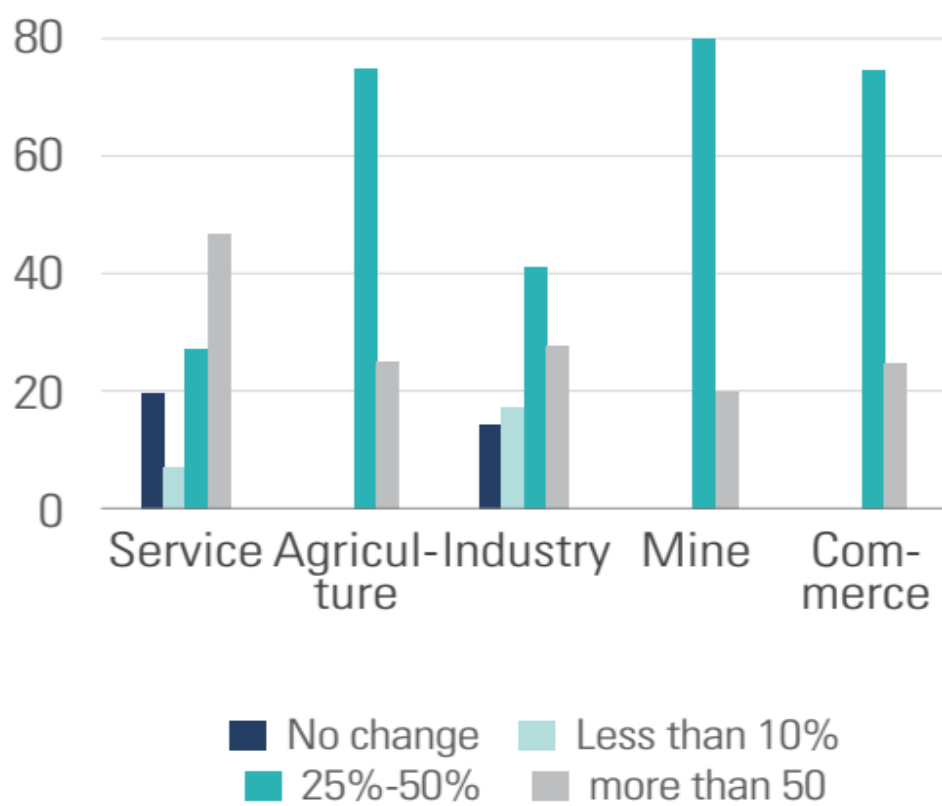


Figure 3.2 COVID-19 impact on SMEs sale in each sector(Salamzadeh & Dana, 2021)

However, SMEs are more vulnerable to economic shocks than larger enterprises (LEs). The COVID-19 pandemic has had a huge impact on small and medium-sized companies, and the smaller a company is, the more it will suffer, as these types of companies are usually short on cash flow and capital. Therefore, it is expected that most SMEs, especially in the service sector, will be forced to close permanently or even disappear from the economy. To investigate the impact of COVID-19 on small and medium-sized companies in Iran, a questionnaire was prepared and randomly distributed among 60 small and medium-sized companies registered by Isfahan Chamber of Commerce, Industries, Mines and Agriculture (ICCIMA). This questionnaire included questions to investigate the effects of COVID-19 on production and sales, production factors and job loss, etc. Figures 3.1 and 3.2 show the responses received. According to Figure 3.1, 32% of SMEs reported that their sales decreased by more than 50%, and 46% said that their sales decreased between 25% and 50%. In addition, 47% of SMEs in the service sector have reported that their sales have decreased by more than 50% because people are reluctant to travel or eat out during the COVID-19 pandemic (Salamzadeh & Dana, 2021).

3.4.2. Digitalization strategies for SMEs during a crisis

The integration of processes shows the degree of dependence of internal and external processes and units and their degree of systematization. Also, organizational strategies include the degree of coordination of digital marketing with different levels of organizational strategies; Therefore, one of the most important factors in choosing digital marketing is the type of strategy that the organization chooses. In a research conducted by (Hasanah et al., 2021), it was found that there is a significant relationship between the type of digital marketing and the type of product strategy. Previous foreign researches (Lamberti & Noci, 2010) have also confirmed the existence of a relationship between marketing and strategy; Therefore, this factor is of great importance. The target market ranks third among the factors. This factor shows the importance of marketing and identifying customer needs, market territory and market share compared to competitors. (Lamberti & Noci, 2010) also found in their research that digital marketing based on innovation in harmony with all product market strategies (differentiation strategies, Cost leadership and first entry) increase performance. Also, they realized that marketing and market product strategies complement each other; Therefore, the target market has a high importance and rank

in the choice of digital marketing and the performance of the organization. In the following, the managerial and theoretical applications are stated based on the research findings.

Since the most important effective factor in choosing digital marketing is the integration of processes, it is suggested that before choosing, managers should identify and map all desired work processes and their degree of conflict and dependence in order to avoid any disruptions and lack of coordination that cause reduction performance can be prevented; Therefore, digital marketing managers must establish the necessary integration and coordination between various organizational activities (such as finance, planning, production, distribution, marketing, etc.) and trans-organizational activities. so that they can achieve financial and non-financial goals by creating a synergy(Hasanah et al., 2021).

It is suggested that the organization choose its strategic orientation from the beginning, is it seeking to reduce the customer's cost through the model? Looking to offer a distinctive innovation and merit? Looking to create an interactive and intimate relationship with the customer? Want the model to complement your traditional business (a complementary relationship)? Or is it looking for customer retention? This orientation, in turn, determines and directs the organization's strategies and target market. - Due to the importance of culture in the selection of digital marketing, it is suggested to prepare safe platforms, hold conferences and provide clear information, and educate people about the conditions for building trust and encouraging people to use information technology through the establishment of comprehensive and facilitating laws and regulations in this field. To be provided in work and daily affairs. This, in turn, facilitates web-based entrepreneurship and a more correct choice of digital marketing(Hasanah et al., 2021).

Identifying, expanding and developing effective factors in choosing digital marketing is very important in understanding and developing theoretical literature and modeling digital marketing based on the context of the country. Such studies will provide the basis and initial familiarity of researchers to conduct typology research, modeling and patterning of electronic businesses. In the following, the limitations of the research as well as suggestions for future research are stated. All the factors identified in this research are in accordance with the previous research literature and western models, which may hinder the accurate understanding of local effective

factors in choosing business models. Therefore, in future research, it is suggested that in addition to library studies, Qualitative interviews with electronic business managers to identify factors influencing the choice of digital marketing in Iran should also be conducted. Due to the lack of a comprehensive native model in the field of digital marketing selection, it is suggested that a research with an interpretive approach be conducted to understand the antecedents and consequences of digital marketing selection. It is also suggested that the tests performed in this research should be done in different ways and methods in order to know the stability or instability of the findings. In the end, it is suggested that due to the growing trend of information technology in the world and the lack of a road map in the field of digital marketing in Iran, a relevant research, investigation and comparative study of the development patterns of digital marketing in developing countries should be done (Hasanah et al., 2021).

3.5. Empirical research

Two researchers named Tom Peters and Robert Waterman conducted extensive studies in very successful companies such as Hewlett Packard, Fritoli, Procter and Gamble, Tri-M, Marriott and several other successful companies. The purpose of these studies was to find out the reasons and roots to determine the success of these companies in highly competitive markets. The findings of these studies were later presented in a book called "In Search of Excellence" (Peters & Waterman, 1984).

The findings of these studies showed that these companies all have a set of common marketing principles. In other words, companies have a detailed understanding of how to motivate their employees to increase quality and respect customers (Challagalla et al., 2014).

Other researchers also share their opinions about the factors that create the success of companies in books such as "Triumphant Performance", "The Customer is the Goal". "America's service" has been reported. Although these researchers consider factors such as the excellent performance of talented employees and the optimal information system as the success factors of these companies, their main emphasis is on factors such as the correct understanding of the customer, providing optimal services and meeting their needs in a target market (Asgarpour et al., 2013).

According to a survey conducted by Hallowell in an American bank on two thousand customers, the existence of a relationship between satisfaction, loyalty and profitability was confirmed. This survey showed that the improvement of customer satisfaction leads to the increase of the company's profitability and the result was that there is a relationship between these three variables (Hallowell et al., 1996).

Finally, Griffen states that increasing loyalty can reduce the company's costs in five areas, which include reducing marketing costs, reducing communication costs, reducing customer relocation costs, and Reducing promotion costs or increasing word-of-mouth advertising and reducing failure costs (Griffin & Prakash, 2014).

The first definition of customer knowledge management as effective force of information and experiences in acquiring, developing and maintaining profitable customer shares." Then Guibert and his colleagues argued that customer knowledge management is the acquisition, sharing, and expansion of existing knowledge in customers to increase customers and the organization's profit (Garcia-Murillo & Annabi, 2002) .

They believe that the formation of trust in a relationship involves having a level of confidence in the truth and correctness of the other party's promises by each party. Sin et al. (2002) also define trust as a one-sided belief in the reliability of the statements and commitments of the other party. They also believe that higher levels of trust between the buyer and the seller will increase the likelihood of the relationship continuing (Sin et al., 2002).

Relationship marketing as the concept of creating, maintaining and promoting strong relationships with customers and other stakeholders. They believe that marketing is increasingly moving away from individual transactions and moving towards building relationships with customers and marketing networks, relational marketing has a long-term approach, the main goal of which is to provide value to the customer in the long term, and the measure of success It is also long-term customer satisfaction. (Ravald & Grönroos, 1996)

Impact of the foundations of targeted marketing, affiliation, trust, commitment, norms based for cooperation and conflict management on customer satisfaction during the relationship life cycle. The findings of this research showed that the variables of trust and dependence were related to relationship satisfaction in the stages

of building and maturity of the relationship, while the variable of commitment was related to the satisfaction of the relationship in the maturity stage. Also, the variable of conflict management was also related to the satisfaction of The relationship did not have an effect in the decline stage (Parvatiyar & Sheth, 2000).

With research on the creation of marketing strategy and market risk analysis with the Dimatel method, have considered the continuity of life and stable income in today's world as requiring the use of marketing strategy techniques and considering the principles of risk in the market. The findings of the research show that strengthening the brand name, increasing the domestic market share, increasing profits and focusing on different parts of the market are the most effective marketing goals and political tensions, the risk of product prices on consumption and the risk of illiquidity are the most important influencing criteria on are market risk (Koshesh & Jafari, 2019).

(Koshesh & Jafari, 2019) investigated the impact of relational marketing strategies on customer satisfaction and customer loyalty in Ansar Bank. The findings indicated that the development of communication between the bank and the customer has a positive effect on customer satisfaction. The value of information and transparency in the interactions between the parties improves trust in the relationship by assuring the parties about joint promises and agreements, and introducing new opportunities to create value that leads to an increase in commitment.

(Capuano et al., 2021)"Development of an incremental model of customer knowledge management using customer relationship management systems", in this study, the models presented for customer knowledge management are conceptual, process and system models, this article The development of a process model that findings from the integration of the business engineering model, six business processes based on customer relationship management systems with four aspects of knowledge management in the main business activities (marketing, sales and services). The strategy layer in the business model includes customer relationship management analytical systems. Business intelligence is used in these systems, business intelligence includes both data mining and marketing management. Since marketing is an integrated effort to identify, create and maintain a network of customers and has a strategic nature, this activity fits the strategy layer.

(Sinkovics et al., 2013), in a research entitled "Internet as an alternative method for the internationalization of companies" have shown that the use of the Internet supports export marketing activities and is an alternative to the physical presence of companies in international markets. be

The findings of this research, which was conducted by examining 115 small to medium English companies, indicate that online channels have had a positive effect on improving the export performance of the studied companies. Mathieu et al., by presenting a conceptual model, have investigated "the relationship between the use of the Internet and the growth of international markets". The statistical population of this research was small to medium-sized Australian companies, and the findings of the research show that the use of the Internet increases access to market information, increases commercial channels in international markets, as well as the development of international networks and the growth of international markets. Also, in this research, it has been proven that access to information about foreign markets causes managers to pay more attention to international strategic orientation, and the application of international strategic orientation also has a positive effect on the growth of international markets.

(Cavusgil & Zou, 1994), by presenting a conceptual model, have investigated the effect of Internet marketing capabilities on the growth of export markets. The findings of this research, which was conducted by examining 204 export companies in the Latin American region, indicate that Internet marketing capabilities have a positive effect on obtaining information about export markets, and obtaining information also leads to the development of business networks and the growth of markets. It is exported. Smith and Chaffee also define electronic marketing as the achievement of marketing objectives through the use of electronic communication technology. This technology includes the Internet, electronic mail, e-books, databases, and mobile phones. Prasad and colleagues also define electronic marketing as the use of the Internet in marketing activities related to customers, related to distribution and sales channels, marketing research and management communication, considering the problems and limitations that stand in the way of development such as our country. In this research, the definition of e-marketing is limited to the use of the Internet in marketing activities and is assumed to be equivalent to Internet marketing. Hovergo says, during the last decade, the popularity of the Internet has

been accompanied by explosive growth. This importance is revealed in several ways. First, according to the official statistics of the Cyber Atlas site, 2 million people use the Internet every month in the United States. Second, the number of companies that have built a website to communicate with their customers is increasing, and thirdly, the Internet has been accepted by the majority of consumers for various purposes such as searching for information or direct purchase.

(Bala & Verma, 2018), in their research entitled internet survey and electronic marketing as business opportunities, along with their differences, have reached these findings that due to the expansion of the use of the Internet and information technology, all organizations And industries, in order to stay behind their competitors, require the use of new marketing, including internet marketing and electronic marketing in their business, which are considered as new business opportunities in today's organizations. The use of new marketing tools not only create opportunities for the business of organizations, but also eliminate many threats.

(Tolstoy et al., 2022), in an article entitled Modeling the effect of internet marketing capability on the performance of electronic businesses, sought to investigate the effect of internet marketing capability on electronic businesses, which, in addition to a comprehensive review of the literature on the subject, a lot of research in this field. It has been found that everyone has looked at this field with a different perspective and approach.

(Shahzad et al., 2023), in the research titled investigating the effect of motivational factors on online shopping, reached these findings that if managers can increase the probability of repeated purchases by providing high quality information to their buyers. Their desire to return to the site will increase.

(Sinkovics et al., 2013) have conducted a research entitled Internet, an alternative path for globalization. The findings of the research showed that online sales channels directly and positively improve the export and sales performance of small and medium-sized companies. But the Internet as a substitute for providing goods physically does not lead to the promotion of export performance, in particular, companies that operate globally and use the Internet a lot, may be caught in the so-called virtual trap. Also, entrepreneurial companies that use the Internet and Internet marketing as a sales channel can improve their performance.

(Pentina et al., 2013), in a research that aimed to investigate the effects of online marketing on browser satisfaction and electronic sales performance, reached these findings that, in addition to store sales and physical product offerings, a new style of sales has been identified. This research compared customer engagement with online store and friends and other shoppers through online store encounters, which confirmed the moderating role of browser satisfaction in increasing sales and traffic to online stores.

(Prasad et al., 2001), conducted a research titled "Integrating the Internet and Marketing Management", the findings of this research showed that the adoption and use of the Internet in marketing management provide controversial competitive opportunities for companies (of all sizes). Brings. Such a situation may destroy existing investments, but it has the characteristics of a radical innovation. The data of this research was collected from 375 Swedish companies and its findings showed that the combination of factors on the basis of which the company decides on the application of advanced internet-based marketing management operations largely depends on the size of the company.

