Structural Analysis of Factors **Influencing the Development** of IT-Based Platform Services

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Abstract: Today, businesses are considered the main factor in improving the country's economy and creating employment through the implementation of policies that foster entrepreneurship and the establishment of supportive institutions. Therefore, the current research seeks to identify factors that affect the development of IT-based platform services. In this research, a questionnaire based on the fuzzy Delphi method was used to identify the factors. The statistical population of this research consists of 20 managers, professors, specialists, and experts who are associated with start-up companies. Due to the small size of the population, the entire population was considered as a sample. In this research, the influential factors were identified using the fuzzy Delphi method. The results of the research showed that providing access to financial resources is the most important factor affecting the development of IT-based platform services. On the other hand, improving the entrepreneurial environment through the establishment of laws is considered the least important factor in this area.

Keywords: Business, Information Technology, Pipe business model, Platform services

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1. Introduction

Digital technologies (DTs) are increasingly becoming a valuable source of future competitiveness for contemporary organizations (Coreynen et al., 2017; Kamalaldin et al., 2020; Kohtamäki et al., 2019).

Start-up companies, including those that offer platform services, have become widespread in Iran and have frequently disrupted traditional business models (Sabokro et al., 2018). Businesses that provide platform services possess a range of skills, abilities, competencies, and specialists who excel in bringing creativity and innovation to their highest levels within these companies. Innovation is the main factor for business growth and development, and it has a long-term impact on the organization's performance (Zahedi et al., 2018). Businesses that provide platform services play an important role in economic growth. Businesses that provide platform services are private companies or institutions formed to promote synergy between science and wealth, foster a knowledge-based economy, achieve scientific and economic objectives, and commercialize research and development outcomes in the field of high-tech technologies with significant added value. (Chen et al., 2017). Platform service businesses play an important role in fostering innovation, generating employment, and enhancing the competitive advantage of countries (Fishani et al., 2021). Knowledge is a crucial factor and strategic resource for acquiring intangible assets and capabilities within an organization. This can ultimately lead to the growth of value creation and the attainment of a competitive advantage (Sabokro et al., 2018). In the economy of countries, knowledge holds great importance, and businesses that offer platform services play a significant role in the economy by facilitating the production and commercialization of knowledge (Azhdari et al., 2018). Considering the competitive environment and the dynamic and complex conditions facing organizations, there is an increasing need for continuous innovation development in various organizations and companies. IT-based platform services need to adopt effective marketing strategies to capitalize on market opportunities (Talari et al., 2021).

For IT-based platform services to be more competitive in the market, they must adopt an innovative approach. They must transform into dynamic and learning organizations, enabling their employees to adapt to changes in the competitive landscape using their existing skills and abilities. The presence of innovative and creative individuals establishes a foundation for success within the organization

(Salamzadeh et al., 2019).

On the other hand, entrepreneurial activity is the driver of economic growth. For this purpose, policies should focus on creating institutions that foster entrepreneurship. When such an institutional environment exists, entrepreneurial investment will be fostered (Cullen et al., 2021). The topic of IT-based businesses is of great interest in today's business world. This creates a competitive environment with the presence of multiple competitors, highlighting the importance of establishing sustainable competitive advantages for each participant in this industry (Akpan, 2021).

Although there are successful models for IT-based platform services, we cannot ignore the impact of institutional, economic, and financial factors on the development of business models. Therefore, in this research, we aim to determine the factors that influence the development of IT-based platform services in Iran, taking into account the aforementioned factors.

Platform-type companies act as intermediaries, developing and managing an aggregated collection of goods and services of the same kind. Although platforms have been common throughout history, the use of collaborative operations and network systems has revolutionized the model. Just as other scholars predicted, it has the potential to become the central organizing principle of the new economy. (Anna Cui, 2020)

Digital economy experts believe that in order to digitize and increase the share of the national economy, steps must be taken in three layers: the central core, the limited digital economy, and the comprehensive digital economy. The central core layer includes information and communication technology companies, ranging from mobile phone operators to hosting and cloud service providers, as well as software companies.

The second layer consists of various service platforms, including Uber, Airbnb, and national examples of internet taxis like Snap and Tapsi. It also includes product platforms like Amazon, eBay, and Digikala in Iran, as well as financial marketplace and payment platforms such as Square, PayPal, and App. Additionally, software development platforms like Apple Store, Salesforce, Cafe Bazaar, and MyKet are part of this layer. The study of the statistics published by the Ministry of Communications and Information Technology and the Iranian Statistics Center shows that in this sector, the GDP can reach 5 to 10 percent. In Iran last year, this

share reached 6.5 percent, with a growth of 71 percent compared to 1995.

The third layer is the comprehensive digital economy, which involves the utilization of information technology in various industries to enhance the value of products, reduce costs through automation or robotics, and implement the related administrative system, commonly referred to as the fourth industrial revolution (Industry 4.0). The share of this sector in the national economy can reach 15-30% of the GDP.

However, these businesses do not pay serious attention to business models. Perhaps, in the case of mature technologies, this strategy can be useful. However, with the emergence of IT products, different strategies should be implemented. The ultimate goal of designing a business model is to identify customer needs and values and achieve a sustainable competitive advantage.

Therefore, IT-based platform services are always at risk of losing their market position and failing in a project. Therefore, considering the importance of businesses and their role in entrepreneurship, this research aims to identify the factors that affect the development of IT-based platform services.

2. Theoretical foundations

2-1. The evolution of the business model concept

A business model is a company's plan for generating profit. It identifies the products or services that the business plans to sell, the target market, and any anticipated expenses. The business model is equally important for established and new companies. They help new and developing companies attract investment, recruit talent, and motivate management and staff.

In the last 60 years, the term "business model" has been present in scientific discussions. The conceptualization of business models can be traced back to 1957 and Bellman's research. Many researchers subsequently incorporated this concept into their articles. Afterward, the business model has been consistently adopted in the field of information technology, primarily in the context of business modeling (process models) (Wirtz. W et al., 2016).

