

# Designing a model for the success of Iranian startups in the field of information technology

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## Abstract

This paper aims to develop a strategic model for the success of Iranian startups in the field of information technology. This research is qualitative in terms of research methodology, inductive in terms of research approach, pragmatic in terms of the governing paradigm, grounded theory in terms of research strategy, and semi-structured interviews in terms of data collection source. With the help of purposive sampling, 15 individuals were selected as the statistical sample, which was determined based on the saturation rule. In the quantitative section, the statistical population consisted of managers of IT-based service startups in the year 2023, totalling 120 startups. The sample was selected through census sampling due to the limited number of the statistical population, and the final integrated model was obtained using the Interpretive Structural Modeling method. Subsequently, to examine the effect of the identified components in the obtained model, foundational research was conducted in the fall of 2023, collecting descriptive-correlational data for successful and failed startups, in a cross-sectional manner. Given the breadth of the population, to reduce costs and save time, 80 samples were selected from this population based on Cochran's formula and with the help of the logistic regression method. Ultimately, a composite model of the research was obtained. The results of the data analysis showed that the three main dimensions as the primary aspects of failure of startups in Iran are: external environmental factors of the business, internal environmental factors of the business, and factors related to the founders, management team, and human resources. Legal and international limitations, macro governmental policies, and structural and infrastructural factors are among the most important factors of failure for startups in Iran. Additionally, government support leads to financial capability and improved liquidity in startups. Suitable upstream policies and planning that facilitate the business environment can help the success of startups.

Keywords: startup, start-up business, success and failure factors, strategy  
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## 1 Introduction

Entrepreneurship is the pursuit of new opportunities amidst resource constraints, and entrepreneurs must create and offer something new—a solution to a customer's problem that is better or less costly than current options.

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This represents an opportunity. Initially, entrepreneurs do not have access to all the resources—skilled employees, production facilities, capital, etc.—needed to capitalize on this opportunity [24]. Startups are newly established companies in the field of entrepreneurship that are in the stage of understanding the market and finding their final business model. They are usually (but not necessarily) associated with high technology, as their products/services can often be easily produced and replicated [23]. A startup is an organization launched to search for a repeatable and scalable business model [6]. Given the resource scarcity that characterizes a startup, to achieve scalability goals, intangible assets such as knowledge and human capital must necessarily be leveraged [8]. The term "startup" has become commonplace in contemporary policies and public debates. Promoting entrepreneurship through startups is a policy that has high priority worldwide. Every year, 100 million startups begin operations globally [12], profoundly impacting the economies in which they operate. In the new global economy, startups play a key and significant role in the economic development of countries, and the reason for the importance of this subject is their nature in creating employment and economic growth at national, regional, and industrial levels [26]. Startups play an important role in economic growth and job creation, making their support and promotion important for governments. However, there is no consensus on what exactly constitutes a startup [11].

Furthermore, found that startups cause existing companies to behave more efficiently and increase competition and innovation in the market [14]. Therefore, there is an urgent need for governments to strengthen the growth and effectiveness of startups, as this is directly related to economic growth. This urgent need to support startups highlights the question, "What is a startup?" To access and assist these startup entrepreneurs, governments must distinguish a startup from a small business and therefore must have an operational definition of it. While small and medium enterprises (SMEs) are classified based on their annual income, number of employees, and value of fixed assets (less buildings and land), there is a lack of literature showing what a startup is. The message conveyed by these limited and few studies is generally the same; they tend to use different and often single-purpose approaches to define and measure key concepts and relationships. Inconsistency among studies creates a problem of generalizability and weakens their external validity. This issue reduces the impact of the message related to startups on policymakers [25]. Startups have been the focus of researchers and policymakers for several decades. However, the definitions used by them have changed over time. Previous researchers have classified a startup solely based on the novelty of its legal existence. Almost all studies before the 2000s use "new" as the main characteristic. "Creating a completely new company that did not previously exist as an organization. Or a new company is one that "has started production for the first time." "New," with these definitions, includes any newly established company in a specific period except for companies created by a change in name, ownership, location, or legal status [19].