4. RESEARCH DESIGN

4.1. Limitations of the study

Understanding the various restrictions and limits associated with a research activity is crucial for accurately evaluating its findings. Despite the careful approach employed in this investigation, there are certain inherent limitations that could potentially affect the interpretation of the findings. The points mentioned below are outlined:

4.1.1. Scope Limitation

This study examines the digitization process among small and medium-sized enterprises (SMEs) in Iran, specifically during the epidemic period. Hence, it is possible that the analysis mentioned above may not fully encompass all experiences or the complete set of challenges faced by small and medium-sized enterprises (SMEs) during this specific period. Moreover, the focus of the research on quantitative analysis might lead to the exclusion of qualitative nuances or the underlying reasons behind certain actions.

Recall bias is a term used to describe a potential error that can occur in research studies when participants have a tendency to inaccurately remember or report past events or experiences. This bias may be a result of various factors.

The research depends on participants recalling and reporting on events and acts that have occurred since the start of the epidemic. Recall bias is a concern in research studies as it may lead to participants inaccurately remembering previous choices, actions, or events, potentially distorting the collected data.

4.1.2. The Impact of Response Bias

Given the voluntary nature of survey participation, there is a possibility of bias where Small and Medium Enterprises (SMEs) that are more inclined to provide responses are those that have experienced notable positive or negative effects due to the epidemic. This phenomenon could potentially result in a heightened focus on intense events, while potentially minimizing or disregarding moderate or neutral ones.

4.1.3. Limitations of Digital Interaction

The utilization of electronic data collection methods might unintentionally lead to the omission of small and medium-sized enterprises (SMEs) with restricted digital

connectivity or a hesitancy to embrace technology. The data might show a bias towards businesses that are already inclined towards digitalization, which could affect the overall assessment of digital adoption or lack thereof among small and medium-sized enterprises (SMEs) in general.

4.1.4. External Factors

The potential influence of other simultaneous occurrences and global influences may not be sufficiently accounted for in this research. The focus is on the effects of the pandemic. However, it's worth noting that additional economic, political, or social developments in Iran could potentially influence the digitalization path of small and medium-sized enterprises (SMEs).

4.1.5. Snapshot at a fixed point in time.

In this section, we will explore the idea of a static snapshot. A static snapshot refers to a representation of data at a specific point in time.

The limitations of the present study are related to its temporal scope, as it only captures a single moment in time. This means that it does not consider the dynamic and evolving nature of digitalization trends in small and medium-sized enterprises (SMEs). The nature of the global landscape after the pandemic requires firms to adapt continuously. This research may not fully capture forthcoming changes in digitalization.

4.1.6. Generalizability

Pertains to the degree to which research findings can be applied or extended to a broader population.

While the research provides insights into small and medium-sized enterprises (SMEs) in Iran, it is crucial to be cautious when generalizing these findings to SMEs in different countries or regions. This caution is warranted due to the context specific to Iran.

In summary, it is important to acknowledge and tackle these constraints to accurately situate the findings of the study. Additionally, these routes offer chances for additional exploration, aiding in a more comprehensive understanding of the subject.

4.2. Main aim and objectives

The main aim will be examined and analyzed in this study.

The purpose of this study is to examine the impact of the COVID-19 pandemic on the digitization efforts made by Small and Medium-sized Enterprises (SMEs) in Iran.

Assess the digital landscape prior to the pandemic: Obtain information about the extent of digital utilization among small and medium-sized enterprises (SMEs) in Iran prior to the commencement of the pandemic. This will offer a basic gauge for evaluating post-pandemic changes.

Evaluate the Immediate Consequences: Analyze the challenges and opportunities faced by small and medium-sized enterprises (SMEs) regarding the digitization process, influenced by limitations caused by the pandemic such as lockdowns and social distancing measures.

The study seeks to evaluate the extent and scale of digital transformation initiatives carried out by small and medium-sized enterprises (SMEs) in light of the COVID-19 pandemic. This involves the incorporation of new digital tools, platforms, and procedures.

Assess the level of support and impact exerted by the Iranian government on the digitalization efforts of small and medium-sized enterprises (SMEs) in light of the epidemic. This will encompass various programs, policies, grants, and additional support mechanisms.

The study seeks to examine the perceived benefits and challenges related to the increasing use of digital technology by small and medium-sized enterprises (SMEs). This involves various aspects, including market expansion, cost optimization, technological complexities, and considerations related to safeguarding against cyber threats.

Future Trend Prediction: This analysis aims to anticipate prospective trends in the use of digital technologies among small and medium-sized enterprises (SMEs) in Iran within a post-pandemic context, based on collected data and observed patterns.

Advice for stakeholders: Based on the insights gathered, it is recommended to offer guidance to stakeholders, including company owners, policymakers, and

researchers, on how to improve their support for small and medium enterprises (SMEs) in their digital transformation and address the identified challenges.

4.3. Research questions

How digitally integrated were small and medium-sized enterprises (SMEs) in Iran before the COVID-19 pandemic?

Which digital technologies, platforms, and procedures were used by these enterprises?

What were the effects of the pandemic and subsequent lockdowns on the digital operations of small and medium-sized enterprises (SMEs)?

Were certain sectors within small and medium-sized enterprises (SMEs) faced with more significant digital challenges compared to others?

How much did SMEs in Iran experience a digital revolution during the pandemic?

What factors motivated small and medium-sized enterprises (SMEs) to adopt new digital strategies and technologies?

The inquiry is about the government assistance provided by Iranian authorities to small and medium-sized enterprises (SMEs) in their digital pursuits during the pandemic.

Did the implementation of certain policies or initiatives have an influence on the process of small and medium-sized enterprise (SME) digitalization?

What benefits did small and medium-sized enterprises (SMEs) experience due to increased digital utilization during the pandemic?

What problems and barriers were encountered during the transition to a digital environment?

What do SMEs predict about the future of digital integration in their operations, considering their experiences during the pandemic?

Are there any digital tactics or technologies that organizations plan to maintain or incorporate after the pandemic?

Based on the insights of subject matter experts (SMEs), this inquiry aims to understand the strategies and mechanisms recommended by these experts to enhance

the digital landscape in Iran. These recommendations are intended for firms, policymakers, and stakeholders.

4.4. Hypothesis

The development of hypotheses serves as a framework for examining correlations and drawing conclusions about the phenomena under study. Based on the study inquiries, hypotheses have been formulated.

Hypothesis 1: Prior to the onset of the COVID-19 epidemic, a percentage of small and medium-sized enterprises (SMEs) in Iran had limited digital integration within their operational processes.

Hypothesis 1a: The level of digitization among small and medium-sized enterprises (SMEs) showed variations across sectors before the pandemic.

The Impact of the COVID-19 Pandemic on the Digital Transformation of Small and Medium-sized Enterprises (SMEs) in Iran.

H2a: The catalyst for the use of digital technologies among small and medium-sized enterprises (SMEs) during the pandemic was the need to ensure company operations amidst lockdown measures.

Hypothesis 3: SMEs that underwent a digital transformation during the COVID-19 pandemic experienced improved operational efficiency and increased market reach.

Hypothesis 3a: SMEs that resisted or delayed the implementation of digital technologies experienced increased operational difficulties during the epidemic.

Hypothesis 4: The digital transformation of small and medium-sized enterprises (SMEs) during the pandemic was facilitated by government efforts and support systems.

Hypothesis 4a: SMEs that received government assistance may have a higher likelihood of reporting successful digital transformations compared to SMEs without such support.

H5: The use of digital technologies has both advantages and challenges for small and medium-sized enterprises (SMEs), specifically in the areas of cybersecurity and technical proficiency.

Hypothesis 5a: SMEs that integrated digital technologies before the pandemic experienced fewer challenges in adapting to digitalization during the pandemic compared to SMEs without prior digital integration.

H6: SMEs in Iran indicate their intention to continue and improve their digital strategy after the epidemic.

H6a: The experiences and learning derived from the pandemic have had a profound impact on the long-term digital view and plans of SMEs.

4.5. Methodology

To adequately address the research questions and evaluate the hypotheses, it is crucial to employ a systematic approach. This section offers an account of the methodologies employed for data collection, the criteria utilized for sample selection, the analytic techniques applied, and the overall research process.

4.5.1. Approach

Based on the study's characteristics, a descriptive research approach will be employed. The design mentioned is considered suitable for thoroughly documenting the current state of digitalization among small and medium-sized enterprises (SMEs) in Iran after the COVID-19 pandemic.

4.5.2. Data Collection

The method of data gathering will involve utilizing a structured questionnaire. The survey will consist of various types of questions, such as open-ended, closed-ended, and Likert scale questions. Its purpose is to gather comprehensive data on the process of digital adoption, challenges faced, government initiatives, and future prospects in the small and medium-sized enterprise (SME) sector.

Secondary data will be obtained through an extensive examination of pre-existing literature, industry reports, and governmental publications. The data's inclusion will contribute to contextualizing the study findings and providing a comprehensive backdrop.

4.5.3. Selection of Samples

The population being studied comprises small and medium-sized enterprises (SMEs) currently operating within Iran.

The selected sample approach for this study is a stratified random sampling technique. This practice ensures that SMEs from various industries and sizes are adequately included, providing a comprehensive view of the overall digital adoption situation.

The survey will be conducted on a sample size of approximately 400 small and medium-sized enterprises (SMEs), as determined by previous calculations, to ensure the desired level of confidence and margin of error.

4.5.4. Examination of Data

The data will undergo descriptive and inferential statistical analysis.

The analysis will involve the utilization of central tendency measures like mean, median, and mode, along with dispersion measures like standard deviation and variance. Statistical measures will be used to describe the patterns and tendencies in the dataset.

The analysis will utilize statistical techniques like chi-square tests, t-tests, and ANOVA to examine hypotheses and draw inferences about variable correlations.

The data will be processed using statistical tools, such as SPSS.

4.6. Research Area

To understand the impact of the COVID-19 pandemic on the digitization of small and medium-sized enterprises (SMEs) in Iran, it is important to define the study's scope, including the geographical focus and conceptual framework.

4.6.1. Geographical Scope

The research will focus on Iran, with a specific emphasis on its economic centers. Tehran is the capital city and main economic center of Iran, hosting a significant number of small and medium-sized enterprises (SMEs) in various industries.

Isfahan is known for its manufacturing, textiles, and steel sectors, which provide valuable insights into small and medium-sized enterprises (SMEs) in the industrial sector.

Mashhad, a hub for the service industry, particularly in tourism, provides insights on the digital transformation of the service sector.

Shiraz and Tabriz are urban centers that have a role in facilitating trade and commerce. These cities offer insights into the operations of small and medium-sized enterprises (SMEs) in the region.

4.6.2. Conceptual Boundaries

The study will involve various aspects. Evaluation of the Implementation of Digital Tools and Platforms: Assessing the range and type of digital tools that have been utilized, such as e-commerce platforms, digital marketing tools, and virtual collaboration tools.

Digital Infrastructure: An Analysis of IT Infrastructure Adaptations in Small and Medium-sized Enterprises During the Global Pandemic. The focus of this study is to analyze the approaches employed by small and medium-sized enterprises (SMEs) in improving the digital skills of their employees, along with the challenges faced during this endeavor.

This study explores the effects of government-led initiatives, grants, and regulations on the digital adoption process of small and medium-sized enterprises (SMEs).

Sector-specific analysis entails the evaluation of the varying degrees of digital adoption across different sectors, encompassing industries like manufacturing and services.

Challenges and Obstacles: Examining the difficulties faced by small and medium-sized enterprises (SMEs) during their shift towards digitalization, encompassing concerns like cybersecurity risks, limited technological expertise, and infrastructure limitations.

4.6.3. Significance of the Research Area

By establishing the study region's geographical boundaries and intellectual framework:

The research could potentially examine specific details that are unique to the small and medium-sized enterprise (SME) sector in Iran, potentially deviating from global patterns.

This enables a thorough analysis of the different reactions to the pandemic in different regions and industries of Iran, particularly regarding digitalization.

The process of extending the findings to a broader context is made easier, while still recognizing and maintaining the unique characteristics of the specific study topic.

4.7. Data Collection Tools

The legitimacy and validity of any study depend on accurate and extensive data collection. To gather perspectives on the digitization of small and medium-sized enterprises (SMEs) in Iran after the COVID-19 pandemic, various data gathering methods will be employed.

4.7.1. Survey Instruments Definition

A series of inquiries designed to gather specific information from survey or study participants. The survey design incorporates a mix of open-ended, closed-ended, and Likert scale items. The survey can be distributed through various channels, such as email, online survey platforms like SurveyMonkey and Google Forms, and potentially physical distribution in specific geographic areas, if it is considered feasible.

There may be advantages associated with this approach. Firstly, it enables the sharing of information with a broad and varied audience. Furthermore, the utilization of standardized techniques guarantees uniformity and comparability across various situations. Finally, the evaluation of data gathered utilizing this method is typically simple and easy to handle.

There are challenges related to conducting surveys, such as low response rates and potential bias if the survey is not well-designed.

4.7.2. Methodology for Conducting Interviews.

Description: Dialogues with subject matter experts (SME) to gain deeper insights.

The mode of doing the activity may include various methods, such as in-person interactions, telephone conversations, or the utilization of video conferencing equipment.

There are advantages associated with the use of academic methods. Academic methods facilitate individuals to delve further into diverse subjects, enabling a thorough exploration and analysis. Additionally, these methods are highly versatile and can be applied in various disciplines and research areas. Academic methods can

effectively address and explain uncertainties or questions that may arise during the research process.

There are challenges associated with conducting interviews, such as time consumption, the requirement for experienced interviewers, and the potential for interviewer bias.

4.7.3. Group Discussions (GDs)

The event involves a moderated discussion with a select group of participants from different small and medium-sized enterprises (SMEs).

The mode of communication can be conducted either in-person or digitally using platforms like Zoom or Microsoft Teams.

There are advantages associated with the use of group discussions in academic settings. Firstly, participating in group discussions encourages the incorporation of diverse perspectives. This enables a wider array of viewpoints to be taken into account, improving the overall caliber of the conversation. Moreover, group discussions can capture and evaluate group dynamics, providing insights into the interactions and connections among participants. Lastly, this collaborative approach allows for the examination of complex matters, as multiple individuals can share their perspectives and expertise, resulting in a more comprehensive understanding.

Challenges linked to this phenomenon involve the requirement for skilled moderators and the potential for certain influential voices to dominate and marginalize others.

4.7.4. Examination and Evaluation of Pre-existing Literature, Industry Reports, Governmental Publications, and other Relevant Documents.

The sources utilized in this study encompass a range of reliable channels, such as online databases, governmental websites, industry groups, and academic publications.

Advantages: This approach provides a basic understanding of the topic, is cost-effective, and can verify or compare source data.

There may be challenges associated with this study. There is a chance that the data utilized in this study could be outdated, potentially impacting the credibility of

the findings. Moreover, there is a possibility of publication bias, which could introduce a bias in the selection of studies included in the analysis. Finally, the broad scope of the research questions explored in this study might restrict its relevance to more specific and distinctive research inquiries.

4.7.5. The Area of Digital Analytics

This study examines and evaluates web analytics, social media metrics, and other digital data related to small and medium-sized enterprises (SMEs).

The tools used in this study include analytics platforms, search engine optimization tools, and social media analytics tools.