Since 2004, there has been an increase in the publication of practice-oriented and scientific books (Wirtz. W et al., 2016). Even though the topic has received significant attention in recent times, the field of research is still in its early stages, and many fundamental questions remain. There is still no complete clarity in the

literature, particularly regarding the purpose or justification for the existence of the business model approach, or even its contrast to established concepts (Wirtz. W et al., 2016). Overall, there have been significant differences in the initial developments in terms of the level of consideration among various approaches. Yet, meanwhile, a broader company perspective has become the main focus. Here, a company's actual focus includes both a competitive and a company-internal view (Osterwalder and Pigneur, 2010). Despite the significant attention paid to the topic of business models in recent years, numerous questions in this field remain unanswered.

The concept of a business model has evolved over many years. The efforts of researchers in the field of understanding concepts and attitudes toward business models have led to gradual progress. The results of research and comprehensive reviews have identified several phases in the evolution of the concept of business models.

Phase one: It coincided with the time when the importance of the term "business model" began to emerge, and several experts started to provide definitions and classifications of business models.

Phase two: In this phase, the experts completed the definitions by adding business model elements to the provided definitions.

Phase three: In this phase, detailed and comprehensive explanations of the elements of the business model were presented.

Phase four: In this phase, the experts began conceptual modeling of the components. This work resulted in the development of business meta-models in the form of reference models and ontologies.

Phase five: In this phase, reference models were used for information and management system programs (Ohadi and Naseri., 2017).

In a study, Guo.h et al. (2023) decompose business model innovation into three elements: value proposition, value creation, and value absorption innovation. They examine how business model innovation helps improve the performance of digital startups. According to a study conducted on Chinese digital startups, there is a positive relationship between value proposition innovation and digital startup performance.

Digital technologies, such as Industry 4.0, Internet of Things, cloud computing, big data, and blockchain, are profoundly impacting companies' activities and processes. As a result, there are changes in firms' mechanisms for value creation, value delivery, and value capture. (Ancillai.C, 2023).

Some studies contribute to the theoretical and managerial discussion on digital-driven business model innovation. The existing research provides valuable background knowledge to develop an interpretive framework for understanding the relationship between DTs and BMI (Ancillai.C, 2023) (see Fig. 2).

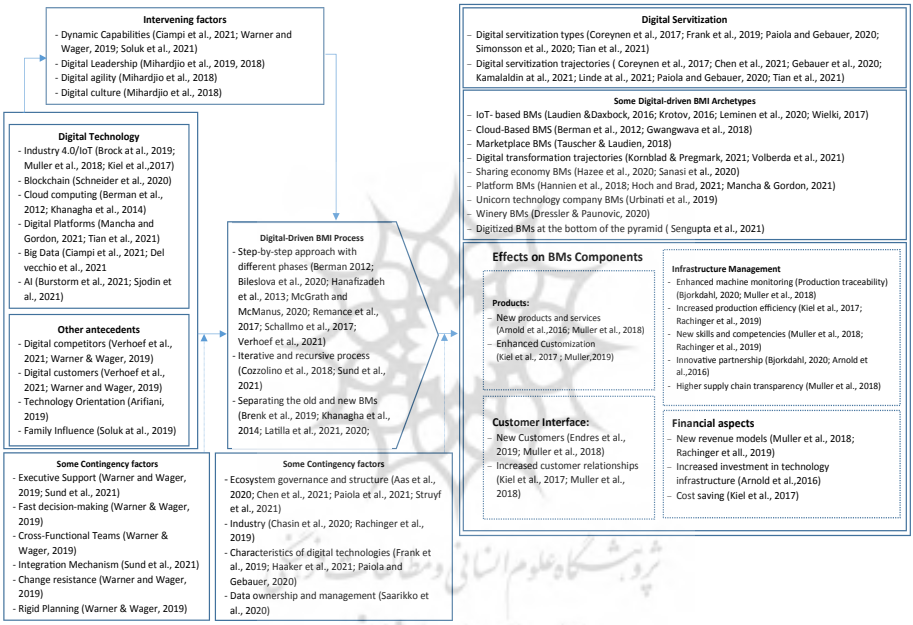

Figure 1. Interpretative framework (Adapted from Chiara Ancillai et al., 2023)

2-2. Shift from Pipes to Platforms

Firms are responsible for creating something, pushing it out, and selling it to their customers. This is a pipe business model. For a long time, these models have dominated the business models.

The manufacturing process is entirely based on a pipe model. Radio and television are conduits that deliver content to us. Our entire education system is like a pipeline through which teachers impart knowledge to us. (Kela Casey, 2021).

A business pipeline is the flow of data or physical products, similar to the movement of goods in manufacturing, driven by the forces of demand and supply. It has a link between the factory, retail store, and customer. Besides, this creates a workflow from product development to retail, where the product is brought to the table for consumers to purchase. This is known as a business pipeline. The business pipeline facilitates the flow of opportunities among all three businesses in various directions, which is why it is referred to as a pipeline (Kela Casey, 2021).

Rapid development of technology and increasing use of the Internet, along with decreasing willingness to invest, have changed the business environment and created new platforms.

A platform is a business model that creates value by facilitating exchanges between at least two groups, typically consumers and producers, of a given value. Because of rapid and widespread digital transformation, it has become the dominant business model of the 21st century.