In Iran, given the presence of young and educated people (a significant number of whom are unemployed), launching startups can provide a suitable environment for creating jobs and growing the country in various fields [22]. But how can we increase the chances of success for startups in Iran, considering the existing potential and the many problems caused by sanctions and misguided laws in the way of production and commercialization of products? Moreover, most startups fail in their early years of operation and are eliminated from the business cycle [17]. This raises questions about whether a model can be created that increases the chances of success for these businesses. What are the indicators, components, and dimensions of failure of startups in Iran? What is the extent and conceptual relationship between these factors? Given that more startups are established around the world every year, creating personal jobs does not become easier. Since 9 out of 10 startups fail [3], the importance and necessity of this research becomes even more significant. Addressing the issue of failure and success factors of startups is not only important for the entrepreneurial community of Iran but also for the communities of other countries, as it leads to increased employment rates and the creation of an active and dynamic society. Therefore, the purpose of this research is to present a model for formulating a strategy for the success of IT-based service startups, which is being done for the first time in the entrepreneurial ecosystem of Iran.

The following will examine the history of the formation of startups abroad and inside Iran.

### 1.1 The history of startups in the world

The roots of startups can be traced back to the 18th and 19th centuries in the United States. The first recorded use of the word "startup" was in a newspaper article in 1851. The term was used to describe a new business or company. The concept of a startup took shape in the early 20th century. In the 1920s and 1930s, a number of new businesses were established in the United States. During World War II, the U.S. government heavily invested in research and development. This led to the creation of new technologies that were later commercialized by startups. The modern startup ecosystem began to form in the 1970s and 1980s. This was a period of economic turmoil with high inflation and interest rates. However, it was also a time of opportunity. Several important startups were established during this period, including Apple, Microsoft, and Genentech. The success of these companies inspired others to start their

own businesses. Today, startups are an important part of the global economy. They are responsible for creating new jobs and driving innovation [1]. In the early days of startups, the most important thing was to get the product out the door. This was especially true for technology startups, where the technology was often new and unproven. The focus was on building something that worked and getting it to market as quickly as possible. This meant that many early startups were founded by engineers or developers who were more interested in building something interesting than creating a business. It was not until the late 1990s that the modern startup began to take shape. The first step was the development of new business models that allowed startups to generate revenue from their products. The second step was the increase in venture capital, which provided the necessary funding to turn a good idea into a successful business. The third step was the creation of a new generation of entrepreneurs who were more interested in building a large company than creating a great product. These entrepreneurs understood that a successful startup needed to have a strong team, a vision, and a suitable business model. Today, the chances of success for startups are higher than ever before. But the path to success is still fraught with risk.

## 1.2 The history of startups in Iran

The well-known startups that we all interact with, mostly in the field of information technology, date back to just 8 to 10 years ago. However, the entrepreneurship and startup ecosystem in Iran has an older history, dating back to the 1990s. The plan to create venture capital firms first took shape in companies such as the Industrial Development and Renovation Organization of Iran and supporters of emerging projects like the Center for Advanced Industries. The first companies that emerged were in the field of telecommunications technology, and part of Iran's telecommunications infrastructure was established by these companies in the 70s and 80s of the Persian calendar. Telecommunications and biotechnology were the two main business areas in innovation that formed after the Iran-Iraq war based on the country's needs. In the early 90s, with the emergence of growth centers and accelerators alongside universities, various teams emerged that led to the growth of human resources in Iran's startup ecosystem.

## 2 Literature review

Among the research conducted outside of Iran, according to the study by [21], 9 influential factors have been discussed, which are gender, having a co-founder, age, level of education, having previous experience, need for investment, being a business owner, family support, ease of doing business, and the suitability of the organizational environment. In the research conducted by Baken, the factors of success in order of impact are listed as follows: creativity in the business model, forming credible collaborations and using networks, focusing on a strong commercial case, sustainable leadership, creating new demand, forming an excellent team, government and legislation, attitude (including) ambition, hard work, and inspiration, systemic thinking and the possibility of change in systems, patience and perseverance of the investor, and expectation of long-term profit, speed of reaching the market [6].

According to one definition, a startup is a company that receives funding from an external source, such as investors or a larger company. This investment frees new companies from focusing on short-term profits, allowing them instead to concentrate on innovation, user experience, and growth [7]. The failure of startups has attracted widespread attention, and many researchers are trying to design various forward-looking models to successfully predict the fate of a new company. Some studies have attempted to identify factors leading to success or failure in a new business, and the results of these studies have presented strategies adopted in startups [16].

