Journal of
Value Creating in Business Management
https://www.jvcbm.ir

Volume 4, Issue 4, Winter 2024, Pages 43 to 70

Original Article (Qualitative)

eISSN: 2980-8359

The relationship between factors affecting the development of industrial startups using methodology Fuzzy cognitive mapping

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Receive:
29 February 2024
Revise:
09 June 2024
Accept:
21 July 2024

Keywords:
Startups,
Industrial startups,
Development Competencies,
Startup brand

Abstract

The purpose of this research is the relationship between the factors affecting the development of industrial startups using fuzzy cognitive mapping methodology. According to its purpose, the research method is applicable, and in terms of implementation, it is …. The statistical population of the research includes 19 professional experts in industrial startups, including senior managers and their collections, and the sampling was done in a targeted manner, and the interviews continued until reaching theoretical saturation. The data collection tool is a semi-structured interview. To collect data, fuzzy Delphi technique was used to identify the components, and fuzzy cognitive mapping method was used to present the model. The results of the analysis showed that the main factors affecting the development of industrial startups include eleven variables: development competencies, human resources competencies, the organization's needs for development, attracting and retaining elites, startup brand, creating suitable opportunities, the development of elite skills, economic conditions, customer satisfaction, startup progress, and development culture. Then using the methodology of fuzzy cognitive maps, the way of relationship between these factors was explained accordingly.

Please cite this article as (APA): Naghibi, M., Valmohammadi, C., Fathi Hefeshjani, K., & Modiri, M. (2025). The relationship between factors affecting the development of industrial startups using methodology Fuzzy cognitive mapping. *Journal of value creating in Business Management*, *4*(4), 43-70.

https://doi.org/10.22034/jvcbm.2024.446306.1330

Publisher: research centre of resources management studies and knowledge-based business

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Value Creating in Business Management
https://www.jvcbm.ir
Volume 4, Issue 4, Winter 2024, Pages 43 to 70

Extended Abstract

Introduction

Knowledge and innovation are the most fundamental factors of progress in the economic and industrial fields. Transitioning from an economy dependent on primary industries and relying on the sale of raw and low-processed materials is possible only through the path of innovative economy and the production of innovative ideas (Abdollhi et al, 2020). Schumpeter mentions the importance of startups as the main drivers of economic development, industrial evolution, and innovation; because they are transformed into commercial products to create innovative ideas. Startup emerges as an entrepreneurial investment for a new business as a new company. However, to launch and develop these companies, they need to evaluate and analyze and develop their idea (Sunanda, 2017). Mazo Kato states in his book "Entrepreneurial Government" that it is the forward-looking policies of the government that can lead to the emergence of very successful companies such as Google, Apple, etc. He also states that most of the successful American startups benefited from government support in the early stages of their growth (Mazocato, 2018). The government can be influential in the development process of startups in various ways, such as creating science and technology parks, growth centers, amending regulations, financial aid, etc. (Sultana, 2015). Today, successful technology startups have become the growth engine of the information economy and the Internet economy, and the recent development of startup ecosystems around the world will have significant consequences for the future of the global economy. An important challenge that companies are dealing with in the blue ocean is to be able to find untapped markets, which means that when companies are competing on price, the best option is to focus on improving quality. (Ligonenko et al, 2021) In fact, by focusing on increasing quality, they form their strategy in a blue ocean, which can further lead to making an outstanding brand, or a special product (Gupta et al, 2016). Government policies and weakness in policymaking, despite efforts and valuable measures, are still challenges for the growth of industrial startups. Technical infrastructure is also one of the challenges faced by startups in the country. Startups play an essential role in reducing the unemployment crisis and economic growth of countries (Mirzadeh et al, 2021). Considering the above, the main question of the research is as follows: What is the relationship between the factors affecting the development of industrial startups using fuzzy cognitive mapping methodology?