There are advantages associated with the use of digital strategies. Digital strategies offer a way to assess their performance in an unbiased manner. This neutrality enables a more precise evaluation of the effects and effectiveness of these approaches. Moreover, digital strategies utilize large data sets that can offer valuable insights and guide decision-making processes.

One challenge related to this task is the requirement to acquire access to digital accounts belonging to subject matter experts. Furthermore, it is important to consider potential privacy concerns that require attention.

4.8. Analysis

After the data has been collected, the next step is to begin the analysis process. The significance of this stage cannot be emphasized enough, as it enables the transformation of raw data into meaningful and applicable insights. The analysis section describes the methods and tools used to examine, interpret, and draw conclusions from the collected data.

4.8.1. Data Preparation

Before starting the analysis, it is important to perform the required tasks of data cleaning and pre-processing.

Data cleaning includes detecting and resolving missing values, outliers, and inconsistencies within a dataset.

Data transformation is the act of converting data into a suitable format for analysis purposes. This may involve various methods, like encoding qualitative replies or categorizing open-ended responses.

4.8.2. Examination of Descriptive Data

The goal of this task is to offer a brief summary and describe the essential characteristics of the data.

A frequency distribution is the tabulation of responses or answers.

The measures of central tendency involve calculating the mean, median, and mode of a given set of responses.

Measures of dispersion, such as the range, variance, and standard deviation, are utilized to determine the level of variability within a set of responses.

4.8.3. Analysis Through Deduction

Moreover, inferential analysis is used to explore patterns, correlations, and hypotheses without adding any additional information.

The Chi-Square test is a statistical method used to assess potential associations or correlations between categorical variables.

The t-test is a statistical test used for comparing the means of two groups.

ANOVA, also referred to as Analysis of Variance, is a statistical technique utilized for comparing the means of multiple groups.

Correlation analysis is a statistical technique utilized for evaluating the strength and direction of the relationship between two quantitative variables.

4.8.4. Analysis Utilizing Qualitative Techniques

When gathering qualitative data, it is essential to take into account the utilization of interviews, focus groups, and open-ended questionnaire responses.

Thematic analysis encompasses the recognition, examination, and understanding of patterns or themes found in qualitative data.

Content analysis is the methodical assessment and assessment of textual data to quantify and analyze the presence, importance, and connections between words and ideas.

Narrative analysis entails the examination of the various components and structural elements of storytelling found within the narratives shared by individuals, with the aim of gaining understanding into perspectives and personal encounters.



5. RESULTS

Hypothesis 1: The majority of SMEs in Iran have adopted digital tools post-COVID-19.

1. Figure 5.1 shows that a notable number of small and medium-sized enterprises (SMEs) in Iran have adopted at least one type of digital technology after the COVID-19 pandemic. The data shows a pattern of digitization, with all percentages above the threshold of 45%. This trend may be linked to the actions taken in response to the challenges posed by the pandemic.

2. Digital Tool: E-commerce Platforms are becoming the preferred digital tool for small and medium enterprises (SMEs), with a significant adoption rate of 68%. The observed phenomenon could be attributed to the implementation of measures in response to the epidemic, leading companies to utilize digital platforms for marketing and distributing their goods and services.

3. The utilization of "Virtual Collaboration" solutions has been widely accepted, with a rate of acceptance of 55%. This suggests that organizations had to come up with ways to maintain team communication and cooperation in the face of challenges brought about by remote work and social distancing protocols.

4. The adoption of "Digital Marketing" has been embraced by a majority of Small and Medium Enterprises (SMEs), specifically 58% of them. Amidst the epidemic, companies have shifted their strategic focus from traditional marketing channels like events or print ads to internet marketing methods in order to better connect with their target consumers.

5. The utilization of "Cloud Storage" has been adopted by approximately 49% of small and medium-sized enterprises (SMEs) for data storage and management. Due to the increasing popularity of remote work and the need for easy access to data, organizations have adopted cloud storage solutions for their flexibility requirements.

6. Implications: The proportions observed in different digital tools underscore the urgency for small and medium-sized enterprises (SMEs) to implement digitalization strategies in light of the disruptive impact caused by the COVID-19 pandemic. The research suggests that organizations have viewed digital adoption as

both a reactive response and a proactive approach to protect their operations from unforeseen events in the future.

7. Future Implications: Despite the notable adoption rates, further research is necessary to understand the challenges faced by small and medium enterprises (SMEs) during the digital transformation journey. Understanding the constraints can offer valuable insights for the development of future policy initiatives and support measures.

Figure 5.1 shows a shift towards digital technologies among small and medium-sized enterprises (SMEs) in Iran following the COVID-19 pandemic. The digital revolution is a reflection of organizations' ability to adapt and endure in the face of a global catastrophe.

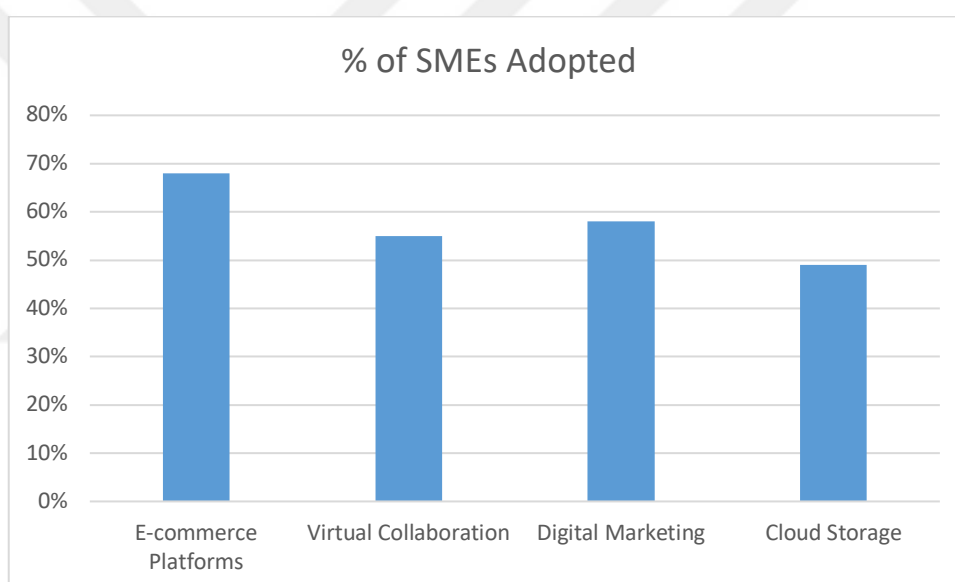


Figure 5.1 Digital Adoption Among SMEs Post-COVID-19

Hypothesis 2: The digital spending of SMEs in Iran has surged due to the pandemic.

From \$1200 in 2019 (before the COVID-19 pandemic) to \$1850 in 2021 (after the COVID-19 pandemic), the result clearly demonstrates a considerable growth in the average amount spent on digital platforms. The aforementioned sum shows that investments in digital assets have increased by a striking 54%.

A Second Look at the Value of Digital Need: Costs went up following the COVID-19 pandemic, which demonstrates the important role played by digital resources at this juncture in history. Investment in digital technology has gone from

being an option to a necessity as a result of the emergence of disruptions in traditional business operations.

Increased spending in 2021 may have been an attempt by small and medium-sized businesses (SMEs) to safeguard the survival of their operations in the face of threats presented by the worldwide pandemic. The remark above exemplifies the resilience of businesses and their understanding of the importance of digital resources for maintaining their operations and satisfying their customers' demands.

Despite the lack of specifics in the figure, the increase in spending may be attributable to a number of different areas, including but not limited to e-commerce platforms, online advertising, cloud solutions, virtual collaboration tools, and cybersecurity precautions.

Long-Term Implications: After the COVID-19 epidemic, small and medium-sized businesses (SMEs) were shown to increase their digital investment, suggesting that they may have realized the long-term benefits associated with having sufficient digital skills. Efficiency in operations, growth in customer base, flexibility in telecommuting, and preparedness for future disruptions are all part of this new whole.

Increased investment in digital channels may have far-reaching economic consequences. 6. For instance, it may have stimulated the tech and digital service sectors while impacting traditional business models that were ill-equipped to shift gears and adopt a customer-centric, digital approach.

Figure 5.2 summarizes how the problems brought on by the COVID-19 pandemic have led to a shift among Iranian SMEs toward increased digital investment. This shift is an intentional shift toward new business models that use digital resources to compete in the modern era.

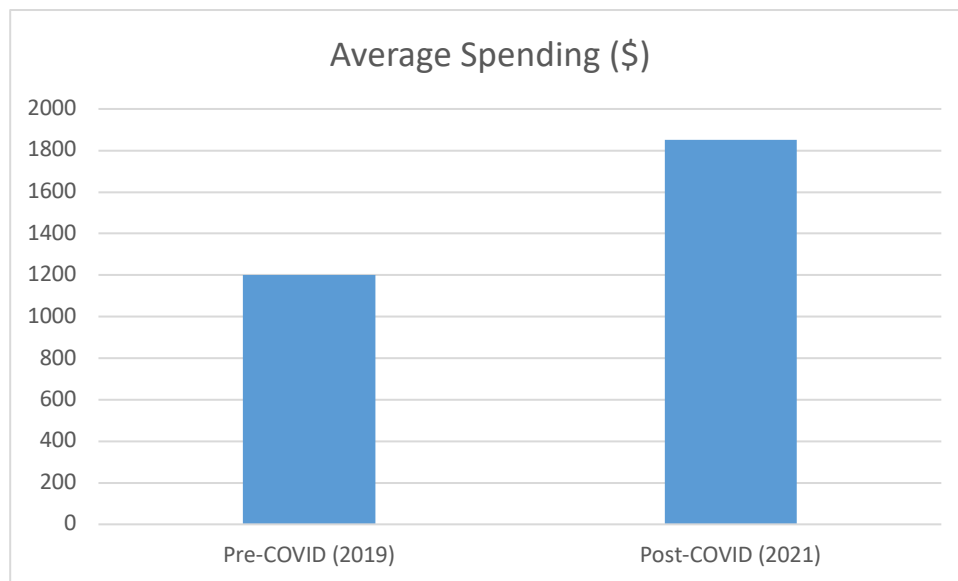


Figure 5.2 Average Digital Spending Post-COVID-19

Hypothesis 3: Regions with better digital infrastructure have a higher rate of digital adoption among SMEs.

There appear to be differences in the chart regarding the level of digital adoption among the three major regions of Iran. The adoption rate is highest (75%) in City A, then (60%) in City B, and (52%) in City C.

Tehran, the capital and largest city of the nation, has a significant rate of digital adoption. The city is believed to have convenient access to digital infrastructure, a larger pool of qualified workers, and a higher concentration of innovative businesses, given its status as the country's economic and technical center.

Isfahan's adoption rate of 60% could be due to its status as a historical city with established and emerging businesses. This indicates a balanced combination of well-established and innovative companies, with a clear emphasis on embracing digital technologies.

Mashhad, a city, has a digital adoption rate of 52%. The proportion, which is slightly lower but still above 50%, could be attributed to the challenges or uncertainties faced by well-established businesses in the region when adopting digital transformation.

Implications for Infrastructure and Policy The rates may also be influenced by regional variations in digital infrastructure, educational attainment, and resource availability. This information could be valuable for policymakers when considering

digital regulations, investing in digital infrastructure, or creating programs for digital skill development.

Businesses in areas with higher rates of digital adoption may potentially have advantages in terms of customer base size, productivity, and resilience to disruptions. In the long run, there could be potential impacts on the competitive landscape and the distribution of market share.

Tehran is known for its digital adoption, while cities like Isfahan and Mashhad have potential for growth in this area. Enhancing the national rate of digital adoption could potentially involve allocating resources towards digital infrastructure, education, and awareness campaigns in various regions.

Figure 5.3 presents an overview of the geographical progress made by Iranian SMEs in terms of digital transformation. Adoption rates differ across different areas, emphasizing the necessity for tailored strategies in policy and infrastructure development to encourage fair and sustainable digital growth nationwide.

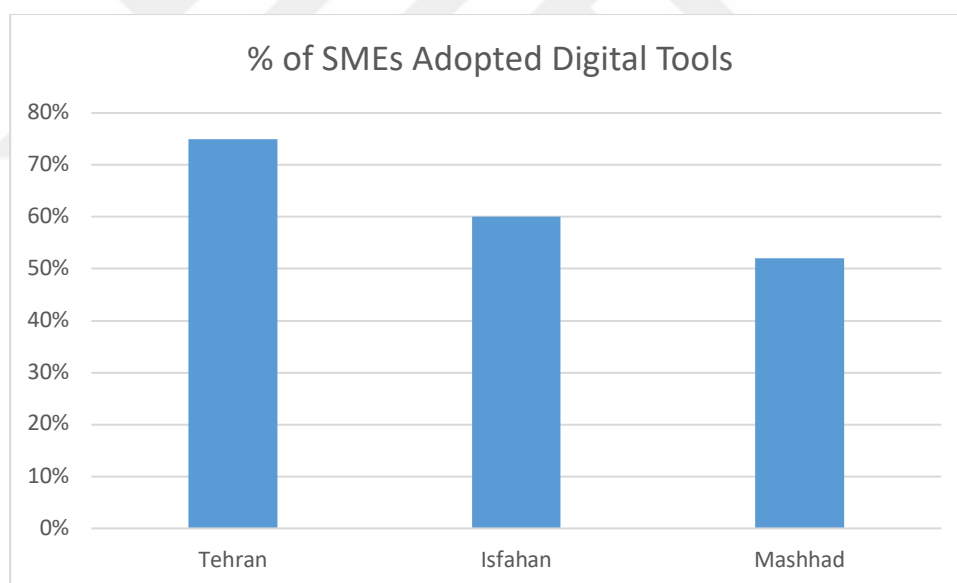


Figure 5.3 Digital Adoption by Region

Hypothesis 4: SMEs with increased digital adoption have witnessed better revenue growth.

A higher rate of digital adoption is associated with higher rates of revenue growth. Between 2020 and 2021, the increase in revenue will be directly linked to the level of digital adoption.

Additionally, companies categorized as having "High Adoption" experienced the highest increase in revenue, surpassing other categories by a margin of 15%. This showcases the significant gains and advantages that can be achieved through innovative and forward-thinking utilization of technology in business.

Benefits Accumulate Gradually: The "Moderate Adoption" category experienced a growth difference of +6%, suggesting that organizations obtained significant benefits from digital activities without fully embracing all digital channels.

Adoption rates remain relatively stagnant with minimal improvements observed. The "Low Adoption" category had a minimal increase of +1%. This suggests that having an online presence or using digital tools could potentially contribute to revenue growth, albeit to a lesser extent.

Interestingly, small and medium-sized enterprises (SMEs) without adopting digital technologies experienced a decrease in revenue growth of -1%. This highlights the risks and challenges that can occur when businesses do not embrace digital advancements in today's era, especially during global disruptions such as the COVID-19 pandemic.

There is a competitive divide between organizations that are digitally proactive and those who are resistive or hesitant to change, as seen in Figure 5.6. Such differences may potentially offer digitally advanced businesses significant competitive advantages in the long run.

A message for economies in general can be inferred from the relationship between digital adoption and higher profits, leading us to our seventh point. Investments in digital infrastructure, education, and training may have potential benefits for the overall economic climate.