In a study titled "Investigating Success Factors and Risks in the Pre-launch Phase of Startups," a framework was created that shows startup efforts differ in terms of the entrepreneur's personal characteristics, supporting organization, surrounding environment, and the process by which the new startup is initiated [15] proposed a method for predicting the outcome of launching a business based on key factors such as the amount of financial resources, timing of funding, and factors influencing success and failure at different stages [24]. Conducted research titled "Lack of Core Competencies in Failed Startup Teams." In this study, 50 startups were examined using the Sponsor Competency Model. Researchers analyzed the stories of 50 failed startups published online by their managers. The resulting factors include information search, customer service approach, specialized managerial and technical skills, analytical thinking, and flexibility. In another study, examined 214 technology startups based on the Shell model and developed a new model based on business, organization, product, customer or consumer, and environment factors, which explains the failure of startups [18]. Eisenman, in his book titled "Why Startups Fail," states that a startup fails when its initial investors do not make more money than they invested - or never make any money at all [12]. Studies show that the failure rate of startups is very high, reaching 90% in some industries [4]. In a study conducted [5], the factors of failure of small and medium-sized businesses in Iran were addressed, which include the following: lack of crisis management skills, lack of managerial skills such as (sales, finance, human resources, and team management), changing motivations over

time, having a traditional business perspective, insistence on mistakes, and lack of abilities such as time, knowledge, and experience. In another review, the six main factors of startup failure in Iran are listed in order of importance: insufficient capital, unsuitable team members, inadequate and incorrect market information, wrong business model and insistence on continuing, unsuitable product, intense market competition, weak and incorrect marketing. In another study using the Q-methodology, two patterns were identified for recognizing effective factors. The first pattern includes speed of action, team, collaboration, the essence of the idea, and opportunity assessment, and the second pattern includes customer, competitors, partner, investor, and supports [22]. In another study, factors affecting the survival and growth of startups in Iran were examined, which include timely financial resources, correct identification of market opportunities, understanding customer interests and behavior, business intelligence, innovation, investment in research and development, marketing capabilities, and technology capabilities [24]. Also, in another study on the business excellence model, a data-driven business excellence model was examined based on 5 criteria, which include: management work, enabling factors, market, and people [20]. In another descriptive-survey study, the impact of futurology on innovation in startups was examined and it was determined that futurology has a direct impact as one of the indicators of startups [13]. Finally, in another study, a suitable business model, capital attraction and support, market recognition and management, the founder's managerial ability, product/service features, team characteristics, legal and regulatory issues were stated as the main categories for success and preventing failure in startups [1]. In a study titled "Entrepreneurial Communities and Startup Ecosystem in Iran," examined various factors in the initiation and failure of startups in Iran by surveying 65 technology startups, and the findings show that most startups face challenges in the following order of priority: initial public offering possibility, intense competition with other companies, lack of necessary legal support, lack of intellectual property rights, lack of soft skills, specifically organizational and managerial skills, the gap between technical teams and marketing, and insufficient capacity to meet market demand [9]. A study by Harvard Business School identifies six patterns that commonly lead to startup failure. The research, based on interviews and surveys with founders and investors, challenges the conventional wisdom that failure is solely due to the founding team or business idea. Key patterns include "Bad Bedfellows," where external parties such as employees, strategic partners, and investors play a significant role in a firm's demise, and "False Starts," where startups fail to research customer needs before testing products. Another Research conducted as part of a Master's degree project at NOVA – School of Business and Economics explores the major reasons for startup failures. The study, which surveyed founders of failed startups, identifies critical factors such as poor sales and marketing, non-viable business models, inadequate teams, market problems like lack of traction or too niche markets, and lack of financing. Another study about Failure in the Entrepreneurial shows that addresses the gap in research on business failures by providing a comprehensive framework. It analyzes 74 papers focusing on new ventures' failure to identify the main causes of failure. The review highlights the need for a systematic approach to understanding the entrepreneurial process and the role of failure within it. Another systematic literature review examines 74 papers to identify the main causes of new venture failure. The study categorizes the causes of failure and contributes to the understanding of trends and contributions in the field of startup failure literature. These studies collectively provide a nuanced understanding of the complex factors that contribute to startup failure and success. They emphasize the importance of strategic planning, understanding customer needs, building strong teams, and securing adequate financing as key elements for startup success. For a more detailed exploration of these topics, you can refer to the full articles available in the provided references. This literature review should serve as a valuable resource for anyone interested in the dynamics of startup success and failure.