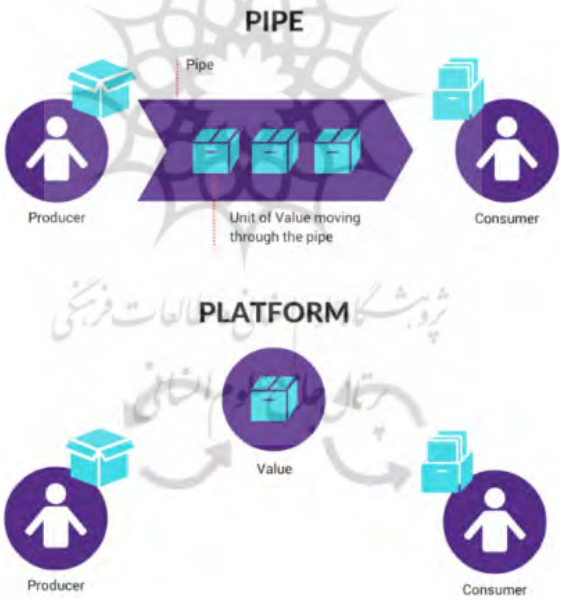

Figure 2. Pipe Thinking VS Platform Thinking

The platform business models aim to satisfy the diverse needs of consumers (Oxera, 2016). Analyzed platform cases in four European Union countries - Germany, France, Spain, and Poland. Based on case analyses, the main reasons

why customers and companies use platforms were identified (see Table 1).

Table1. Reasons for Using Platforms (Adapted from Oxera, 2016)

Consumers	Companies
Reasons for using platforms	
◇ communication; ◇ entertainment; ◇ online marketplace; ◇ comparison; ◇ information.	◇ reach a wider market; ◇ low-cost channel for gathering customer feedback; ◇ platforms are much cheaper than bricks and-mortar stores.

2-3. Platform-based services businesses

Rafti et al. (2018) conducted a study on the concept of platforms and the business models associated with them. With the emergence of the digital economy, numerous concepts have been proposed, and some of these concepts serve as its main elements. The online platform is one of the main components of the digital economy, and understanding it can greatly benefit the participants in this ecosystem for maximizing the use of the digital economy. Therefore, the purpose of this article is to review the concept of platforms, introduce platform-based business models, discuss different perspectives on types of platforms, and explore their applications. To achieve this goal, the concept of the online platform is discussed first. Then, the four main elements of the platform are examined, followed by an exploration of business models based on the platform and the classification of global platforms from different perspectives. At the end, examples of internal platforms based on one of the provided categories are introduced.

Kumar et al. (2020) conducted a study on digital mediation in business marketing research. Digital mediation in B2B marketing is becoming increasingly important for companies due to evolving customer needs and technological environments. This research provides a framework for digitally mediated B2B marketing. Muñoz et al. (2018) conducted a research study on measuring the alignment between business and information technology. As technology has become increasingly integrated into the business context, particularly in the era of digital transformation, the alignment of business and information technology (BIT) has emerged as a key concern for managers. This alignment is crucial for

ensuring the overall performance of the company. BITA measurement is one of the main decision-making tools in the strategic field of companies.

Nithyananda (2017) investigated business models for entrepreneurship, commercialization, leverage, and monetization of intellectual property rights in ASEAN countries and India. The results showed that in India and ASEAN countries, there has been a fundamental shift from traditional to modern intellectual property rights. The growth of industrialization and the development of innovative businesses, trademarks, brands, and their registration have made intellectual property rights possible.

Platform phenomena have become increasingly important, and according to various prognoses, companies need to rethink their business models in order to capitalize on the opportunities that platforms are bringing. Digitalization is considered as a strategy to adapt and utilize digital technologies instead of just upgrading them. In this context, the clear shift in platform usage is observed (Gatautis.R, 2017). A product is considered a platform when it is one component or subsystem of a developing technological system. It is strongly functionally interdependent with most of the other components of this system. Additionally, there is no demand for the components when they are isolated from the overall system. This definition was provided by Anssi Smedlund in 2012.

The rise of the sharing economy has led to an increase in studies on platform operations that offer product rental or sharing services. Numerous studies examine the utilization of rental/sharing platforms across various industries. The product rental/sharing platforms are different from the secondary market platforms in that consumers who search for this service can only obtain the right to use the products but cannot possess ownership of them (Xiutian Shi et al., 2021).

Online platforms that offer on-demand services are frequently faced with the issue of leakage, wherein customer-provider pairs may choose to conduct transactions “off-platform” in order to avoid paying commissions to the platform. (He. J et al., 2023).

The platform is a business. Platforms create value through engagement. Platforms create and shape interactions between producers and consumers. An important aspect of the platform’s role is to establish infrastructure for facilitating interactions and to establish the framework and rules that govern

these interactions. The most important feature of the platform is that, instead of producing and supplying the product, it creates a space and infrastructure for the relationship between producers and consumers of a product or service. (Kraus et al., 2019). Considering that platform-based businesses are not specialized in producing and supplying a product, their core lies in the mechanism that connects the supplier and the demander. Algorithms that perform this function are called adaptive algorithms. The better a platform can connect suppliers to demanders, and vice versa, the more suitable supplier it can find for each demand. Platforms are designed to decrease the cost of interaction between suppliers and receivers of goods and services by efficiently matching supply and demand through the use of technology. (Dias et al., 2020).

Information and communication are two fundamental tools required for any entrepreneurial activity. Entrepreneurship is not possible in isolation and without the support of institutions, organizations, and individuals. Therefore, the use of information technology is one of the important factors for progress in the 21st century. Information technology has caused a transformation in various aspects of life, including the economy and social activities. Few organizations can be found that have not benefited from this technology. Currently, this technology is used in various industries, including medicine, the oil industry, the stock market, and banking. New information technologies are crucial for organizations because of their high capacity and ability to process and rapidly disseminate information necessary for carrying out organizational activities. This importance stems from the fact that information and its flow and processing are vital for the organization. The formal structure of an organization acts as an information processor (Shaheen et al., 2018). The emergence of digital business after the Internet has changed the perspective, structure, and pattern of businesses.

In the new trade system, consumers are exposed to a wider range of options and, in some cases, it has resulted in reduced prices. With the implementation of this system, errors in business operations have been minimized, the expenses associated with paper usage have been eliminated, and the business model has transitioned to digital.