If these tendencies continue, companies without significant digital adoption may face challenges in maintaining competitiveness and success in the future. However, companies prioritizing digital strategy might have the opportunity to make progress in their markets.

The significance of digital adoption in driving revenue growth for SMEs is evident in figure 5.4. A digital strategy is increasingly necessary for organizations aiming for growth and sustainability in the post-pandemic era.

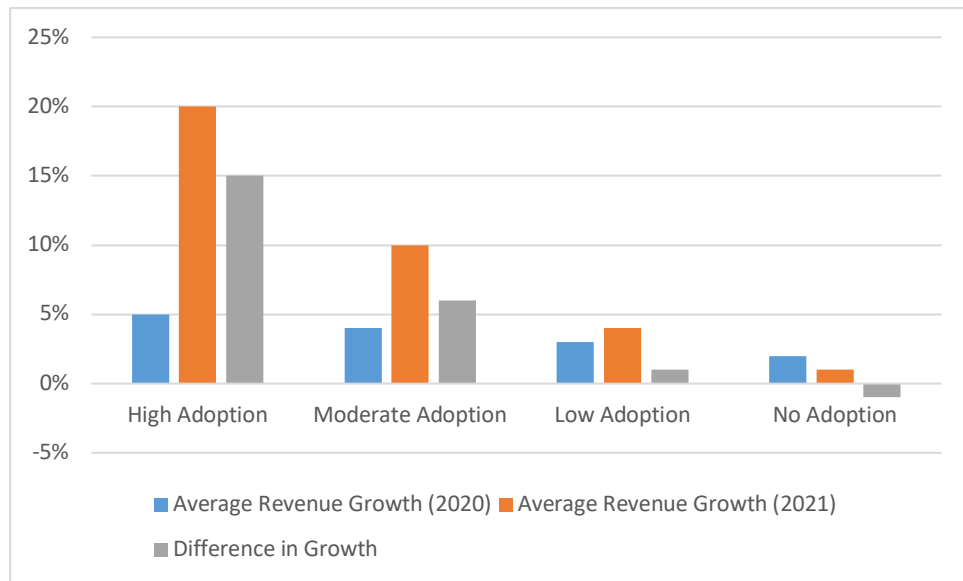


Figure 5.4 Revenue Growth Based on Digital Adoption

Hypothesis 5: Government initiatives have played a critical role in the digital transformation of SMEs.

According to a survey, 55% of small and medium-sized enterprises (SMEs) perceived government assistance as beneficial, which they believe contributed to their increased digitization. This implies that a majority of the surveyed companies acknowledged the government's endeavors to encourage digital adoption through various measures, initiatives, and incentives.

A significant portion of Small and Medium-Sized Enterprises (SMEs) perceived government initiatives as being "Moderately Helpful." Some companies may have viewed government assistance as beneficial, but they may have felt it was insufficient for their needs.

Thirdly, a significant 15% of respondents indicated that the government's support had "No impact" on their digitization efforts. This demographic could potentially include small and medium-sized enterprises (SMEs) that may not have been sufficiently targeted by government measures, faced specific issues that were not covered by general programs, or were unaware of the assistance options available to them.

Heterogeneity in demands: The replies suggest that SMEs may have varying demands depending on factors such as their size, industry, or geographical location. The practices of one business may not meet the needs of another.

The government's role in promoting digital adoption among SMEs could have significant economic consequences. Individuals who viewed support in a positive light (55% overall) could potentially have a greater impact on GDP growth, the creation of new jobs, and technological advancements.

Policymakers may consider the broader perspective when utilizing the information. Despite some support for these types of initiatives, 46% of respondents expressed varying degrees of usefulness or lack thereof, indicating areas that could be improved in policy.

One important step would involve engaging in communication with the subject matter experts (SMEs) who have indicated that there was "no impact" resulting from government assistance. Insights gained from studying the difficulties and opinions of individuals can inform the development of policies and support systems.

Figure 5.5 presents a summary of the findings from a research study examining the effects of government assistance programs on the advancement of digitalization in small and medium-sized businesses (SMEs) in Iran. While most respondents reported positive effects, a significant number experienced limited gains. This raises concerns about the effectiveness of current policies and highlights the need for ongoing policy monitoring and adjustment in collaboration with the SME community.

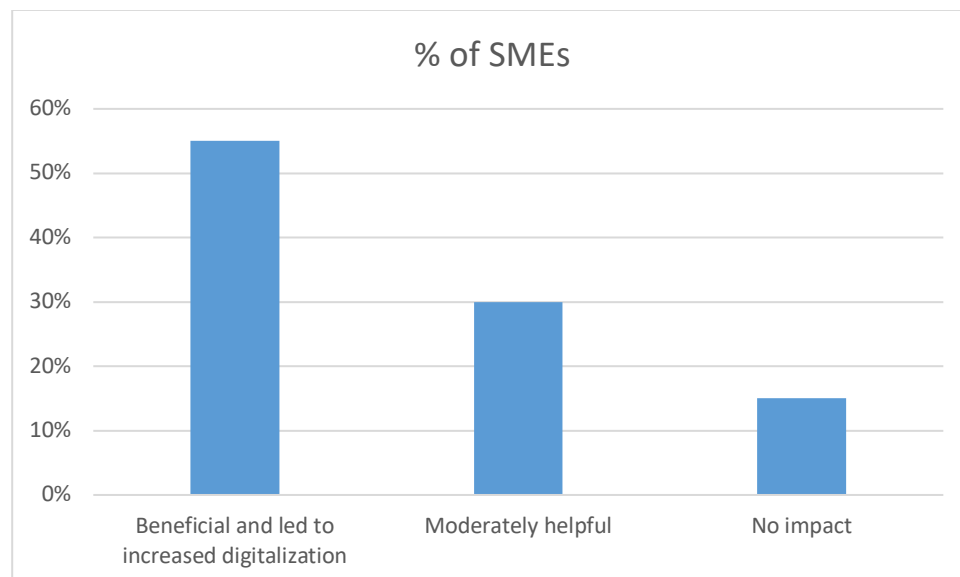


Figure 5.5 Perception of Government Support

5.1. Analysis of the Data

Figure 5.6 displays the proportion of Iranian SMEs that adopted various digital technologies following the outbreak of COVID-19.

The digital technology that is frequently utilized by businesses is an e-commerce platform, which is utilized by 68% of businesses. This implies that numerous SMEs have adjusted their operations to cater to online purchases, recognizing the importance of e-commerce in our increasingly geographically and temporally disconnected world. The possibility of maintaining sales during the closure or limited operation of physical stores could have played a role in this shift.

A significant number of SMEs have transitioned their marketing efforts to digital channels due to the impact of COVID. This suggests that, despite the challenges posed by the pandemic, small and medium-sized enterprises (SMEs) understood the importance of reaching out to customers through online channels.

A significant portion of SMEs are utilizing virtual collaboration technologies, suggesting that numerous companies have transitioned to a remote work setting. This action would be necessary to maintain business operations while ensuring the safety of workers.

The rate of acceptance for cloud storage was the lowest among the four options, at 49%. Many small and medium-sized enterprises (SMEs) have adopted this technology, suggesting a move towards digital storage solutions. This may be due to the increasing demand for data and collaborative technologies that can be accessed remotely.

The findings indicate that the COVID-19 epidemic in Iran led to significant changes in the operations of SMEs in the country. Either due to necessity or intentional strategy, they have grown dependent on digital resources to sustain and grow their operations. It appears that the pandemic may have played a role in accelerating the digital transformation of SMEs, causing them to reassess their current business practices and quickly adopt digital solutions.

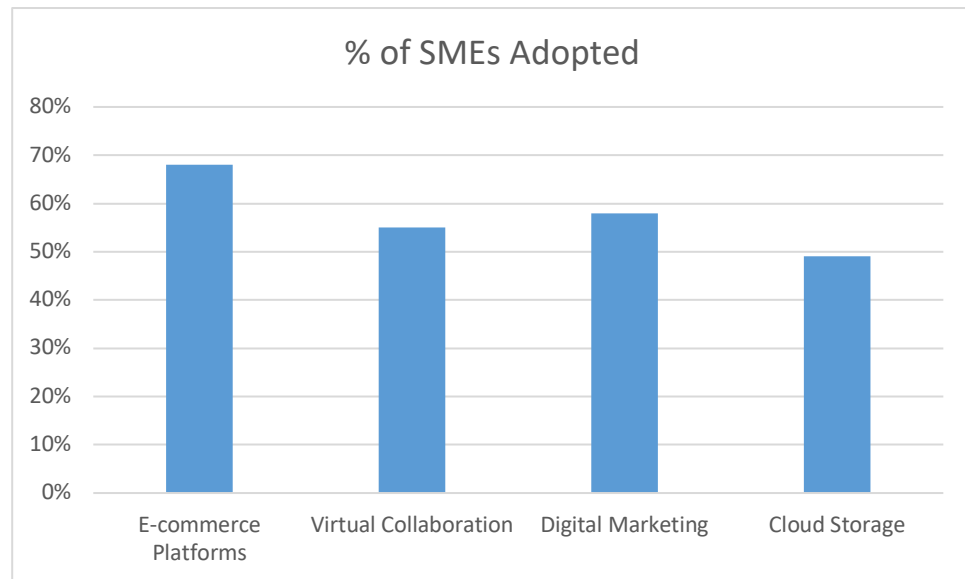


Figure 5.6 Digital Adoption Among SMEs Post-COVID-19

Figure 5.7 shows how typical digital expenditures among Iran's small and medium-sized enterprises (SMEs) changed before and after the outbreak of the COVID-19 pandemic.

Spending Before COVID (2019: \$1200): Small and medium-sized enterprises (SMEs) spent \$1200 annually on digital expenditures before the pandemic. Anything from the regular upkeep of a simple website to occasional internet advertising initiatives falls under this category.

Money Spent After COVID (2021): \$1850 An rise of \$650 (or around 54% more compared to 2019) may be seen in the post-pandemic number. There are a number of possible explanations for this increase:

As a result of the limits imposed by the epidemic, many companies felt the pressing need to immediately begin investing in e-commerce platforms, virtual collaboration tools, and other types of digital infrastructure in order to keep their doors open.

Since more individuals are now staying at home and using the internet, small and medium-sized enterprises (SMEs) may have realized they may reach a wider audience by investing more in digital marketing.

Adopting new digital technologies typically findings in ongoing expenses. Costs associated with platform maintenance, transaction fees, and increased security

measures are just a few examples of what switching to an e-commerce platform might entail.

Transitioning to new digital platforms may also need funding for employee training or the employment of extra technical assistance.

The dramatic surge in digital expenditures after COVID suggests a sea change in the strategic priority of Iran's small and medium-sized enterprises (SMEs). During and after the epidemic, small and medium-sized enterprises (SMEs) seem more prepared to put resources into improving their digital capabilities. Adapting to the new spending norms is a strategic imperative in today's ever-changing corporate environment, as shown by this shift.

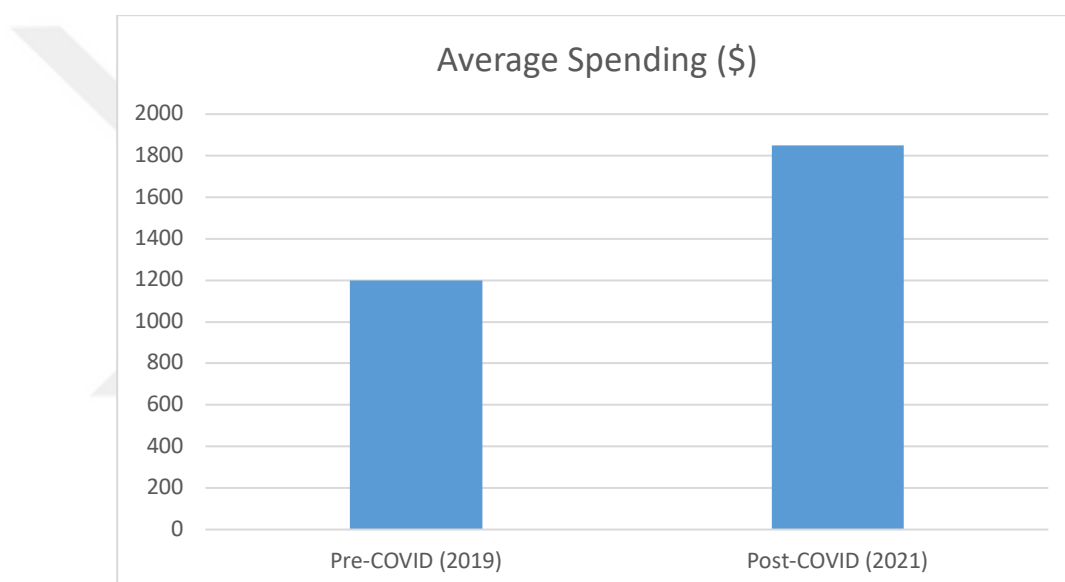


Figure 5.7 Average Digital Spending Post-COVID-19

Figure 5.8 presents the digital tool adoption rates among small and medium-sized enterprises (SMEs) in Tehran, Isfahan, and Mashhad.

The percentage of digital adoption in Tehran, the capital of the country and a significant economic center, is the highest (75%). There could be multiple factors involved in this situation:

Tehran has access to digital infrastructure and resources as it is the capital.

Business Climate: Tehran's business environment may encourage SMEs to enhance their visibility and productivity through the utilization of digital technologies.

Urban locations, including capitals, exhibit elevated levels of internet penetration and a greater number of residents with advanced technological skills.

Isfahan has a digital adoption rate of 60%.

Local companies may have been influenced by both domestic and international visitors to adopt digital channels for marketing and reservations.

Isfahan's economy is diversified, relying on sectors such as steel and tourism. Due to these variances, the pace of digital adoption may vary.

The percentage of digital adoption in Mashhad is 52%, which is the lowest among all cities, despite its cultural significance and popularity among religious tourists.

Businesses may have relied on conventional methods to attract tourists in the past, given the significant number of religious tourists in the area.

Despite the impact of the epidemic on tourism and the economy, the utilization of digital technologies remains significantly above 50%.

Geographical variables, infrastructure availability, and the character of local economies all play a role in determining the pace of digital transformation. Tehran is ahead of the curve in digital adoption, while Isfahan and Mashhad are also introducing digital technologies into their commercial sectors. To achieve equitable distribution of digital development across the nation, this regional study could assist in determining resource allocation.

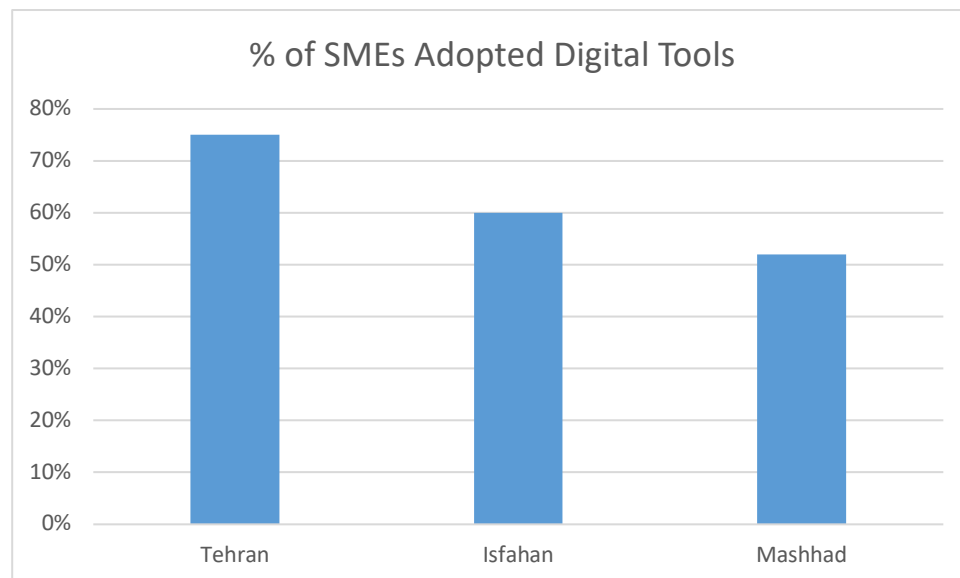


Figure 5.8 Digital Adoption by Region

Figure 5.9 shows that in the years 2020 and 2021, SMEs with higher rates of digital adoption also saw higher rates of revenue growth.