### 3 Research methodology

This research is qualitative in terms of method; inductive in terms of research approach; pragmatism is the prevailing paradigm; grounded theory is the research strategy; and data were collected through semi-structured interviews. In the qualitative part, deep interviews and coding analysis were used. In the first part, open coding of interview data was performed, and concepts and categories presented in interviews with experts were identified and extracted. In the quantitative section, the statistical population consists of 120 IT-based service startups in the year 1402. Four items were extracted from the questionnaire, which, after open coding and determining the initial indicators of the model, similar extracted codes were grouped into one category or group. The results of open coding showed that 60 sub-categories were identified and extracted, and ultimately, 15 main categories were identified in 3 dimensions including factors related to the external business environment, factors related to the internal business environment, and factors related to founders, management team, and human resources. And subsequently the in this study, a researcher-developed questionnaire was used to collect data. Indeed, considering the identified components of the success model, startup owners were asked to what extent they have paid attention to these components in their startup or have applied them in their trade. Therefore, considering the effective components in the model, 32 questions were designed

for the questionnaire. The questions were divided according to the dimensions of the model into three categories, and each dimension included various components. In addition, in the last question, business owners were asked to specify the status of their business in terms of success or failure in the market. The validity of the questionnaire was confirmed by content method and its reliability was confirmed by calculating Cronbach's alpha. The value of Cronbach's alpha statistic was reported as 0.84, indicating that the questionnaire has satisfactory reliability. With the online questionnaire link sent to business owners, 81 questionnaires were ultimately completed. Finally, with the collection of information, data analysis was performed using descriptive and inferential statistical methods. In the descriptive analysis, a frequency table was used to describe the characteristic of success or failure of startup in the market. In the inferential analysis, using logistic regression modeling, while assessing the effect of the main dimensions of the startup success model and its components on business success, the possibility of calculating the probability of startup success using the identified components was also provided. It is also worth mentioning that SPSS software version 26 was used to perform the statistical data analysis.

Table 1: Results of Open and Axial Coding

Open Code (Subcategories)	Axial Code (Main Category)	Selected Code (Main Factors)
Internet Filtering and Restrictions	Legal and International Limitations	External Business Environment Factors
Economic and Technological Sanctions		
External Business Environment Pressure	Government Macro Policies	
Inappropriate High-Level Policies and Planning		
Society-Governing Relationships	Structural and Infrastructural Factors	
Inadequate Economic Infrastructures		
Ease of Obtaining Licenses	Government Support and Backing	
Copyright Protection Laws		
Government Neglect of Startups	Government Support and Backing	
Cumbersome Laws		
Lack of Support from Responsible Organizations		
Product Development	Product Design and Development	Internal Business Environment Factors
Technology-Based Product/Service Design		
Attractiveness in Startup Products or Services		
Responding to Real Needs in Society		
Market Development	International Level Competition Acceptance	
Commercialization		
Readiness for International Markets	Customer Orientation and Understanding Customer Needs	
Creating Unique Value for Customers		
Increasing Customer Orientation Level		
Attracting and Retaining Customers	Competitiveness and Flexibility in Processes	
Accurate Recognition of Competitive Advantage		
Flexibility		
Innovative Business Marketing	Marketing and Advertising	
Focus on Target Market		
Lack of Integrated Marketing and Branding Activities	Social Responsibility of Business	
Attention to Public Health Issues		
Importance of Environmental Issues	Social Responsibility of Business	
Importance to Eradicate Poverty Globally		
Acting Socially Responsible	Financial Ability and Sufficient Liquidity	
Observing Human Rights		
Attracting Sufficient and Timely Investment	Financial Ability and Sufficient Liquidity	
Low Financial Capability		
Planning for Financial Capability Development		
Liquidity Management Ability	Consumer Rights Compliance	
Financing		
Protection of Customers' Personal Information	Consumer Rights Compliance	
Preserving Individuals' Privacy		
Periodic Performance Evaluation	Management Capability	Factors Related to Founders, Management Team, and Human Resources
Managers' Adequate Knowledge of Customer Needs		
Managers' Adequate Knowledge of the Market		
Internal Business Management		
Confidence in Set Goals	Management Capability	
Resilience of Managers and Founders		
Recognition of Opportunities Ahead		
Recognition of Obstacles and Problems Ahead		
Founder's and Creator's Approach	Founders' Capabilities	
Not Using Consulting Services		
Familiarity with Commercial Law Affairs		
Founders' Non-Technical Expertise		
Founders' Technical Expertise		



Human Resources Training	Factors Related to Human Resources and Their Empowerment
Shortage of Skilled Human Resources	
Employees' Salary Gap Compared to Market Average	
Input to Output Ratio of Workforce	
Human Resources Growth Rate	
Human Resources Retention Rate	
Acceptance of Change	
Empowerment of Human Resources	
Encouraging Teamwork	