Online platforms that connect customers with service providers may encounter a scenario where pairs who have been matched on the platform choose to conduct

future transactions “off-platform” in order to avoid paying commission fees. This phenomenon is often described as “platform leakage” (Moazed, 2015) and can pose a long-term threat to a platform’s business model. (Eryn Juan He et al., 2023).

The concept of a ‘platform’ is transformative, with the potential to bring about significant changes in business logic, economics, and society as a whole. Any company that considers information on factors such as supply-and-demand status, customer needs, trends, and willingness to pay as an essential asset is very likely to participate in the platform revolution. The concept of a ‘platform station’ is used as a strategy to operate multifaceted platforms and connect buyers, sellers, and other stakeholders, without necessarily owning the products or services being sold. (Larsson. Ö, 2019)

AI (Artificial Intelligence) is the platform. AI platforms enable businesses to achieve maximum efficiency by providing multiple benefits, such as overcoming redundant tasks, offering deeper insights into data for better decision-making, providing efficient data management capabilities, and much more. As businesses look for ways to streamline their output, AI platforms are a boon. Based on the markets, business models, and platforms, key business model attributes are presented in Table 2.

Table 2. Key Business Model Attributes of Marketplaces (Adapted from Täuscher, Karl & Laudien, Sven 2018)

	Business Model	Specifications				
Value creation dimension	Platform type	Web-based platform			Mobile app	
	Key activity	Data services		Community building	Content creation	
	Price discovery	Fixed prices	Set by sellers	Set by sellers	Auction	Negotiation
	Review system	User reviews		Review by marketplace	None	
Value delivery dimension	Key value proposition	Price/Cost/ Efficiency		Emotional value	Social value	
	Transaction content	Product			Service	
	Transaction type	Digital			Offline	
	Industry scope	Vertical			Horizontal	
	Marketplace participants	C2C		B2C	B2B	
	Geographic scope	Global		Regional	Local	
Value capture dimension	Key revenue stream	Commissions	Subscriptions	Advertising	Service Sales	
	Pricing mechanism	Fixed pricing		Market pricing	Differentiated pricing	
	Price discrimination	Feature based	Location based	Quantity based	None / other	
	Revenue source	Seller	Buyer	Third party	None / other	

When we talk about business models, the first thing that comes to mind is Osterwalder's business model canvas. However, the comparison between Osterwalder's business model and the platform business model reveals some differences.

Table 3. Building Blocks for a Platform Business Model Canvas

Osterwalder Business Model	Platform Business Model	
Value	Core Value Unit	Owner
Propositions: Job, pain, gain	Job, pain, gain	Transaction
Revenue Streams	Revenue Streams	Contributor
Key Resources	Key Resources	Filters
Key Activities	Key Activities	Governance
Key Partnerships	Key Partnerships	

Osterwalder Business Model	Platform Business Model
Channels	Channels
Customer Relationships	-----
Cost Structure	Cost Structure
Customer Segments	Customer

3. Research method

In terms of its purpose, this research is part of applied research. The research approach of this study is inductive-deductive in terms of data collection logic.

3-1. Qualitative part - Library Research

In this step, first by examining the theoretical foundations of the research, the main and sub-components and indicators affecting the development of IT-based platform services were identified and compiled in the form of a scoring checklist.

3-2. Quantities part -Fuzzy Delphi analysis

Based on the analogical approach, an attempt was made to validate the research indicators and components using the Fuzzy Delphi analysis method. The Delphi method is an iterative process used to collect and distill the anonymous judgments of experts. The Fuzzy Delphi method uses a series of data collection and analysis techniques interspersed with feedback. The Delphi method is well-suited as a research instrument when there is incomplete knowledge about a problem. (Jafari. A et al., 2018)

In other words, the fuzzy Delphi analysis method utilizes both inductive and deductive methods to categorize and classify qualitative data. In the inductive method, categories and general concepts that summarize similar data are defined and selected based on the collected data. These categories are then considered and analyzed. In the deductive method, the main and macro-categories are first defined and specified. Then, the qualitative data are classified and grouped within each category based on their content and proximity to the defined categories. And then they can be analyzed and surveyed. In this research, a deductive method was used to analyze the content of open-ended questions and supplementary

structured interviews.

The tool used to gather qualitative information was based on the critical evaluation method and a review of similar articles and research. The tool was designed to score the components of the development of plausible scenarios in the field of platform service provider businesses using a scoring checklist. The data was then analyzed using the fuzzy Delphi method.

3-3. Export Panel Composition

The composition of the Fuzzy Delphi working group of this research consists of managers, professors, specialists, and experts in connection with start-up companies. The members of the Fuzzy Delphi working group were selected for this research number of 20 people by snowball sampling.

3-4. Extraction of Affecting Factors

According to the previous arrangements, the designed scoring checklists were provided to the members of the expert panel. In the quantitative part of the research, the impact of the approved indicators and identified sub-components on the development of IT-based platform services was examined and tested. This was done after confirming the components of the research in the qualitative part and using a questionnaire created by the researcher. It is necessary to explain that only the indicators with the highest frequency, repetition, and importance in identifying the research categories have been mentioned in the table. In practice, the researchers have used more indicators to identify the content of the respondents' answers.

At this stage, Excel software is used to implement the Fuzzy Delphi method.

4. Analysis of findings

In this section, the descriptive analysis of research variables is presented. The identified indicators were given to the experts' panel and they were asked to indicate their agreement or disagreement with each of these determined indicators and to add some items if possible.

This research was carried out using the fuzzy Delphi method in three stages and the results of each of which are presented separately.

4-1. The average opinions of experts

The results of this stage of the Delphi technique in the first stage are reported in Table (4). At this stage, the values are calculated based on triangular fuzzy numbers.