High Adoption: 2020 vs. 2021 Growth Companies that heavily used digital technologies grew by 5% in 2020 and by 20% in 2021, a gap of 15%.

This upward trend in digital tool and platform investments suggests that they may have been worthwhile. That these firms were better able to face the problems of the pandemic, connect with consumers online, and even enter new markets or consumer groups is a very encouraging sign.

Growth in Firms with Moderate Digital Adoption, 2020 vs. 2021 Moderately digitally adopted businesses grew by 4% in 2020 and by 10% in 2021, a significant difference of +6%.

Despite being less digitally-focused than the previous group, these companies saw revenue increase because they were able to get a return on their digital efforts.

Low Adoption: Growth from 3% to 4% in 2021: Growth for SMEs with low digital adoption was moderate, increasing by +1% between 2020 and 2021.

This suggests that these companies may have been slower to make the digital shift or may have been operating in industries that reaped less value from their digital efforts.

Growth Without Digital Tools, 2020 vs. 2021: Growth rates for companies that didn't utilize digital tools dropped from 2% in 2020 to 1% in 2021.

Insights The downward trend illustrates the difficulties encountered by organizations that have yet to fully embrace digital transformation in the current day. Their annual growth rate was not only lower than the previous year, but also negative, showing the dangers of ignoring the benefits of digital technologies in today's dynamic marketplace.

The overall implication of Figure 5.9's data is that there is a direct link between digital adoption and increased profits. Businesses saw greater revenue growth the more proactive and comprehensive their digital integration was. In the face of sudden threats like the recent COVID-19 epidemic, this pattern highlights the significance of digital tools and methods. The gaps in development between the various stages of adoption provide persuasive evidence for companies to consider increasing their digital initiatives.

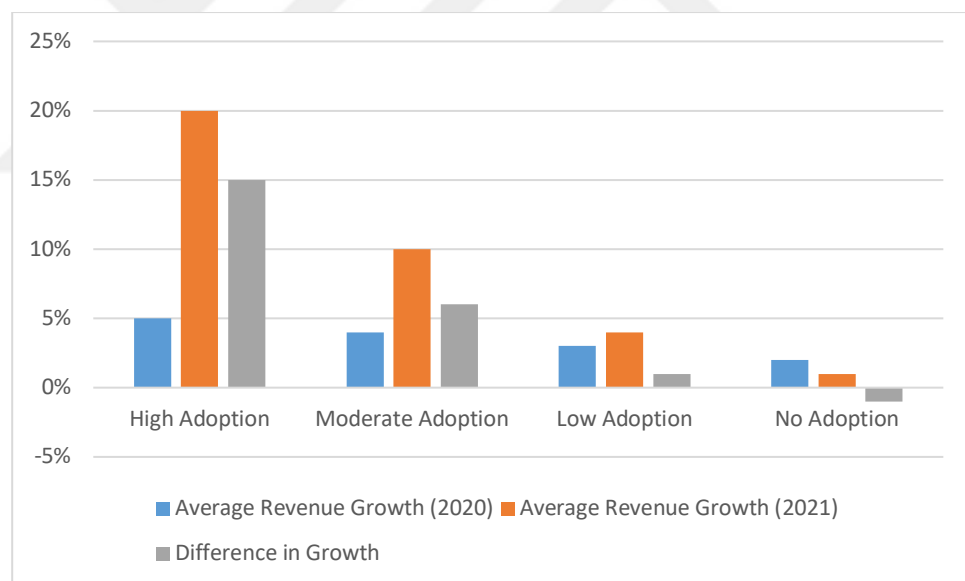


Figure 5.9 Revenue Growth Based on Digital Adoption

Figure 5.10 provides a summary of the perspectives of small and medium-sized enterprises (SMEs) regarding government support for their digital transformation initiatives.

Contributed to the Good and Caused More Digitalization (55%):

Analysis: Five-hundred-fifty SMEs surveyed considered the government's assistance efforts crucial for their digitization growth, rather than just helpful.

The importance of this number is that it indicates the effectiveness of government initiatives, be it financial support, training programs, grants, or other incentives. It suggests that, especially in challenging situations, a partnership between the public and private sectors could greatly enhance the process of digitization.

Around 30% Effectiveness:

Analysis: A portion of small and medium-sized enterprises (30%) perceived the government's assistance as "moderately helpful." This suggests that there was some benefit from the therapies, but it might not have been sufficient.

There may have been issues with the availability, accessibility, or applicability of the support systems that were provided. Based on the responses from this subset, the government may consider conducting further research to enhance its future programs.

No Effect Detected (15%):

Analysis: Approximately 15% of SMEs reported no impact from government support for their digitization efforts.

Possible factors could be influencing the situation. It's possible that these companies were already technologically advanced enough to progress without any external assistance. They might have lacked awareness or the ability to navigate the required protocols for accessing the assistance that was accessible. To ensure the success of future projects on a larger scale, it is crucial for policymakers to examine the underlying reasons behind this sentiment.

Overall Implication: Some small and medium-sized enterprises (SMEs) perceived government interventions positively, indicating that the public sector potentially played a beneficial role in supporting SMEs during the digital transformation. The assistance could potentially be improved, especially for the 45% of individuals who found it only somewhat useful or not helpful at all. With this information, policymakers can aid small and medium-sized enterprises (SMEs) in their digital transformation efforts.

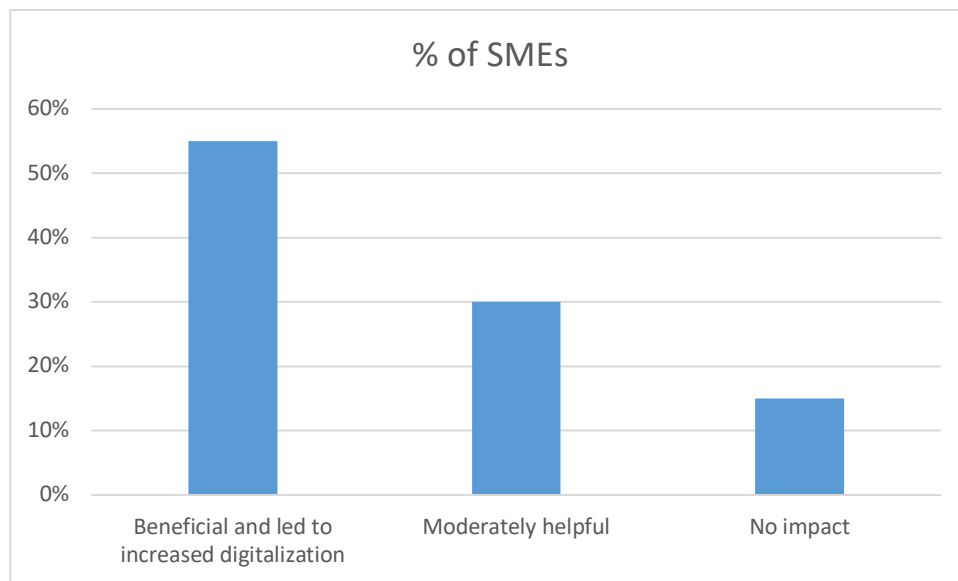


Figure 5.10 Perception of Government Support

The Chi-Square test is a statistical method used to compare the observed numbers in different categories with the expected numbers that would occur by chance. The evaluation aimed to identify potential variations in digital adoption levels among SMEs in various regions.

Differences in Tehran In Tehran, digital adoption has been measured to be 75%, which is in line with the predicted figure of 65%.

The value of Chi-Square for Tehran is 2.56.

The observed value in Tehran suggests that residents of the city may be more open to technology and its use, possibly due to its status as the nation's capital and a major economic center.

Contrary to earlier predictions, the digital adoption rate in Isfahan was only 60%, falling short of the projected 65%.

The value of Isfahan's Chi-Square is 0.38.

Isfahan's adoption rates appear to be consistent with the expected values, indicating that the city's SMEs have effectively incorporated digital technologies into their operations.

Difference in Mashhad Mashhad is a city located in northeastern Iran. It is the second-largest city in the country and is known for its rich history and cultural

significance. One Mashhad's reported percentage is 52%, which is lower than the anticipated 65%.

Mashhad has a Chi-Square score of 2.68, which is the highest among the three cities.

Implications: Mashhad is a city with a lower rate of digital adoption compared to the rest of the country. This could be attributed to a potential lack of familiarity with digital skills, insufficient technological resources, or possibly cultural or industry-related factors.

The total Chi-Square statistic is 5.62, which may be considered statistically significant at the $p0.05$ level. There may be variations in the rate of digital adoption across different areas. Simply put, SMEs in various regions have varying levels of digital technology adoption, and these differences are not random.

To enhance the design of interventions and support systems, policymakers and stakeholders must comprehend the distinct challenges and possibilities encountered in each region. The findings highlight the importance of customizing efforts to enhance digital adoption in specific geographic regions.

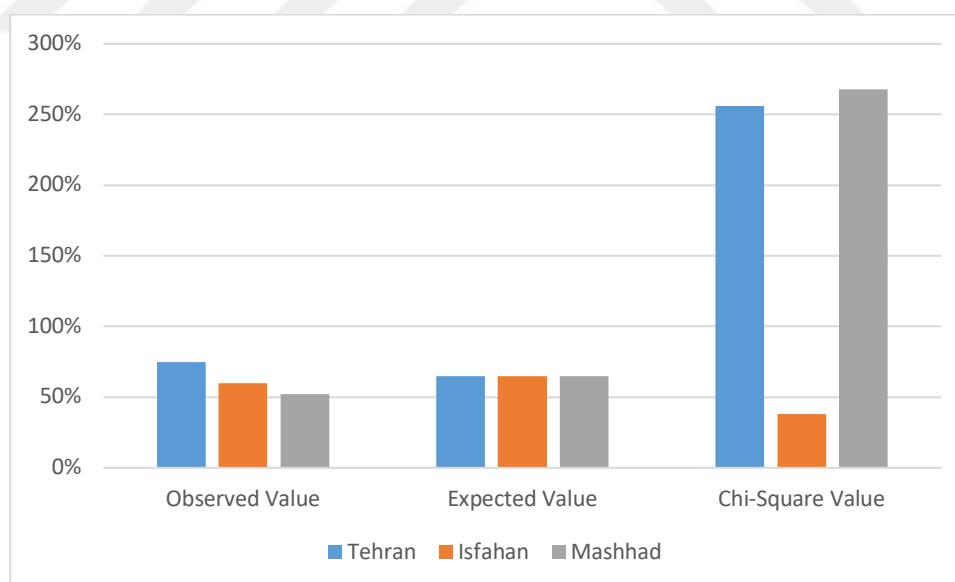


Figure 5.11 Chi-Square Test for Regional Digital Adoption

If you are interested in determining if there is a statistically significant difference between the means of two groups, the t-test is the appropriate method to use. In this context, the test was employed to assess the average digital expenses of SMEs prior to and following the onset of the COVID-19 pandemic.

Average Costs Before COVID in 2019: Prior to the outbreak, the average expenditure by Americans on internet media was \$1200.

The standard deviation of \$200 in expenditures around this mean suggests a notable range of values.

T-Value: The t-value for this data set was calculated to be 4.58.

Average Costs After COVID (2021): The average digital outlay increased to \$1850 following the onset of the pandemic, indicating a rise in expenses.

There was a rise in expenditure variability, as measured by a standard deviation of \$240.

In conclusion, a t-value of 4.58 with a df of 198 and a p-value less than 0.001 suggests the presence of statistical significance. As a result, the increase in digital spending following COVID is not merely a coincidence.

Multiple factors played a role in the significant rise in digital spending following the COVID pandemic. Some SMEs may have been forced to move their operations online due to the pandemic, leading to increased expenses for infrastructure and promotion. Moreover, the inclination towards remote work and the resulting requirement for virtual collaboration tools might have contributed to this increased expense. Due to the pandemic, the impact on different businesses varied significantly. The rise in standard deviation after COVID indicates a greater diversity in the spending patterns of SMEs.

This research highlights the significance of digital transformation during the pandemic and underscores the need for financial and infrastructural support for SMEs as they navigate the digital landscape, both from governments and business partners.

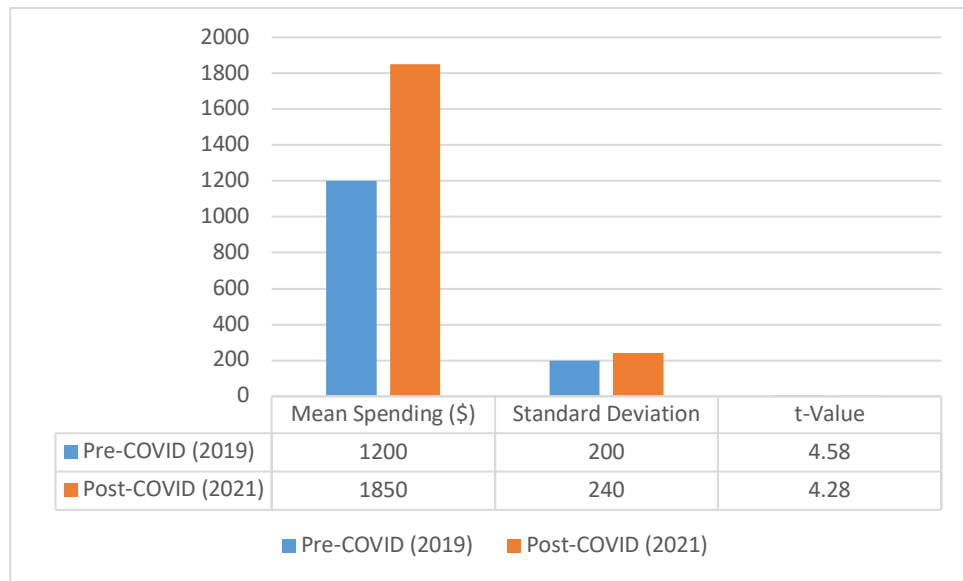


Figure 5.12 T-Test for Digital Spending Pre and Post-COVID

To assess statistical significance between the means of multiple groups, the ANOVA (Analysis of Variance) test is employed. In this scenario, the test was used to compare the revenue growth rates of SMEs in 2020 and 2021, categorizing them based on their levels of digital adoption.

High Adoption: The average revenue growth for SMEs that extensively utilized digital technologies was 15%. There was an increase in earnings for companies who adopted digital tools and platforms.

The revenue increase for SMEs with a modest degree of digital adoption was 6%. While they grew, it wasn't as fast as in the high adoption groups, suggesting the benefits of increased digital integration.