In the following, using the Interpretive Structural Modeling (ISM) method, after identifying the indicators, a Structural Self-Interaction Matrix (SSIM) is formed. This matrix is completed by experts and process-oriented specialists [27]. In the next step of this phase, the initial reachability matrix is obtained by converting the structural self-interaction matrix into a binary matrix of zeros and ones. Then, in the third step, the initial reachability matrix must be made consistent. This consistency is achieved by adding secondary relationships that may not exist to the initial reachability matrix. After the matrix is converted into a zero and one matrix, a secondary matrix must be designed. In a received matrix, for assurance, secondary relationships must be checked. This means that if A leads to B and B leads to C, then A must lead to C. Scientifically, by introducing transitivity in the relationships of indicators, the final reachability matrix is obtained. In the fourth step, based on the consistent reachability matrix, the levels of each variable must be determined. The sum of the input and output variables and their intersection is calculated, and in each repeat, if the output variable is equal to the intersection variable, then that iteration is the  $i$ -th level. Then, in the next iteration, the row and column of that variable are removed from the matrix, and the calculations are performed again. To determine the relationships and level of criteria in the ISM structural model, the output set and input set for each criterion must be extracted from the received matrix.

In the next step, based on the consistent reachability matrix, the levels of each variable must be determined. We calculate the sum of the input and output variables and their intersection. In each repeat, if the output variable is equal to the intersection variable, then that iteration is at level  $i$ . Then, in the subsequent iteration, the row and column of that variable are removed from the matrix, and the calculations are performed again. The results are summarized below. To determine the relationships and level of criteria in the Interpretive Structural Modeling (ISM) model, the output set and input set for each criterion must be extracted from the received matrix.

The reachability set (influence or outputs): Includes the criterion itself and the criteria that are influenced by it.  
The antecedent set (affected or inputs): Includes the criterion itself and the criteria that influence it.

Penetration power: The number of elements that element  $i$  influences.

Dependency degree: The number of elements that influence element  $i$ .

In Table 2, the penetration power and dependency degree of the variables are observed. For example, the results show that factors related to human resources and their empowerment have a high dependency on other factors but have little influence on other variables. Also, legal and international limitations have very little dependency on other factors but have a high influence on other factors. The penetration power and dependency degree of other factors are observed in the table.

Table 2: The degree of dependency and the level of influence of the components

Row	components	degree of dependency	level of influence
Component-1	Legal and international limitations	1	14
Component-2	Macro policies of the government	1	11
Component-3	Structural and infrastructure factors	3	10
Component-4	Support from the government	3	8
Component-5	Product design and development	3	7
Component-6	International competitiveness	4	7
Component-7	Customer orientation and recognition Customer needs	5	6
Component-8	Competitiveness and Flexibility in processes	7	7
Component-9	Marketing and advertisements	8	5
Component-10	Social Responsibility	9	5
Component-11	Financial strength and liquidity	7	3
Component-12	Compliance with consumer rights	8	3
Component-13	Management ability	9	3
Component-14	The ability of the founders	11	1
Component-15	The factor of staff and Empowerment of Human Resources	12	1

In the next step, the initial reachability matrix must be made consistent. This consistency is achieved by adding

secondary relationships that may not exist to the initial reachability matrix. After the matrix is converted into a binary matrix of zeros and ones, a secondary matrix must be designed. In a received matrix, for assurance, secondary relationships must be checked. This means that if A leads to B and B leads to C, then A must lead to C. That is, if according to secondary relationships, direct effects should have been considered; but in practice, this has not happened, the table must be corrected to also show the secondary relationship.

Table 3: Initial adapted received matrix

components	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	level of influence
Legal and international limitations	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	14
Macro policies of the government	0	1	1	0	0	1	1	1	1	1	0	1	1	1	1	11
Structural and infrastructure factors	0	0	1	1	1	1	1	0	0	1	1	1	0	1	1	10
Support from the government	0	0	0	1	0	0	1	1	1	1	0	0	1	1	1	8
Product design and development	0	0	0	0	1	0	0	1	1	1	0	0	1	1	1	7
International competitiveness	0	0	0	0	0	1	0	1	1	0	1	1	1	0	1	7
Customer orientation and recognition	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	6
Customer needs																
Competitiveness and Flexibility in processes	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	7
Marketing and advertisements	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	5
Social Responsibility	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	5
Financial strength and liquidity	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	3
Compliance with consumer rights	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3
Management ability	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
The ability of the founders	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
The factor of staff and Empowerment of Human Resources	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
degree of dependency	1	1	3	3	3	4	5	7	8	9	7	8	9	11	12	

In the final step for determining the relationships and level categorization of criteria in the Interpretive Structural Modeling (ISM) framework, the output and input sets for each criterion from the received matrix must be extracted. If there is a relationship between two variables  $i$  and  $j$ , it is indicated by a directed arrow. The final diagram is created by removing transitive states and also using the segmentation of the obtained levels [10]. It is shown in Figure 1.