Table 4. The opinion of experts regarding the factors (first stage survey)

Indicator	Components	(l.m.u)	S1
Institutional factors	Strengthening R&D centers and motivating researchers	(0.95, 0.80, 0.55)	0.77
	Importance to the national system of innovation	(0.91, 0.78, 0.53)	0.74
	Creating knowledge to access different levels of information for the development of entrepreneurship	(0.95, 0.78, 0.53)	0.75
	Proper management of human resources and executive-motivational factors	(0.95, 0.84, 0.59)	0.79
	Development and forecasting of future technologies	(0.94, 0.75, 0.50)	0.73
	Creating motivation and a culture of innovation in the country	(0.98, 0.92, 0.67)	0.86
	The existence of a transparent database to use its information for entrepreneurship	(0.94, 0.81, 0.56)	0.77
	Creating appropriate infrastructure	(0.91, 0.77, 0.52)	0.73
	Implementation of continuous supervision and monitoring to ensure the existence of a suitable space	(0.92, 0.78, 0.53)	0.74
	The efficiency of the country's legislative system in drafting efficient and transparent laws	(0.94, 0.73, 0.48)	0.72
	The efficiency of the government in the administration of the country's affairs and the implementation of laws	(0.94, 0.73, 0.48)	0.72
	The efficiency of the judicial system (simplification of procedures, time and cost necessary to issue a verdict from the beginning to the end)	(0.94, 0.84, 0.59)	0.79
	macroeconomic stability (sustainable economic growth)	(0.94, 0.81, 0.56)	0.77
	The degree of openness of the economy and economic freedom (absence of undue interference of the government in the markets)	(0.94, 0.83, 0.58)	0.78

Indicator	Components	(I.m.u)	S1
Economic factors	Promotion of monetary and financial policies in the direction of entrepreneurship	(0.88, 0.70, 0.47)	0.68
	Supply and access to financial resources	(0.94, 0.75, 0.50)	0.73
	Actual evaluation of business plans	(0.95, 0.80, 0.55)	0.77
	Economic conditions of society	(0.94, 0.75, 0.50)	0.73
	Estimating the cost and income of entrepreneurship	(0.95, 0.78, 0.53)	0.75
Legal factors	Amendment of tax laws	(0.95, 0.86, 0.61)	0.81
	Strengthening the educational system	(0.97, 0.83, 0.58)	0.79
	Improving research and development activities in domestic markets	(0.89, 0.70, 0.45)	0.68
	Direct government support for investment	(0.98, 0.84, 0.59)	0.80
	Modernization of related national and administrative regulations	(0.97, 0.81, 0.56)	0.78
	Access to capital markets	(0.1, 0.88, 0.63)	0.84
	Updating laws related to industrial property	(0.89, 0.70, 0.45)	0.68
	Revision of compensation law	(0.89, 0.70, 0.45)	0.68
	Providing rules for registering industrial designs	(0.92, 0.75, 0.50)	0.72
	Improving the entrepreneurial environment through the establishment of laws	(0.91, 0.70, 0.45)	0.69
	Financing by financial institutions such as banks	(0.94, 0.78, 0.53)	0.75
	Revision of labor law	(0.95, 0.80, 0.55)	0.77
	Reform the banking system	(0.92, 0.75, 0.50)	0.72

4-2. Secondary Delphi Plan- Examine the Indicators

After identifying the most important components and indicators from the experts' point of view, in the secondary Delphi plan, the object is to examine the indicators proposed for each of the effective indicators and according to the opinions of the experts, for each of the indicators, the required components are stated.

These results are summarized in Table 5.

Table 5. The result of the views and opinions of the expert panel (second stage)

Indicator	Components	(l.m.u.)	S2	|S1-S2|
Institutional factors	Strengthening R&D centers and motivating researchers	(0.97, 0.84, 0.59)	0.80	0.03
	Importance to the national system of innovation	(0.98, 0.88, 0.63)	0.83	0.09
	Creating knowledge to access different levels of information for the development of entrepreneurship	(0.1, 0.86, 0.61)	0.82	0.07
	Proper management of human resources and executive-motivational factors	(0.97, 0.84, 0.59)	0.80	0.01
	Development and forecasting of future technologies	(0.97, 0.80, 0.55)	0.77	0.04
	Creating motivation and a culture of innovation in the country	(0.97, 0.86, 0.61)	0.81	0.05
	The existence of a transparent database to use its information for entrepreneurship	(0.98, 0.83, 0.58)	0.80	0.03
	Creating appropriate infrastructure	(0.95, 0.83, 0.58)	0.79	0.06
	Implementation of continuous supervision and monitoring to ensure the existence of a suitable space	(0.95, 0.83, 0.58)	0.79	0.05
	The efficiency of the country's legislative system in drafting efficient and transparent laws	(0.98, 0.80, 0.55)	0.78	0.06
	The efficiency of the government in the administration of the country's affairs and the implementation of laws	(0.97, 0.78, 0.53)	0.76	0.04
	The efficiency of the judicial system (simplification of procedures, time and cost necessary to issue a verdict from the beginning to the end)	(0.97, 0.86, 0.61)	0.81	0.01
	macroeconomic stability (sustainable economic growth)	(0.95, 0.83, 0.58)	0.79	0.02
	The degree of openness of the economy and economic freedom (absence of undue interference of the government in the markets)	(0.95, 0.83, 0.58)	0.79	0.01