Theoretical Framework

Startups

Startup is "a business that is mainly technology-oriented and has a very high growth and development potential (Karimi & Lalbar, 2023). Startups are usually small companies that enter the market using innovation and new ideas. They are formed to solve a problem or offer a new product or service. Startups may be new or have been operating for several years. There are various fields for startups, including technology, health, food, environment, etc. These companies may use investments for rapid growth and further development process. They are small and emerging companies that start their activities with the aim of developing and growing a service product or a new idea. These companies usually start with limited financial resources and small teams and seek rapid growth and development in the market (Konomi, 2022).

Tabatabai Asl (2023) in a research entitled creating service and product innovation in startup companies concluded that an efficient business model strongly encourages product adopter innovation but strongly discourages disruptive product innovation. Furthermore, the analysis shows that the firm's disruptive technological capability strengthens the positive relationship between new business model and disruptive product innovation, but weakens the positive

relationship between design efficiency and discretionary innovation. Besides, they found that disruptive technological capability strongly encourages blockchain-based entrepreneurial firms to favor disruptive product innovation over selective product innovation.
Almasi et al, (2021) in a research entitled providing a combined data mining model to investigate the failure or success of Iranian startups by choosing characteristics and classification, concluded that the type of idea industry, creativity and skill of people, innovation, and type investors have a great impact on the success or failure of Iranian startups.

Research methodology

According to its purpose, the research method is applicable, and in terms of implementation, it is …. The statistical population of the research includes 19 professional experts in industrial startups, including senior managers and their collections, and the sampling was done in a targeted manner, and the interviews continued until reaching theoretical saturation. The data collection tool is a semi-structured interview. To collect data, fuzzy Delphi technique was used to identify the components.

Research findings

Fuzzy Delphi method was used in data analysis, and fuzzy cognitive mapping method was used to present the model. The results of the analysis showed that the main factors affecting the development of industrial startups include eleven variables: development competencies, human resources competencies, the organization's needs for development, attracting and retaining elites, startup brand, creating suitable opportunities, the development of elite skills, economic conditions, customer satisfaction, startup progress, and development culture. Then using the methodology of fuzzy cognitive maps, the way of relationship between these factors was explained accordingly.

Conclusion

The current research was conducted with the purpose of the relationship between the factors affecting the development of industrial startups using fuzzy cognitive mapping methodology. The results of this research are in agreement with the results of Aghazadeh et al, (2023), Tabatabai Asl (2023), Almasi et al, (2021), Maruti Sharifabadi (2019), Mirghaderi et al, (2023), Van Opstal et al, (2023), Kanishchenko & Kuznetsova (2020), Krienbuehl (2020), Valmohammadi et al, (2020), Chaus (2020), Adhari (2020), Feng et al, (2019), Smith & Guerrero (2019), Anthony (2019), Rocha et al, (2019), Muhammad Handayani et al, (2019), DEHBASTEH et al, (2019), Kofanov & Zozulov (2018), and Poliakova (2017). Van Opstal et al, (2023) showed that younger startup entrepreneurs tend to focus on inner circle strategies, while older startup entrepreneurs prefer to engage in outer circle strategies or no circular strategy at all. Female startup entrepreneurs are less inclined to combine multiple circular strategies, and the business-to-business and business-to-government market segments are leading circular business models. Circular startups mostly embrace sustainability and circularity as a comparative advantage, and startup entrepreneurs with an immigrant background seem to be more optimistic about starting a profitable circular business. The results show that there is no such thing as a “circular economy startup”, so policymakers are advised to develop tailored solutions to support startups implementing different circular strategies.
According to the results of the research, the following suggestions are provided:
Use business plans to make a lot of profit. The business plan for the development of startups can fulfill many purposes, including drawing business models, predicting problems, and even

attracting investors. Having a plan is a good guide to help your company stay on track and focus on goals.

The development of startups has a direct relationship with well-organized and optimized advertising. As long as you can choose the best advertising methods, you can hope for the expansion of your startup. Optimized advertising means that you can get the most audience at the lowest cost. Today, the use of e-mail marketing, using virtual networks, and influencers has much more feedback than traditional marketing such as billboard and tract ads.