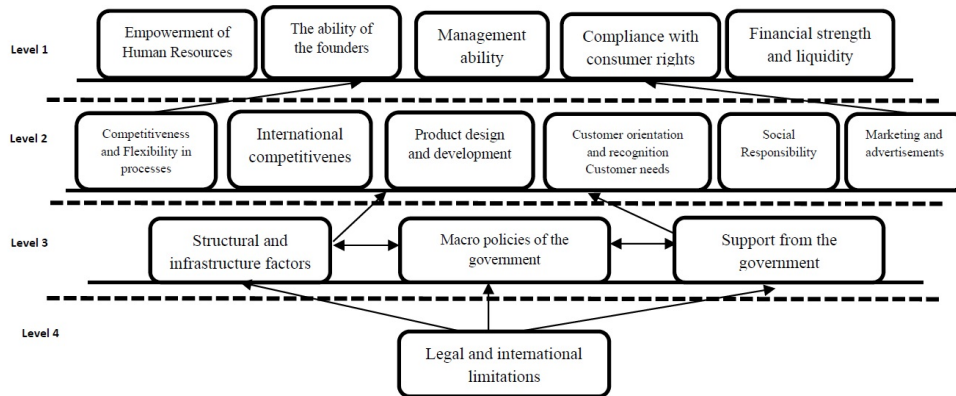


Figure 1: The final interpretive structural diagram

In the success model of IT-based startups, the capabilities of the founders and human resources, the external environment, and the internal business environment form the three main dimensions of the model, and of course, each dimension includes several sub-components. Therefore, to examine the effect of these dimensions and their components on business success, logistic regression was used to predict the probability of business success. Logistic regression is used to evaluate the effect of predictor variables on a binary response variable (success or failure of businesses in the market). Considering the main dimensions and their sub-components in the startup success model, logistic regression modeling was generally performed in 5 scenarios. In the first scenario, the three main dimensions were considered as predictor variables, and the logistic regression model was fitted to the data. In the second, third and fourth scenarios, the dimensions were considered separately, and modeling was done by considering the sub-components of each dimension as predictor variables. In the fifth scenario, a general model was fitted to the data by considering the sub-components as predictor variables; in fact, in this scenario, the sub-components were entered into the model together without being separated into the three main dimensions. Since some of the predictor variables were not significant even at the 10 percent error level in fitting the regression model, after screening and removing the mentioned variables, the logistic regression model was refitted to the data. Table 5 shows the results from fitting the final logistic regression model, which displays the 5 scenarios of modeling separately. This table reports the estimated regression coefficients and their significance levels. According to the results in the table, all coefficients are significant at the 10 percent error level.

It was mentioned that in the first scenario, the three main dimensions are present as predictor variables in the model and their effect on business success is evaluated. According to the output of Table 5, the results of logistic regression modeling show that, unlike other dimensions, the internal business environment dimension is significant at the 5 percent error level, meaning this variable has been effective in business success. Therefore, in this case, the probability of business success can be predicted based on the predictor variable (internal business environment) using the logistic regression equation. According to the results in Table 5, the logistic regression model was extracted as follows:

$$\pi(x_3) = \frac{e^{-10.79+3.21x_3}}{1 + e^{-10.79+3.21x_3}} \quad (3.1)$$

In the second, third and fourth scenarios, each dimension was considered separately, and the logistic regression model was extracted for each dimension individually. According to the results in Table 5, in the second scenario, the regression model was fitted to the data considering the components of the first dimension (ability of founders and human resources) as predictor variables. In the third scenario, the components of the second dimension (external business environment) were considered as predictor variables, and modeling was performed. In the fourth scenario, modeling was done by considering the components of the third dimension (internal business environment) as predictor variables. Now, according to the results in Table 5, in the second scenario, the components of human resource ability and management ability are significant variables in the model. In the third scenario, two components, the macro government policies and support laws, are significant variables that have been effective in business success. In the fourth scenario, the components of consumer rights, customer orientation, understanding customer needs, and social responsibility are three predictive variables that have become significant in the final model. Therefore, considering the results in Table 5, for each scenario, the probability of business success can be calculated separately based on the significant predictor variables using the logistic regression equation. The final logistic regression model results for all three scenarios were extracted separately as follows:

Second scenario (considering the sub-components of the first dimension as predictor variables);

$$\pi(H) = \frac{e^{-10.50+1.004a_2+1.624a_3}}{1 + e^{-10.50+1.004a_2+1.624a_3}} \quad (3.2)$$

Third scenario (considering the sub-components of the second dimension as predictor variables);

$$\pi(H) = \frac{e^{0.817b_1-1.145b_2}}{1 + e^{0.817b_1-1.145b_2}} \quad (3.3)$$

Fourth scenario (considering the sub-components of the third dimension as predictor variables);

$$\pi(H) = \frac{e^{-10.22+0.77c_2+1.25c_4+0.81c_7}}{1 + e^{-10.22+0.77c_2+1.25c_4+0.81c_7}} \quad (3.4)$$

In the fifth scenario, to directly evaluate the effect of the sub-components on business success, the separation of them into the three dimensions was disregarded. Therefore, in this case, all sub-components were considered as predictor variables, and ultimately, the logistic regression model was simultaneously extracted. According to the results in Table 5, in this scenario, the components of human resource ability, macro government policies, government support laws, consumer rights, and social responsibility became significant. In other words, among all the sub-components, only these five components had a significant relationship with the dependent variable (business success). Thus, in this case, the probability of business success can be predicted based on the significant predictor variables using the logistic regression equation. The final logistic regression model results were extracted as follows:

$$\pi(H) = \frac{e^{-17.004+1.26a_2+1.72b_1-1.74b_2+2.02c_2+0.997c_7}}{1 + e^{-17.004+1.26a_2+1.72b_1-1.74b_2+2.02c_2+0.997c_7}} \quad (3.5)$$

It is worth mentioning that in assessing the adequacy of the model, the Hosmer-Lemeshow test and the Omnibus test were used for all models. The results of the Hosmer-Lemeshow test examine the hypothesis that the observed values are close to the expected values. Given that the significance value of this test for all models was more than 0.05; this hypothesis was confirmed in assessing the adequacy of all five models. Therefore, the results showed that the logistic regression models were suitable for fitting to the data, and the observed values did not differ significantly from the expected values (values obtained from the model). In addition, in the Omnibus test assessment, the significance value for all models was reported to be less than 0.05, indicating that this test was also significant and the adequacy of all five models has been confirmed.



Table 4: The characteristics of success and failure of businesses in this study are expressed based on frequency and percentage of frequency

Startups status	Frequency	Frequency percentage
Successful startups	30	37%
Failed startups	51	63%
Total	81	

Table 5: The results obtained from fitting the final logistic regression model in 5 different scenarios after the removal of non-significant variables. (Note: The significance levels are indicated as follows: \*\*\* $p < 0.001$ , \* $p < 0.01$ , \*\* $p < 0.05$ .)

Model number	Parameter	Abbreviation	Coefficient	Significance Level
Scenario 1	Constant value	—	-10.79	0.000***
	Internal business environment	$x_3$	3.21	0.000***
Scenario 2	Constant value	—	-10.5	0.000***
	Human resource capability	$a_2$	1.004	0.039**
	Management capability	$a_3$	1.624	0.004***
Scenario 3	Macro policies and regulations	$b_1$	0.817	0.001***
	Government support laws	$b_2$	-1.145	0.000***
Scenario 4	Constant value	—	-10.122	0.000***
	Consumer rights compliance	$c_2$	0.77	0.013**
	Customer orientation and understanding customer needs	$c_4$	1.25	0.010**
	Social responsibility	$c_7$	0.81	0.074*
Scenario 5	Constant value	—	-17.004	0.001***
	Human resource capability	$a_2$	1.26	0.076*
	Macro policies and regulations	$b_1$	1.72	0.005***
	Government support laws	$b_2$	-1.74	0.000***
	Consumer rights compliance	$c_2$	2.02	0.008***
	Social responsibility	$c_7$	0.997	0.019**

In Figure 2, considering the results and findings of the study, a schematic model was drawn based on the relationships between the predictor variables and the response variable. In this model, the relationships of the main dimensions of the business success model and their subcomponents with business success are depicted, taking into account the significance of the logistic regression coefficients.