Indicator	Components	(l.m.u.)	S2	|S1-S2|
Economic factors	Promotion of monetary and financial policies in the direction of entrepreneurship	(0.94, 0.75, 0.50)	0.73	0.05
	Supply and access to financial resources	(0.98, 0.81, 0.56)	0.78	0.05
	Actual evaluation of business plans	(0.98, 0.84, 0.59)	0.80	0.03
	Economic conditions of society	(0.98, 0.80, 0.55)	0.78	0.05
	Estimating the cost and income of entrepreneurship	(0.97, 0.80, 0.55)	0.77	0.02
Legal factors	Amendment of tax laws	(1, 0.91, 0.66)	0.86	0.05
	Strengthening the educational system	(0.97, 0.83, 0.58)	0.79	0
	Improving research and development activities in domestic markets	(0.97, 0.78, 0.53)	0.76	0.08
	Direct government support for investment	(0.97, 0.86, 0.61)	0.81	0.01
	Modernization of related national and administrative regulations	(0.98, 0.88, 0.63)	0.83	0.03
	Access to capital markets	(0.95, 0.83, 0.58)	0.79	0.01
	Updating laws related to industrial property	(1, 0.92, 0.67)	0.86	0.01
	Revision of compensation law	(0.97, 0.81, 0.56)	0.78	0.01
	Providing rules for registering industrial designs	(0.97, 0.80, 0.55)	0.77	0.09
	Improving the entrepreneurial environment through the establishment of laws	(0.98, 0.81, 0.56)	0.78	0.06
	Financing by financial institutions such as banks	(0.98, 0.81, 0.56)	0.78	0.09
	Revision of labor law	(0.97, 0.78, 0.53)	0.76	0.01
	Reform the banking system	(0.98, 0.80, 0.55)	0.78	0.06

In the present study, the factors extracted from the literature were evaluated and approved by 20 professors and experts in the field of entrepreneurship using the fuzzy Delphi analysis method. This analysis refers to a method that examines

the entire path of real communication, and the application of this method can be expanded and applied to other data collection methods

such as interviews and observations.

4-3. Determining the final affecting factors

In the end, by obtaining a group consensus, 23 factors affecting the development of IT-Based platform services were identified, which can be seen in Table (6).

After determining the research components to design a structural-interpretive analysis model, the factors affecting the development of IT-Based platform services are first determined based on the table below, the abbreviations of the indicators as follows:

Table 6. Abbreviations of indicators

Indicator	Abv	Indicator	Abv
Strengthening R&D centers and motivating researchers	V1	Promotion of monetary and financial policies in the direction of entrepreneurship	V12
Importance to the national system of innovation	V2	Supply and access to financial resources	V13
Creating knowledge to access different levels of information for the development of entrepreneurship	V3	Actual evaluation of business plans	V14
Development and forecasting of future technologies	V4	Economic conditions of society	V15
Creating motivation and a culture of innovation in the country	V5	Estimating the cost and income of entrepreneurship	V16
The existence of a transparent database to use its information for entrepreneurship	V6	Amendment of tax laws	V17
Creating appropriate infrastructure	V7	Improving research and development activities in domestic markets	V18
Implementation of continuous supervision and monitoring to ensure the existence of a suitable space	V8	Modernization of related national and administrative regulations	V19
The efficiency of the country's legislative system in drafting efficient and transparent laws	V9	Providing rules for registering industrial designs	V20

Indicator	Abv	Indicator	Abv
The efficiency of the government in the administration of the country's affairs and the implementation of laws	V10	Improving the entrepreneurial environment through the establishment of laws	V21
macroeconomic stability and stability (sustainable economic growth)	V11	Financing by financial institutions such as banks	V22
		Reform the banking system	V23

As can be seen in Table (6), the indicators approved by the experts have been determined in the form of abbreviations to form the structural self-interaction matrix. At this stage, the opinions of 20 experts about the relationship between indicators were first compared. For this purpose, the "Mode" index was used in such a way that among the four possible relationships between the indicators, the relationship that has the most frequency according to experts were included in the final table.

According to this issue, the final structural self-interaction matrix was calculated as follows. To determine the type of relationships, it was suggested to use various management techniques, including brainstorming and nominal group techniques.

Table 7. Conceptual relationships in forming the structural self-interaction matrix

symbol	Symbol concept
V	I lead to j (row leads to column)
A	j leads to I (column leads to row)
X	There is a two-way relationship between i and j
O	There is no valid relationship

The SSIM matrix should be prepared with the opinion of experts. For this purpose, with the opinions of experts and using the assumed relationships (Table 8), the SSIM matrix was completed as follows.

Table 8. The SSIM matrix based on exports opinion

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23
V1		A	V	X	A	X	A	A	A	V	A	A	X	A	A	X	X	A	A	X	A	X	V
V2			X	V	A	X	A	A	A	X	A	A	A	A	A	X	X	X	A	A	A	A	V
V3				A	A	A	X	A	X	A	A	A	A	X	X	A	A	A	A	A	A	A	A
V4					A	A	A	X	X	X	A	A	A	A	A	A	V	A	A	A	A	A	A
V5						A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	A
V6							A	A	A	V	A	A	A	A	A	A	A	A	A	A	A	A	A
V7								V	X	V	A	A	A	X	A	X	X	V	A	A	A	V	A
V8									X	V	A	A	A	A	A	X	X	X	A	V	A	A	A
V9										X	X	A	A	X	X	X	X	V	A	A	A	A	A
V10											A	A	A	A	A	A	A	A	A	V	A	A	A
V11												X	A	X	X	V	X	V	A	A	A	X	A
V12													V	V	V	V	V	V	A	A	A	A	A
V13														V	V	V	V	V	A	A	A	A	A
V14															X	V	X	V	A	A	A	A	A
V15																V	V	X	A	A	A	A	A
V16																	A	A	A	A	A	A	A
V17																		X	A	A	A	A	A
V18																			A	A	A	A	A
V19																				X	V	A	A
V20																					V	V	A
V21																						V	V
V22																							X
V23																							