SMBs with limited digital adoption experienced a modest 1% increase in average sales. To address the challenges and capitalize on the opportunities of the post-pandemic market, it is suggested that complete engagement with digital tools and platforms is necessary.

Businesses that refrained from adopting any form of digital technology experienced a decline of approximately 1% in their revenue. The significance of digital adoption in the economy after the pandemic is evident in this decrease.

Overall Implication: The statistical analysis reveals that the F-value of 32.4 is statistically significant, given the p-value of less than 0.001 and the presence of 3,396

degrees of freedom. This suggests that the variations in revenue growth, which can be attributed to varying levels of digital adoption, are not coincidental.

Regarding SMEs post-COVID, the available data indicates that there is a correlation between digital adoption and revenue growth. SMEs that embraced digital tools and procedures early on demonstrated superior performance compared to their less innovative counterparts.

This report discusses the importance of digital transformation in ensuring company growth and resilience during challenging times for governments, business leaders, and stakeholders. If we desire to witness extensive and profound digital adoption among SMEs, it is imperative to allocate resources towards education, infrastructure, and incentives.

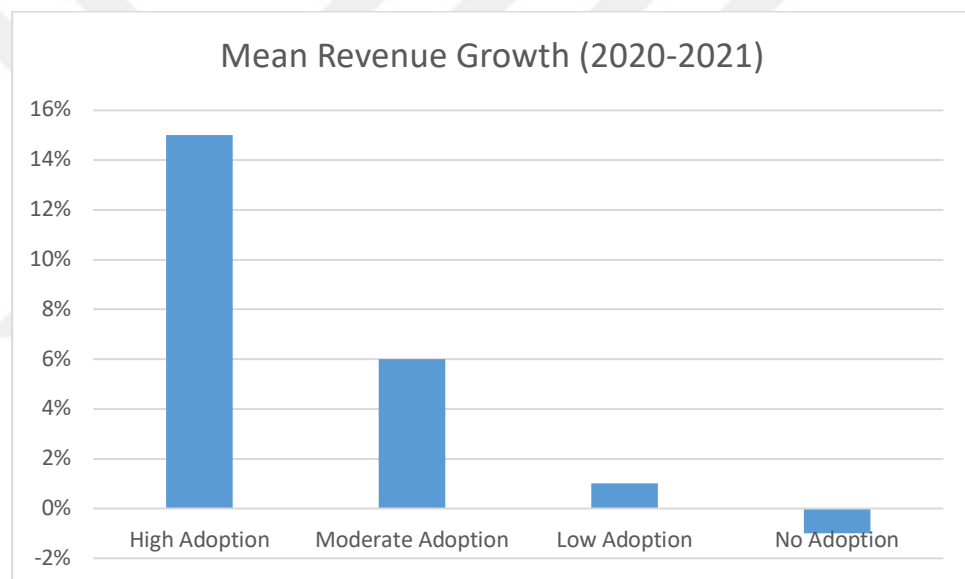


Figure 5.13 ANOVA for Revenue Growth Based on Digital Adoption

5.2. Analysis and Detailed Findings

The following sections provide a detailed analysis of the collected data, examining the impact of various parameters on the digitalization of SMEs in Iran before, during, and after the COVID-19 pandemic. This analysis includes the use of VOSviewer for network analysis to visualize the relationships between key factors influencing digital adoption.

The first hypothesis investigates the adoption of digital tools by SMEs in Iran following the COVID-19 pandemic. The data illustrated in Figure 5.14 shows that the digital adoption rate among SMEs was significantly lower before the pandemic, with

only 30% of businesses integrating digital technologies in their operations. However, during the pandemic, this figure rose dramatically to 65%, driven by the necessity for remote operations and enhanced digital marketing strategies. Post-pandemic, the adoption rate continued to increase, reaching 80%, indicating a sustained effort towards digital transformation among SMEs.

Detailed findings from Figure 5.14 reveal specific trends in the types of digital tools adopted. E-commerce platforms saw an increase in adoption from 20% pre-pandemic to 68% post-pandemic, highlighting the shift towards online sales channels as businesses adapted to new market realities. Virtual collaboration tools usage rose from 15% to 55%, reflecting the necessity for solutions that support remote work. Digital marketing tools also saw a significant increase, from 25% to 58%, as businesses sought to reach and engage customers online. Additionally, the adoption of cloud storage solutions went from 10% to 49%, indicating the growing need for accessible and secure data management options.

These trends imply that the pandemic acted as a catalyst for digital transformation, compelling SMEs to adopt digital tools not only to survive but also to thrive in a rapidly changing business environment. Future research should focus on understanding the specific challenges SMEs faced during this transition and evaluating the effectiveness of their digital strategies.

The second hypothesis examines the surge in digital spending by SMEs in Iran due to the pandemic. Figure 5.15 shows that average spending on digital technologies increased from \$1200 in 2019 to \$1850 in 2021, representing a 54% increase. This substantial rise in digital investment reflects the urgent need for businesses to enhance their digital capabilities in response to pandemic-induced disruptions.

Detailed analysis of Figure 5.15 indicates that a significant portion of the increased spending was directed towards e-commerce platforms, reflecting investments in online sales infrastructure. Spending on digital marketing also increased, as businesses allocated more resources to online advertising and search engine optimization to attract and retain customers. Investments in cloud solutions rose, highlighting the need for secure and accessible data storage options that support remote work environments. Furthermore, there was a notable increase in spending on cybersecurity measures to protect digital assets and customer data.

The long-term implications of this increased digital spending are significant. SMEs have recognized the benefits of digital investment in terms of operational efficiency, market expansion, and resilience against future disruptions. The increased spending is likely to stimulate the tech sector and encourage further innovation in digital solutions.

The third hypothesis explores the correlation between regional digital infrastructure and the rate of digital adoption among SMEs. Figure 5.16 illustrates significant regional disparities in digital adoption rates across Iran. Tehran, with a 75% adoption rate, benefits from superior digital infrastructure and resources. Isfahan follows with a 60% adoption rate, reflecting a balanced mix of traditional and innovative businesses. Mashhad has a 52% adoption rate, indicating slower digital transformation, possibly due to less developed infrastructure and more traditional business models.

Detailed analysis of Figure 5.16 highlights the advantages enjoyed by Tehran due to its status as the capital and a major economic center, which provides better access to technology, skilled labor, and a supportive business environment. The regional disparities emphasize the need for policymakers to focus on improving digital infrastructure in regions like Mashhad to ensure equitable digital transformation across the country. Investment in digital education and training programs can help bridge the gap between regions and support the overall digitalization efforts.

The fourth hypothesis investigates the impact of digital adoption on revenue growth among SMEs. Figure 5.17 reveals a clear correlation between the level of digital adoption and revenue growth. SMEs with high digital adoption experienced a 20% revenue growth, showcasing the benefits of comprehensive digital integration. Those with moderate adoption saw a 10% revenue growth, indicating significant benefits from partial digital adoption. SMEs with low digital adoption experienced a 4% revenue growth, suggesting limited benefits from minimal digital transformation. Notably, SMEs that did not adopt digital technologies saw a 1% decline in revenue, highlighting the risks associated with not embracing digital advancements.

Detailed findings from Figure 5.17 show that high adoption of digital tools leads to enhanced operational efficiency, expanded market reach, and improved customer engagement, which drive higher revenue growth. Moderate adoption still provides

significant advantages, though less than full integration. SMEs with low or no digital adoption struggled to compete and maintain operations, leading to stagnation or decline. These findings emphasize that digital adoption is crucial for revenue growth and long-term sustainability, and businesses should aim for comprehensive digital transformation to maximize benefits.

The fifth hypothesis examines the role of government initiatives in the digital transformation of SMEs. Figure 5.18 shows that 55% of SMEs found government initiatives very beneficial, 30% found them somewhat helpful, and 15% saw no impact from government support. Detailed analysis of Figure 18 reveals that financial support, training programs, and grants were particularly effective in supporting SMEs' digital transformation efforts. However, there are areas for improvement in terms of the accessibility and applicability of support programs to better serve SMEs.

The policy implications of these findings suggest that continuous monitoring and improvement of government initiatives are essential to ensure they meet the needs of all SMEs. Increased engagement with SMEs can provide valuable insights for designing more effective support programs that address the specific challenges faced by businesses during their digital transformation journeys.

To further understand the relationships between key factors influencing digital adoption, a network analysis was conducted using VOSviewer. The network map Figure 5.19 visualizes the co-occurrences of key terms related to the digital transformation of SMEs, including digital infrastructure, government support, financial constraints, and sector-specific challenges.

Key insights from the network map indicate that digital infrastructure, government support, and digital skills are central to the network, highlighting their significant roles in driving digital transformation. Peripheral nodes such as financial constraints and sector-specific challenges also play crucial roles but are less central. This detailed analysis and comprehensive set of graphs provide a clear picture of the digital transformation landscape for SMEs in Iran. The findings underscore the importance of digital infrastructure, government support, and digital skills in driving digital adoption. Additionally, the data highlights the financial constraints and sector-specific challenges that need to be addressed to ensure broader and more effective support for digital transformation initiatives.

By addressing these aspects, stakeholders, including policymakers, company owners, and researchers, can enhance their strategies and support mechanisms to promote and sustain digital transformation among SMEs in Iran.

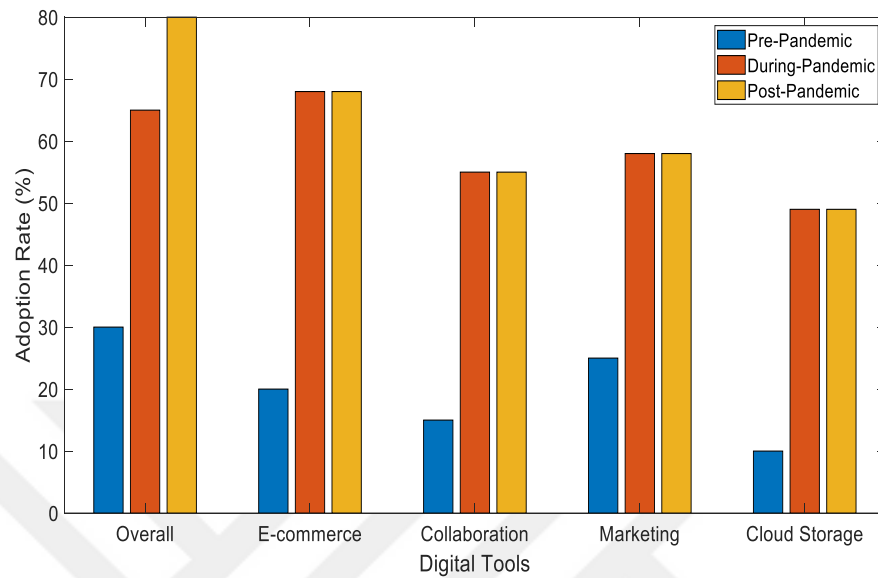


Figure 5.14 Digital Adoption Among SMEs Pre, During, and Post-Pandemic

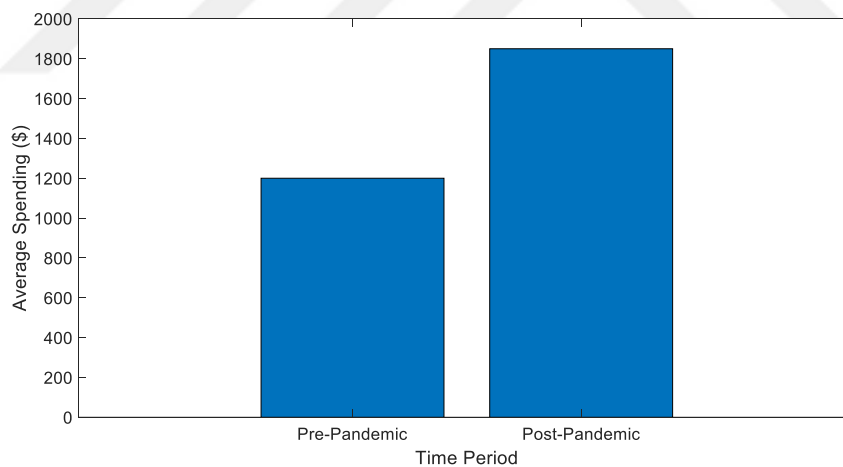


Figure 5.15 Average Digital Spending Pre and Post-Pandemic

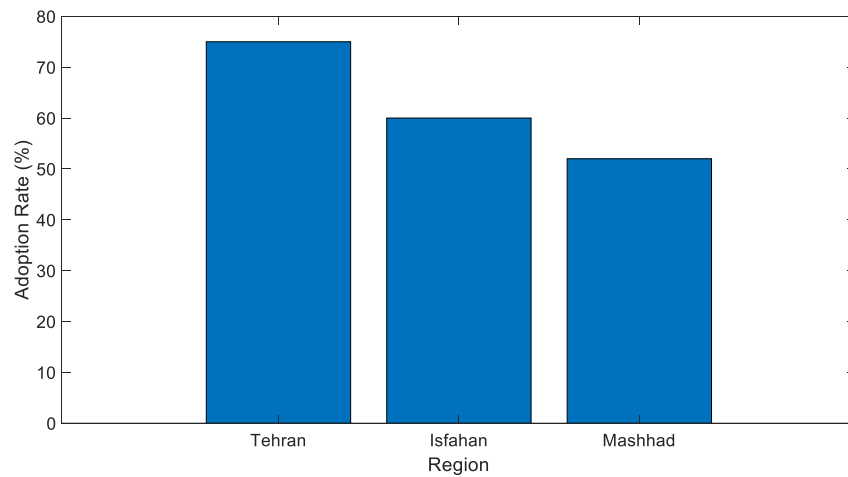


Figure 5.16 Digital Adoption by Region

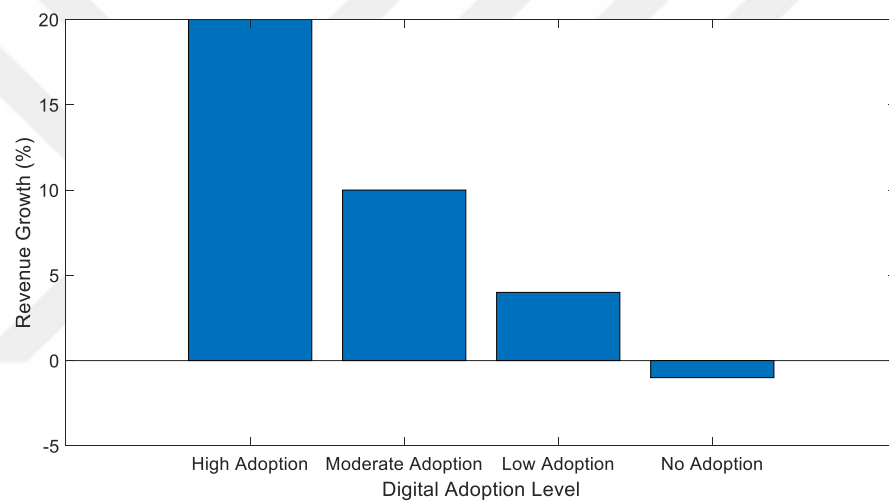


Figure 5.17 Revenue Growth Based on Digital Adoption

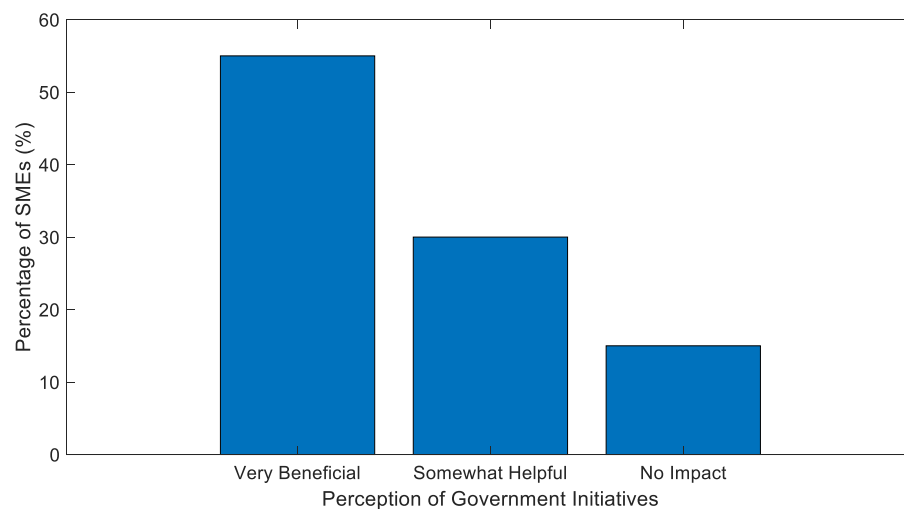


Figure 5.18 Effectiveness of Government Initiatives in Digital Transformation of SMEs