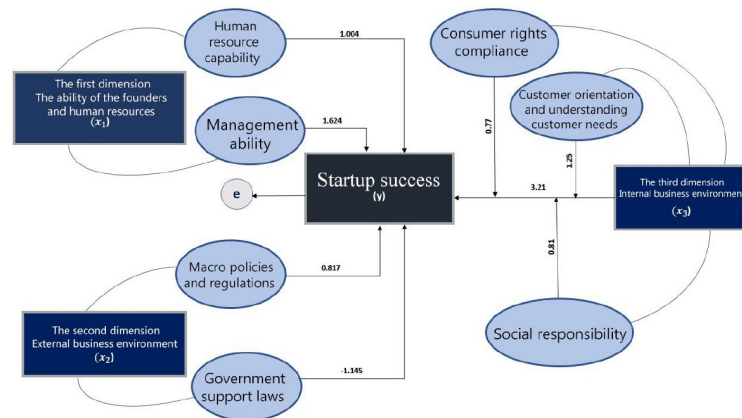


Figure 2: The schematic model of the relationships between the predictor variables and the response variable is drawn based on the value of the logistic regression model coefficient.

Based on the presented model, startup success can be depicted as a three-dimensional model, which includes: the internal environment, the external environment, and the ability of the founders and human resources. Among these dimensions, it can be generally understood that startup performance, 'team,' and 'the impact of society and policymaking' can be associated with the organizational dimension of startup success.

## 4 Discussion and conclusion

Since this research aimed to present a model for the success of startups, the data analysis results indicate that there are three main dimensions as the primary aspects of the failure of emerging businesses in Iran. These dimensions

are external business environment factors, internal business environment factors, and factors related to founders, management teams, and human resources. Legal and international limitations, macro policies of government, and structural and infrastructural factors are among the most important factors of startups failure in Iran. Additionally, government support, product design and development, international competitiveness, and flexibility in processes are the next level of influence on the success or failure of startups in Iran. Legal and international limitations, as the most significant factor of failure, have a direct relationship with macro policies of government, structural and infrastructural factors, and government support and backing. International competitiveness has a reciprocal relationship with product design and process flexibility. Moreover, government support and backing lead to financial capability and improved liquidity in startups, which, with better financial status, can lead to appropriate product design and company growth. Suitable upstream policies and planning that facilitate the business environment can help the success of startups. In research conducted over the past years, researchers have examined entrepreneurial ecosystems, and their findings show results similar to the present study, including the research titled "Entrepreneurial Communities and Startup Ecosystem in Iran." They identified four main dimensions of financial discussions, human resources, government support and infrastructure, and other reasons including human skills and customer needs as the dimensions of startup failure, which is consistent with the content of this research. Among the domestic research that has examined the factors of failure and success of startups, the research titled "Investigating the Factors Affecting the Failure and Success of Startups in Iran with a Constructivist Grounded Theory Strategy" can be mentioned, which shows that factors, an appropriate business model, capital attraction and government support, market recognition and management, founder's management ability, product/service characteristics, team characteristics, legal and regulatory issues are the main categories for success and preventing the failure of startups, which is very consistent with the results of the present research [2]. Considering the final model, in the first dimension, the model coefficients for both the human resource ability and management ability components have been reported positive, indicating that these two factors have a positive and significantly strong relationship with the dependent variable, namely startup success. In other words, the positive coefficients of the variables in this model indicate that both factors have had a direct relationship with startup success.

According to the model results in the second dimension, the coefficient of the macro laws and policymaking component has been reported positive, indicating a direct relationship between this factor and startup success. Whereas, the coefficient of the government support laws has been negative, this according to the results suggests a negative and significantly strong relationship between this factor and startup success.

Considering the model results in the third dimension, all three factors of consumer rights compliance, customer orientation, and social responsibility have had a positive and significant relationship with startup success. Indeed, the positive coefficients indicate that all three factors have a direct relationship with the startup success variable.

Overall, considering the output of the logistic regression model, the regression coefficients for the components of human resource ability, macro laws and policymaking, consumer rights compliance, and social responsibility have been reported positive, indicating a positive and significant relationship between these factors and startup success. While the regression coefficient for the government support laws has been reported negative, indicating a negative and significant relationship between this factor and the dependent variable of the research.

#### 4.1 Suggestion

Considering the research model, appropriate economic infrastructure is a factor for the success or failure of startups, and it is recommended that the government allocate a suitable budget for the improvement and enhancement of economic infrastructures. Ease of obtaining licenses and supportive copyright laws can aid the success of startups, and it is suggested that the process of granting licenses to businesses be reviewed and facilitated. It is also recommended that business support laws such as copyright law be drafted and implemented with comprehensive and full support. It is suggested that future research should test the research model for two different industries and conduct a comparative analysis between them, to expand the scope of the research and reveal the differences in factors affecting different industries.

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