Table 9. Initial acquisition matrix

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23
V1	-	0	1	1	0	1	0	0	1	0	0	0	1	0	0	1	1	0	0	1	0	1	1
V2	1	-	1	1	0	1	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	1
V3	0	1	-	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
V4	1	0	1	-	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
V5	1	1	1	1	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
V6	1	1	1	1	1	-	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
V7	1	1	1	1	1	1	-	1	1	0	0	0	1	1	0	0	1	0	0	0	0	1	0
V8	1	1	1	1	1	1	1	-	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0
V9	1	1	1	1	1	1	1	1	-	1	0	0	1	0	0	1	1	0	0	0	0	0	0
V10	0	1	1	1	1	0	0	1	1	-	0	0	0	0	0	1	0	0	1	0	0	0	0
V11	1	1	1	1	1	1	1	1	1	0	-	1	0	1	1	1	1	0	0	0	0	1	0
V12	1	1	1	1	1	1	1	1	1	0	0	-	1	1	1	1	1	0	0	0	0	0	0
V13	1	1	1	1	1	1	1	1	1	0	0	0	-	1	1	1	1	0	0	0	0	0	0
V14	1	1	1	1	1	1	1	1	1	0	0	0	0	-	1	1	1	0	0	0	0	0	0
V15	1	1	1	1	1	1	1	1	1	0	0	0	0	0	-	1	1	0	0	0	0	0	0
V16	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	-	0	0	0	0	0	0	0
V17	1	1	1	0	1	1	1	1	1	1	0	0	0	0	1	0	-	1	0	0	0	0	0
V18	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1	1	-	0	0	0	0	0
V19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	0	0	0
V20	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	-	1	1	0
V21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	-	1	1
V22	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	-	1
V23	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	-

The Boolean rule was used to adapt the achievement matrix and the achievement matrix was obtained with the final adaptation as shown in Table 10.

Table 10. Revised achievement matrix

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	Penetration Power
V1	1	0	1	1	0	1	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	7
V2	1	1	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6
V3	0	1	1	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	6
V4	1	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6
V5	0	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	6
V6	1	1	1	1	0	1	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	9
V7	1	1	1	1	0	1	1	1	1	1	0	0	0	1	0	1	1	1	0	0	0	0	0	13
V8	1	1	1	1	0	1	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	0	0	14
V9	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	15
V10	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	10
V11	1	1	1	1	0	1	0	1	0	1	1	0	0	0	1	1	1	1	0	0	0	0	0	12
V12	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	16
V13	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	16
V14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
V15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	19
V16	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	19
V17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	21
V18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
V19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	20
V20	1	1	1	1	0	1	0	1	1	1	0	0	0	0	0	1	1	1	0	1	0	0	0	12
V21	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	18
V22	1	1	1	1	0	1	1	1	1	1	1	0	0	1	0	1	1	1	0	0	0	1	0	15
V23	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	1	17
Dependence Power	21	21	23	22	6	20	16	18	19	21	14	8	10	15	14	19	17	17	6	3	3	4	5	

At this stage, after obtaining the final achievement matrix to determine the level of criteria, we define two sets that can be achieved (output) and the set that comes before (input), and then determine their commonality. An achievable set is a set in which the number of criteria in the row appears as 1 in the final achievement matrix, and the predecessor set is a set in which the number of criteria appears as 1 in the columns.

Table 11. Determining the level of indicators

Row	Achievable Set	Predecessor Set	Common Set	Level
1	1, 3, 4, 6, 10, 13	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	1, 4, 6, 13	3rd
2	1, 2, 3, 4, 6, 10	1, 2, 5, 6, 7, 8, 9, 11, 12, 13, 14	1, 2, 6	3rd
3	2, 3, 7, 9, 14	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	2, 3, 7, 9, 14	1st
4	1, 3, 4, 8, 9, 10	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	1, 4, 8, 9, 10	2nd
5	2, 3,4, 5, 9, 10	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	2, 4, 5, 9, 10	2nd
6	1, 2, 3, 4, 6, 10	2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	2, 3, 6, 10	4th
7	1, 2, 3, 4, 6, 7, 8, 9, 10, 14	3, 5, 7, 8, 9, 11, 12, 13, 14	3, 7, 9, 14	6th
8	1, 2, 3, 4, 6, 7, 8, 9, 11, 14	5, 7, 8, 9, 10, 11, 12, 13, 14	7, 8, 9, 11, 14	6th
9	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 14	3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14	3, 4, 7, 8, 9, 10, 11, 14	6th
10	1, 2, 3, 4, 6, 7, 8, 9, 10	1, 2, 5, 9, 10, 11, 12, 13, 14	1, 2, 7, 8, 9, 10	4th
11	1, 2, 3, 4, 6, 8, 10, 11	2, 5, 7, 8, 9, 11, 12, 13, 14	2, 8, 11	5th
12	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 14	5, 9, 11, 12, 13, 14	9, 11, 12, 14	7th
13	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14	3, 5, 6, 9, 11, 12, 13, 14	3, 6, 11, 13, 14	7th
14	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	14	14	8th

Based on the direct MICMAC graph, we analyze the research variables (see Figure 3). Figure 3 consists of two horizontal axes: one representing dependence power and the other representing driving power. The research variables are classified into four categories: independent, linkage, autonomous, and dependent variables. This classification is based on two dimensions: influence and dependence.

In this research, the following indicators are included in the group of dependent variables. In addition, this implies that these factors have a limited impact but are highly reliant on the development of feasible scenarios for businesses that offer platform services using information technology.

Strengthening R&D centers and motivating researchers (V1).

- ◇ Importance to the national innovation system (V2);
- ◇ Creating knowledge to access different levels of information for the development of entrepreneurship (V3);
- ◇ Development and forecasting of future technologies (V4);
- ◇ The existence of a transparent database to utilize its information for entrepreneurship (V6);
- ◇ The efficiency of the government in administering the country's affairs and implementing laws (V10);
- ◇ Macroeconomic stability and sustainable economic growth (V11)

The indicators below are classified as autonomous variables, indicating that they have a weak influence and low dependence on the factors affecting the development of IT-based platform services.

- ◇ Creating motivation and a culture of innovation in the country (V5);
- ◇ Providing rules for registering industrial designs (V20);
- ◇ Improving the entrepreneurial environment through the establishment of laws (V21);Financing by financial institutions such as banks (V22);
- ◇ Reform the banking system (V23).