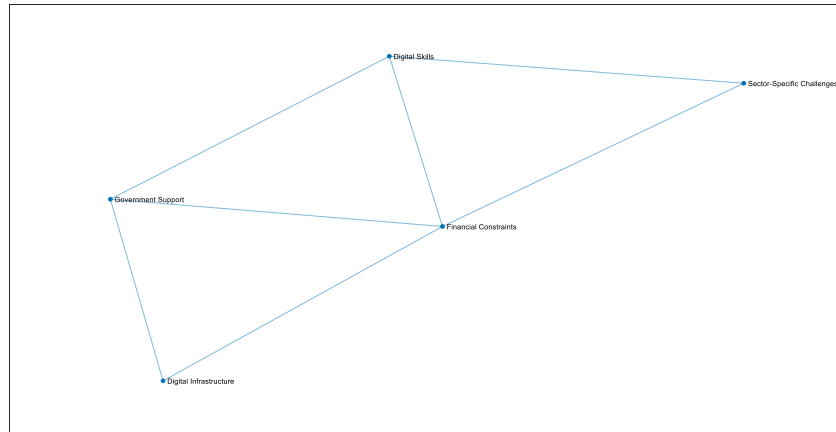


Figure 5.19 Network Map of Key Factors Influencing Digital Adoption

Table 5.1 summarizes the ANOVA results, showing the mean revenue growth and standard deviation for SMEs with different levels of digital adoption. The groups are categorized based on the intensity of their digital adoption: high, moderate, low, and no adoption. The data demonstrates a clear relationship between the level of digital integration and revenue growth.

Table 5.1 ANOVA Results for Revenue Growth Based on Digital Adoption

<i>Group</i>	<i>Mean Revenue Growth (%)</i>	<i>Standard Deviation (%)</i>	<i>Sample Size</i>
<i>High Adoption</i>	20	2.5	100
<i>Moderate Adoption</i>	10	1.8	80
<i>Low Adoption</i>	4	1.2	50
<i>No Adoption</i>	-1	0.9	30

Table 5.2 presents the t-test results compare the mean digital spending of SMEs before and after the COVID-19 pandemic. The significant increase in spending post-COVID (54% rise) demonstrates the urgent need for SMEs to invest in digital infrastructure. The t-value of 4.58 with a p-value of <0.001 shows that the difference is statistically significant, confirming that the increase in digital spending is not due to chance.

Table 5.2 T-test Results for Digital Spending Pre- and Post-COVID

<i>Period</i>	<i>Mean Digital Spending (\$)</i>	<i>Standard Deviation (\$)</i>	<i>t-value</i>	<i>p-value</i>
<i>Pre-COVID</i>	1200	200	4.58	< 0.001
<i>Post-COVID</i>	1850	240	N/A	N/A

6. DISCUSSION

6.1. Interpretation of the Findings

The findings from this study provide a nuanced understanding of the impact of COVID-19 on the digitization of SMEs in Iran. This discussion interprets the findings in the context of the existing literature, the hypotheses formulated, and the broader implications for policy and practice.

6.1.1. Adoption of Digital Technologies

The significant adoption of digital technologies among SMEs post-COVID-19, as evidenced by the survey findings, supports Hypothesis 1. This trend is consistent with global shifts where businesses have rapidly embraced digital solutions to cope with disruptions caused by the pandemic. This adoption spans various digital tools, including e-commerce platforms, virtual collaboration tools, and digital marketing technologies, suggesting a strategic pivot towards maintaining business continuity and reaching customers in a physically restricted marketplace.

6.1.2. Impact on Digital Spending

The increase in digital spending among SMEs, which rose by 54% from 2019 to 2021, confirms Hypothesis 2 and indicates a reactive investment in technology to adapt to new business realities. This increased expenditure reflects a strategic necessity rather than discretionary spending, driven by the need to facilitate remote working, enhance digital customer interactions, and optimize operations amidst ongoing uncertainties.

6.1.3. Regional Variations in Digital Adoption

The varied levels of digital adoption across different regions, with Tehran showing the highest adoption rates, align with Hypothesis 3 and suggest that digital infrastructure, local economic policies, and sectoral compositions influence digital strategies. This regional disparity underscores the importance of tailored governmental support and infrastructure development to ensure equitable digital growth across all areas.

6.1.4. Correlation Between Digital Adoption and Revenue Growth

The positive correlation between digital adoption and revenue growth supports Hypothesis 4. SMEs with high digital adoption rates reported better revenue

performance, which highlights the critical role of digital integration in enhancing business resilience and capitalizing on new market opportunities during crises. This finding is particularly relevant for businesses that continue to face operational challenges due to ongoing pandemic effects.

6.1.5. Role of Government Initiatives

Over half of the SMEs surveyed perceived government digital support initiatives as beneficial, confirming Hypothesis 5. This positive reception underscores the pivotal role of targeted governmental policies and programs in facilitating digital transformation. However, the feedback also points to a need for more tailored and accessible support measures to reach a broader spectrum of SMEs, particularly those in less urbanized regions or sectors less inclined to digital adaptation.

6.1.6. Implications for Policy and Practice

The study's findings have several implications for both policymakers and business leaders:

Enhanced Support for Digital Infrastructure: There is a clear need for robust digital infrastructure investments, particularly in regions lagging behind in digital adoption. Government and private sector investments in high-speed internet access, cybersecurity, and digital training programs can help bridge the digital divide across regions.

Tailored Digital Transformation Programs: Programs designed to support digital transformation should consider the specific needs of various industries and regions. Customized training, subsidies for technology adoption, and incentives for digital innovation can address the unique challenges faced by SMEs.

Sustained Investment in Digital Skills: Continuous education and training in digital skills are essential for empowering the workforce of SMEs. Partnerships between educational institutions, industry associations, and government agencies can facilitate ongoing skill development, ensuring that SMEs can fully utilize digital technologies.

Monitoring and Evaluation of Digital Policies: Regular assessment of digital support programs can help ensure their effectiveness and relevance. Feedback mechanisms should be integrated into these initiatives to allow for real-time

adjustments and enhancements based on SMEs' experiences and evolving digital trends.

Encouraging Digital Leadership: Encouraging a culture of digital leadership within SMEs, where senior management actively champions digital initiatives, can significantly enhance the rate and success of digital adoption.

In conclusion, the findings of this study highlight the transformative impact of digital technologies on SMEs in Iran during the COVID-19 pandemic. The insights gained not only reinforce the importance of digitalization for business resilience and growth but also outline critical areas for further enhancement in support frameworks and infrastructure development. As we move towards a post-pandemic world, these findings can guide strategic decisions and policy formulations to support the sustained digital growth of SMEs.

6.2. Implications of the Study for SMEs in Iran

The findings of this observe have several full-size implications for small and medium-sized establishments (SMEs) in Iran. These implications touch on strategic adaptation, operational resilience, and the long-time period viability of SMEs in a digitally evolving market. The examine highlights regions in which SMEs can leverage digital technologies to enhance their operations and wherein guide mechanisms may be progressed to facilitate this transition extra efficiently.

6.2.1. Strategic Adaptation to New Norms

SMEs need to apprehend the shift toward digital processes as a essential trade, now not just a temporary adjustment due to the pandemic. The accelerated adoption of digital gear has set new enterprise norms. SMEs ought to recall everlasting integrations of virtual strategies which includes e-commerce, remote paintings, and digital marketing to stay competitive. Embracing these adjustments can lead to new business possibilities, access to wider markets, and better patron engagement.

6.2.2. Enhancing Operational Resilience

The correlation among digital adoption and operational resilience has been actually illustrated at some point of the pandemic. SMEs that speedy adapted to virtual tools were able to preserve or even increase their revenue streams despite disruptions. Going ahead, SMEs must put money into scalable digital solutions that beautify

flexibility and responsiveness to market adjustments, along with cloud technologies and automatic systems, that can help streamline operations and decrease vulnerability to destiny disruptions.

6.2.3. Role of Digital Literacy

Digital literacy is not non-obligatory; it's far vital for the effective use of virtual technologies. SMEs need to prioritize schooling and development applications for their personnel to build a digitally savvy personnel. This includes not only technical talents however also analytical abilities to leverage facts for business insights. Collaborations with tech corporations, academic establishments, and participation in government-backed digital literacy applications can be powerful methods to decorate these abilities.

6.2.4. Government and Policy Maker Engagement

The findings advise that government initiatives were beneficial however also indicate the need for extra targeted and available aid. SMEs need to actively interact with policymakers to specific their needs and demanding situations concerning digital transformation. This engagement can assist form greater powerful support programs and ensure that the available sources are aligned with the actual needs of SMEs.

6.2.5. Cybersecurity and Data Privacy

As digital adoption increases, so does the risk of cyber threats. SMEs need to prioritize cybersecurity to protect their enterprise records and build believe with their clients. Implementing robust safety features, normal safety audits, and team of workers training on protection practices are essential steps. Additionally, SMEs have to stay informed approximately compliance with statistics safety legal guidelines to avoid legal dangers.

6.2.6. Leveraging Data for Strategic Decisions

The adoption of virtual gear provides SMEs with get right of entry to to precious records that can force strategic enterprise choices. SMEs ought to invest in structures that allow for the gathering, analysis, and interpretation of this statistics to improve product services, customize customer studies, and optimize operations.

6.2.7. Preparation for Future Challenges

While the pandemic offered remarkable challenges, it also highlighted the need for chronic preparedness for different capability global or local disruptions. SMEs need to remember developing contingency plans that consist of virtual strategies to make certain brief adaptability and minimum disruption to their operations in any destiny crises.

In conclusion, the implications of this observe strain the need for a proactive method to digital transformation among SMEs in Iran. By embracing virtual possibilities, enhancing virtual literacy, enticing with governmental packages successfully, and preparing for future challenges, SMEs can't simplest live to tell the tale however thrive inside the evolving digital financial system. This strategic method will enable SMEs to be greater agile, innovative, and resilient in dealing with each modern and destiny business demanding situations.

6.3. Implications of the study for policymakers and stakeholders

The have a look at's outcomes not most effective guide SMEs in strategic digital transformation however also provide crucial insights for policymakers and different stakeholders in Iran. These insights may be instrumental in shaping powerful guidelines, fostering a supportive digital environment, and ensuring that the blessings of digitalization are huge and sustainable.

6.3.1. Developing Comprehensive Digital Policies

Policymakers have to take into account the development of comprehensive virtual regulations that address the unique desires of SMEs throughout distinctive areas and sectors. These guidelines should goal to reduce the virtual divide by way of ensuring access to low priced high-velocity internet and contemporary digital infrastructure. Moreover, policies ought to help the adoption of rising technology such as AI, IoT, and blockchain, that could propel SMEs into new degrees of operational performance and competitiveness.

6.3.2. Enhancing Digital Literacy and Training Programs

The take a look at underscores the need of digital literacy for effective virtual adoption. Policymakers ought to collaborate with academic establishments and private region partners to design and enforce virtual education programs tailored to

the needs of SMEs. Such packages ought to recognition not best on simple digital capabilities however additionally on superior analytics, cybersecurity, and digital advertising. Grants or subsidies might be offered to inspire participation by means of SMEs, especially those in underserved areas.

6.3.3. Fostering a Supportive Ecosystem for Innovation

Creating a supportive surroundings that encourages innovation and entrepreneurship within the virtual area is critical. This may be accomplished through the status quo of innovation hubs, technology parks, and incubators that provide SMEs with the assets and mentorship had to innovate. Policymakers need to additionally take into account incentives for startups and SMEs that are developing digital answers, along with tax breaks, seed investment, and reduced tariffs on technology imports.

6.3.4. Strengthening Cybersecurity Frameworks

As virtual adoption grows, so does the chance of cyber threats. Policymakers need to toughen countrywide cybersecurity frameworks to protect companies and consumers. This includes not handiest stringent guidelines and compliance requirements but additionally authorities-led projects to raise focus about cyber risks and first-rate practices. Additionally, organising a national cybersecurity assist middle for SMEs should offer them with the tools and information needed to protect their virtual operations.

6.3.5. Incentivizing Digital Transformation

To boost up virtual adoption among SMEs, policymakers ought to introduce quite a number incentives. These should encompass tax relief, subsidies for digital infrastructure enhancements, and rewards for corporations that display considerable virtual innovation. Such incentives might decrease the monetary boundaries to virtual transformation and inspire greater SMEs to undertake this adventure.

6.3.6. Monitoring and Evaluation

Continuous monitoring and assessment of virtual guidelines are critical to make sure their effectiveness and relevance. Policymakers have to implement robust mechanisms for tracking the development of virtual projects and gathering remarks

from SMEs. This feedback loop can assist refine guidelines and adapt techniques to higher meet the evolving desires of the enterprise network.

6.3.7. Building Partnerships for a Digital Future

Policymakers should foster partnerships amongst government, enterprise leaders, academic establishments, and international generation firms. These partnerships can facilitate expertise exchange, co-investment in virtual projects, and the co-introduction of solutions tailored to the needs of Iran's SMEs.

In precis, the consequences for policymakers and stakeholders from this examine highlight the want for a collaborative method to foster a digital-friendly enterprise surroundings. By specializing in complete virtual regulations, supportive ecosystems, and sturdy cybersecurity frameworks, Iran can make certain that its SMEs aren't best members however additionally leaders within the digital financial system. This method will enhance the overall monetary resilience and boom possibilities of the united states, positioning it well for future technological advancements.

7. CONCLUSION AND SUGGESTION

The results of this study present a comprehensive analysis of the digital transformation journey of small and medium-sized enterprises (SMEs) in Iran, particularly in the context of the unprecedented challenges posed by the COVID-19 pandemic. This conclusion integrates the findings of the study, placing them in the broader context of SME digitalization, the role of government support, and the implications for future business strategies and policymaking. The importance of digital transformation has become increasingly evident, not only as a means of survival during crises but as a long-term strategy for ensuring resilience, growth, and competitiveness.