The below indicators are included in the group of independent variables, and this means that these factors affecting the development of IT-based platform services have high penetration power but low dependency to some extent.

- ◇ Promotion of monetary and financial policies in the direction of entrepreneurship (V12);
- ◇ Supply and access to financial resources (V13);

◇ Modernization of related national and administrative regulations (V19).

Finally, the following indicators are included in the group of linkage variables and this means that Factors affecting the development of IT-based platform services have high influence and dependence.

◇ Creating appropriate infrastructure (V7);
◇ Implementation of continuous supervision and monitoring to ensure the existence of a suitable space (V8);
◇ The efficiency of the country's legislative system in drafting efficient and transparent laws (V9);
◇ Actual evaluation of business plans (V14);
◇ Economic conditions of society (V15);
◇ Estimating the cost and income of entrepreneurship (V16),
◇ Amendment of tax laws (V17)
◇ Improving research and development activities in domestic markets (V18)

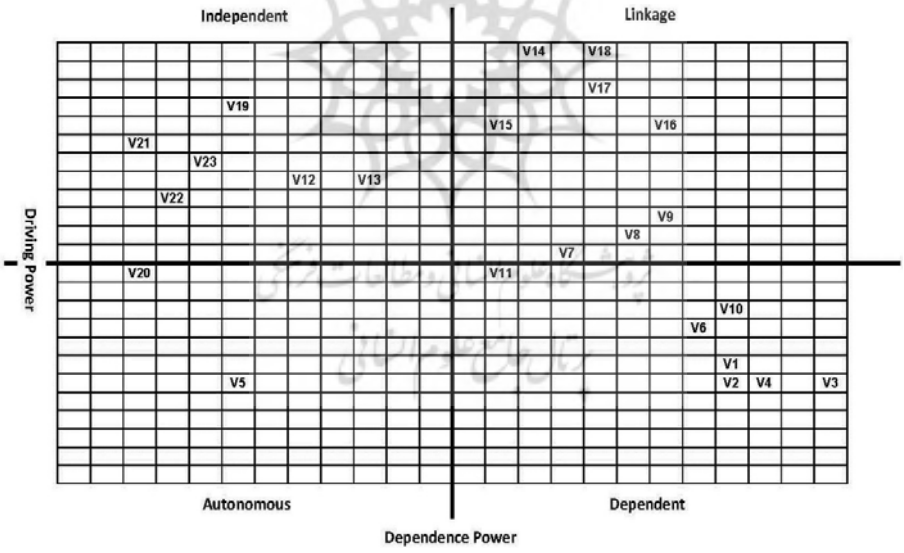

Figure 3. Direct MICMAC Model

5. Discussion and conclusion

This study was conducted to identify the factors that affect the development of IT-based platform services. Studying and reviewing over 50 articles about business

models has revealed that there are various approaches to developing business models. While studying various approaches to business models, we attempted to identify the factors that have the most significant impact on the development of business models, considering the economic, social, and political environmental conditions.

There are some significant questions in the related articles as follows:

- ◇ How can governance in platform ecosystems be socialized? And to what extent?
- ◇ What institutions need to be in place to promote positive behaviors and deter negative interactions?
- ◇ What role do technologies (e.g., blockchains, artificial intelligence) play in facilitating system governance?
- ◇ What are the institutional arrangements that support systemic business model innovation? What tools can facilitate systemic business model innovation?

In studies by McKinsey Global in year 2018, 30 percent of global economic activity ($60 trillion) facilitated mediated by platforms within new digital within a span of in years. time.

When we talk about platform businesses, people often imagine companies like Amazon, eBay, Facebook, and Digikala. But in the age of the digital revolution, there is a growing number of established companies that are seeking a business model that will decrease costs and enhance profit margins.

Choosing a business model that aligns with the global business environment is an essential requirement. However, the political, economic, social, and legal effects of the market should not be neglected.

Although platforms bring new opportunities for value creation, capture, and transfer, most companies will need to figure out how to adopt platforms. How to effectively engage with political, economic, and legal organizations. Gatautis.R (2017).

The present research has examined and identified the factors that affect the development of IT-based platform services in Iran. The results of the research showed that financial, legal, and institutional indicators have an impact on the factors that affect the development of IT-based platform services.

However, many studies emphasize the importance of legal and governmental

issues in platform businesses. Although Iran ranks 13th in the number of internet users in the world, economic conditions caused by sanctions, depreciation of the national currency, inflation, and reduced purchasing power have led to financial resources becoming the most important indicator from the perspective of experts. On the other hand, improving the entrepreneurial environment through the establishment of laws is considered the least important indicator.

Information technology is of critical importance to the strategic success of organizations and serves as a key differentiating factor between high and low-quality performance. According to the research findings, the results of the current study are consistent with the findings of Rafti et al. (2018).

Therefore, based on the results, it is suggested that when developing IT-based platform services, attention should be given to economic factors and conditions. Additionally, the development policy should be adjusted in accordance with financial and economic factors. It is also suggested to provide the necessary infrastructure for companies to develop feasible scenarios in the field of IT-based platform services in order to prepare for the future. It is also suggested that obstacles in the development of plausible scenarios in the field of IT-based platform services should be investigated during future research. To fully understand the changes, we need to familiarize ourselves with them and identify our needs, as well as determine the necessary steps to address them.

Finally, the impact of linkage variables is as follows, which have a high influence and dependence. The impact of IT-based platform services on development can be measured in the following studies.

- ◇ Creating appropriate infrastructure (V7);
- ◇ Implementation of continuous supervision and monitoring to ensure the existence of a suitable space (V8);
- ◇ The efficiency of the country's legislative system in drafting efficient and transparent laws (V9);
- ◇ Actual evaluation of business plans (V14);
- ◇ Economic conditions of society (V15);
- ◇ Estimating the cost and income of entrepreneurship (V16);
- ◇ Amendment of tax laws (V17);
- ◇ Improving research and development activities in domestic markets (V18).

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