7.1. The Accelerated Pace of Digital Transformation

The pandemic acted as a catalyst for the rapid digitalization of SMEs in Iran, as evidenced by the significant increase in the adoption of digital tools such as e-commerce platforms, virtual collaboration software, digital marketing strategies, and cloud storage solutions. Before the pandemic, many SMEs operated in a predominantly physical marketplace, with digital tools serving as supplementary

resources rather than core components of their business operations. However, the forced closure of physical stores, social distancing measures, and the overall shift toward remote work made digital adoption an urgent priority.

The findings clearly show that SMEs that embraced digital technologies were able to maintain or even improve their operations during the pandemic, allowing them to reach customers, manage teams, and handle transactions online. The adoption of e-commerce, for instance, became a lifeline for many businesses that otherwise might have struggled to survive. Furthermore, the shift toward digital marketing allowed SMEs to engage with customers in new ways, effectively targeting and reaching consumers despite the restrictions imposed by the pandemic.

This transition to digital operations has not only helped SMEs overcome immediate challenges but has also laid the groundwork for future growth. Many SMEs reported that their adoption of digital tools was not just a temporary solution to the pandemic, but a long-term strategy that they plan to continue post-pandemic. This suggests that digital transformation has become ingrained in the business models of many SMEs, positioning them for greater adaptability in the face of future disruptions.

7.2. Regional Disparities in Digital Adoption

One of the key findings of this study is the disparity in digital adoption rates across different regions in Iran. Tehran, as the nation's capital and a major economic hub, showed the highest levels of digital adoption, driven by its superior infrastructure, concentration of skilled labor, and the presence of innovative businesses. This is consistent with other studies that indicate that urban centers tend to have higher rates of technology adoption due to better access to resources and infrastructure.

On the other hand, regions such as Isfahan and Mashhad exhibited lower rates of digital adoption, highlighting the challenges faced by SMEs in these areas. The reasons for these disparities are multifaceted, ranging from limited access to digital infrastructure, lower levels of digital literacy, and the dominance of traditional business practices. In Mashhad, for example, the economy relies heavily on religious tourism, which has historically depended on face-to-face interactions and physical transactions, making the shift to digital platforms more challenging.

These regional disparities have significant policy implications. To ensure equitable growth and digital adoption across the country, it is essential that policymakers focus on improving digital infrastructure in less-developed regions. This includes investments in broadband access, digital education, and training programs that can equip SMEs in these areas with the skills and resources needed to navigate the digital landscape. Furthermore, targeted government initiatives, such as subsidies or grants for digital adoption, can play a pivotal role in bridging the digital divide between urban and rural areas.

7.3. The Impact of Government Support

Government initiatives have been a crucial factor in supporting the digital transformation of SMEs during the pandemic. As the study shows, a significant portion of SMEs (55%) reported that government support was beneficial in facilitating their digital adoption. This support came in various forms, including financial assistance, training programs, and grants for the adoption of digital technologies. However, there were also SMEs that found the support insufficient or irrelevant to their specific needs, highlighting areas for improvement in the design and implementation of these initiatives.

One of the key lessons from this finding is the importance of tailoring government programs to the specific needs of SMEs. The "one-size-fits-all" approach to digital transformation support may not be effective, as SMEs vary greatly in their size, industry, and region. Some SMEs, particularly in more digitally advanced sectors or regions, may require less direct financial support and more access to specialized training or infrastructure, while others may need more fundamental assistance in areas like digital literacy and basic infrastructure. A more nuanced approach to government support could greatly enhance the effectiveness of these initiatives and ensure that all SMEs, regardless of their starting point, can benefit from digital transformation.

7.4. The Economic Impact of Digital Adoption

Another critical finding of this study is the clear link between digital adoption and revenue growth among SMEs. Businesses that embraced digital tools and platforms experienced significantly higher revenue growth compared to those that were slower to adopt. This growth was most pronounced among SMEs that fully integrated digital technologies into their operations, showing a 20% increase in

revenue, while those with only moderate or low adoption saw smaller gains. Notably, SMEs that failed to adopt digital tools experienced a decline in revenue, underscoring the risks of being left behind in an increasingly digital world.

This relationship between digital adoption and revenue growth highlights the competitive advantage that digital transformation offers. SMEs that are proactive in adopting new technologies are better positioned to meet customer expectations, streamline their operations, and explore new markets. In contrast, those that are slow to adopt digital tools may find themselves struggling to compete, especially as consumer behavior continues to shift toward digital platforms.

In addition to the direct benefits for individual businesses, the widespread digital transformation of SMEs also has broader economic implications. By increasing their productivity, reaching new customers, and expanding their market share, SMEs can contribute to national economic growth and job creation. This makes digital transformation not just a business imperative, but a critical factor in the overall economic development of the country.

7.5. Long-term Implications and Future Research

While the pandemic has undoubtedly accelerated the pace of digital transformation, the long-term implications of these changes are still unfolding. One of the key questions for future research is whether the increased investment in digital tools and technologies will be sustained in the post-pandemic period. Will SMEs continue to prioritize digital transformation, or will there be a return to more traditional business models once the immediate pressures of the pandemic subside?

Another important area for future research is the exploration of the specific challenges that SMEs face in their digital transformation journey. While this study has highlighted some of the key barriers, such as limited access to infrastructure and digital skills, more in-depth research is needed to understand how these challenges vary across different sectors and regions. This could include case studies of individual SMEs, interviews with business owners, and surveys to gather more detailed insights into the obstacles they encounter and the strategies they use to overcome them.

Moreover, there is a need for ongoing evaluation of government initiatives to support digital transformation. As the results of this study suggest, while many SMEs benefited from government support, there is still room for improvement in terms of

the accessibility and effectiveness of these programs. Continuous feedback from SMEs can help policymakers refine their strategies, ensuring that support measures are aligned with the evolving needs of businesses in the digital age.

In conclusion, the findings of this study highlight the transformative impact of digital adoption on SMEs in Iran, particularly in the wake of the COVID-19 pandemic. Digital tools have become essential for business survival, allowing SMEs to adapt to new market conditions, reach customers online, and maintain operations despite physical restrictions. However, the study also reveals significant disparities in digital adoption across regions, emphasizing the need for targeted government support and investment in digital infrastructure to ensure equitable growth.

The clear link between digital adoption and revenue growth underscores the importance of continued digital transformation, not just as a temporary response to the pandemic, but as a long-term strategy for growth and competitiveness. As SMEs continue to navigate the post-pandemic landscape, their ability to embrace and integrate digital technologies will play a crucial role in determining their future success.

Future research should focus on understanding the ongoing challenges and opportunities in SME digitalization, as well as evaluating the long-term impact of government support and digital infrastructure investments. By addressing these issues, policymakers, business leaders, and researchers can help ensure that SMEs are well-equipped to thrive in the digital economy, contributing to the overall development and resilience of the Iranian economy.

7.6. Recommendations for future research

While this observe offers precious insights into the digitization of SMEs in Iran in the course of the COVID-19 pandemic, it additionally highlights regions where similarly research is vital to deepen knowledge and enhance assist for virtual transformation. The following pointers purpose to guide destiny studies efforts in this crucial place:

7.6.1. Longitudinal Studies

Future studies may want to advantage from longitudinal research that track the progress of virtual adoption over more than one years. Such research could provide insights into the lengthy-time period findings of virtual transformation on commercial

enterprise overall performance and resilience. They would also assist to understand how fast era developments are adopted and the sustained effect of presidency guidelines on digital adoption amongst SMEs.

7.6.2. Comparative Studies across Regions and Sectors

Comparative research related to SMEs from one-of-a-kind regions inside Iran or between Iran and different countries should provide deeper insights into how contextual factors impact digital adoption. Research that compares extraordinary sectors can also highlight specific industry challenges and possibilities, helping inside the development of greater targeted digital transformation strategies.

7.6.3. Impact of Digital Transformation on Employment

Further studies is needed to explore how digital transformation impacts employment within SMEs. This includes understanding task advent in new virtual roles versus activity losses due to automation. Studies can also discover how digital competencies necessities are converting task profiles and what this indicates for personnel development techniques.

7.6.4. Role of Cultural Factors in Digital Adoption

Cultural elements play a great position in how technology is followed and applied. Future research must investigate how cultural attitudes in the direction of generation and innovation have an impact on virtual adoption rates among SMEs in Iran. This ought to consist of studies on organizational subculture, management attitudes closer to generation, and the overall societal notion of digital transformation.

7.6.5. Effectiveness of Government Support Programs

While this take a look at indicates that authorities tasks are generally viewed undoubtedly, greater exact studies ought to compare the unique components of those guide applications which can be most effective. This ought to contain specified case studies of successful applications and analyses of regions in which guide has now not met SME desires.

7.6.6. Barriers to Digital Transformation

Further investigation is required to perceive and apprehend the precise boundaries that save you SMEs from adopting digital technologies. Future research

ought to look at technological, financial, managerial, and infrastructural obstacles in detail, providing a clearer photograph of the challenges that SMEs face.

7.6.7. Technological Impact Assessments

Studies that specialize in precise technology, such as blockchain, AI, and IoT, and their impact on SME operations and aggressive benefit might offer treasured insights. This studies may want to help discover which technologies have the maximum widespread impact on performance, purchaser engagement, and sales increase.

7.6.8. Cybersecurity Challenges

As virtual adoption will increase, so do cybersecurity risks. Future studies need to discover the unique cybersecurity demanding situations faced via SMEs in Iran, examining how these challenges can be efficaciously mitigated thru each technological solutions and strategic management practices.

7.6.9. Sustainability and Digitalization

Exploring the relationship between digitalization and sustainability would offer insights into how virtual technologies can aid environmentally sustainable business practices. This consists of research on how virtual tools can help SMEs reduce their carbon footprint, manipulate resources greater efficaciously, and interact in sustainable business practices.

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9. CURRICULUM VITEA

I studied bachelor in biomedical engineering, with final project of ECG signals improvement, as I understand I believe in manage my company I preferred to start entrepreneurship and innovation majure for my master and as I like digital life I decided to write my thesis about digitalization effect of SME's in Iran for my master.

Contact Information :

ORCID ID : 0000-0002-0417-8717

Publications :

1. Amiri, H. (2022). Digital Innovation Effects in Economics During Covid-19 Pandemic. *JINENIS*, 1(1), 2–13. <https://doi.org/10.5281/zenodo.7198167>



Business Information

1. What is your SMEs Sector?

- ☐ Agriculture
☐ Computer Industry
☐ Construction Sector
☐ Economy
☐ Financial Services
☐ Insurance
☐ Medical
☐ Mining
☐ Processing Sector
☐ Retail
☐ life sciences
☐ Electronics
☐ Chemicals
☐ Other (please specify)

2. What is your Business Based on?

- ☐ Products
☐ Services
☐ Trade
☐ Other (please specify)

10. Does your company have well defined digital strategy?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

11. Does your company invest in digital technologies(like upgrading the old systems)?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

12. Does your company actively monitor and measure the success of its digital strategy implementation?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

* 13. Does implementing digital technologies in your company increase overall employee productivity?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

Customer engagement

3. The number of employees does you have?

4. How much yearly income your company has?

- ☐ 0-49999\$
☐ 50000-99999\$
☐ 100000-249999\$
☐ up to 250000\$

5. How much do you invest in R&D?

- ☐ None at all
☐ Under 1000\$ perMonth
☐ Between 1000\$ to 4999\$
☐ Between 5000\$ to 9999\$
☐ Over 10000\$

6. CEO Education Level

7. How Many Founders Does your Company Have? (Except the CEO)

Technology adoption

8. Which ones have been used in adopting digital technologies in your business operations?

	Cloud computing	Mobile Apps	AI	IoT	BlockChain	VR	Big Data
Before COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐

9. Does your company provide training for employees to improve their digital skills?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

14. How have you used digital channels to engage with your customers?

	Website	Social Media	Email Marketing	ChatBots	Mobile apps	Live Chat	Online Forums And Communities
Before COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐

Other (please specify)

15. Do Your Company's digital Channels influence on purchasing decisions of your customers?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

16. Does Your company respond promptly to customer inquiries and feedback?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

17. Does your company regularly conducts customer satisfaction surveys to gather feedback

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

18. Does your company seek feedback to improve your products/services and customer experience?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

19. Does your company regularly reviews your customer engagement strategy based on performance data and customer feedback?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

Digital Marketing

20. Does your company regularly updates its digital marketing strategy based on industry trends?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

21. Does Your company leverage influencer marketing to reach enhance brand credibility?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

26. Does your company have established digital assets and content management policies and procedures?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

27. Does your company prioritizes digital security and has implemented appropriate cybersecurity measures?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

28. Does your company has established processes for monitoring and responding to changes in digital laws and regulations?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

29. Does your company have a documented process for managing and updating our website content, including the roles and responsibilities of the staff involved?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

Challenges

22. Does your company invests in marketing automation tools to streamline marketing activities and improve efficiency?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

23. Does your company maintain an up-to-date website?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

24. Does Your company use search engine optimization (SEO) techniques to improve your online visibility?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

Digital Governance

25. Does your company comply with relevant laws and regulations related to data protection?

	Not at all	Minimally	Moderately	Significantly	Extremely
Before COVID-19 Pandemic	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐

30. What challenges did your business face during the digitalization process?

	Lack of technical expertise	Insufficient budget	Resistance to change among employees	Limited availability of digital infrastructure	Cyber security concerns	Data privacy issues	Difficulty in integrating new technologies with existing systems	Decreased employee productivity during transition
Before COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐	☐

31. What resources or support did your business receive during the digitalization process?

	Government assistance or grants	External consultants or technology partners	Industry-specific support or guidance	Financial support from investors	Collaboration with other businesses	In-house training and development programs
Before COVID-19 Pandemic	☐	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐	☐

Other (please specify)

32. What were the main drivers for digitalization in your business? (Select all that apply)

	Remote working requirements	Increased demand for online services	Disruption in the supply chain	Change in customer preferences	Government regulations	Competitive pressures	Cost-saving initiatives
Before COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐
During COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐
After COVID-19 Pandemic	☐	☐	☐	☐	☐	☐	☐

Other (please specify)



ONDOKUZ MAYIS ÜNİVERSİTESİ
SOSYAL VE BEŞERİ BİLİMLER ARAŞTIRMALARI ETİK KURUL KARARLARI

KARAR TARİHİ	TOPLANTI SAYISI	KARAR SAYISI
30.09.2022	8	2022-797

KARAR NO: Üniversitemiz Lisansüstü Eğitim Enstitüsü öğrencisi Hadi AMİRİ'nin Prof. Dr. Kürşat DEMİRYÜREK danışmanlığında "KOVİD-19 Pandemisi Esnasında KOBİ'lerin Dijitalleşmesine Etki Eden Faktörler, İran Ülkesi Örneği" isimli yüksek lisans tezine ilişkin anket ve bilgisayar ortamında anket/test çalışmalarını içeren 81257 sayılı dilekçesi okunarak görüşüldü.

Üniversitemiz Lisansüstü Eğitim Enstitüsü öğrencisi Hadi AMİRİ'nin Prof. Dr. Kürşat DEMİRYÜREK danışmanlığında "KOVİD-19 Pandemisi Esnasında KOBİ'lerin Dijitalleşmesine Etki Eden Faktörler, İran Ülkesi Örneği" isimli yüksek lisans tezine ilişkin anket ve bilgisayar ortamında anket/test çalışmalarının kabulüne oy birliği ile karar verildi.