

Original Article

Success Factors for Business Incubators in Saudi Arabia: An ISM-Based Investigation

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Abstract: In this study, interpretive structural modeling (ISM) is used to examine the success variables for business incubators in Saudi Arabia. A thorough literature review process was used to identify and analyse some key success factors, which included funding accessibility, distinct performance indicators, efficient entrance and exit procedures, the suitability of services, an entrepreneurial culture, seasoned management teams, intellectual property rights, the incubator's location, marketing and commercialization efforts, and relationships with other organisations. The hierarchical linkages and prioritisation of these factors were discovered by the ISM analysis. The results offer insightful information for entrepreneurs, stakeholders, and policymakers to improve the performance of business incubators in Saudi Arabia.

Keywords: Business incubators, Saudi Arabia, Success factors, Interpretive structural modeling (ISM).

I. INTRODUCTION

Business incubators have gained significant attention as vital catalysts for entrepreneurship and economic development in countries worldwide (Li et al., 2018; Souitaris et al., 2007). These organizations provide a nurturing environment that supports the growth and success of early-stage ventures by offering various resources, including physical space, mentorship, networking opportunities, and access to funding (Hackett and Dilts, 2004; Ismail et al., 2018). Saudi Arabia, as a rapidly developing economy, recognizes the importance of nurturing and supporting entrepreneurial endeavors to diversify its economy and promote innovation (Al-Hawari et al., 2017; Al-Mubarak et al., 2019).

To foster the growth of startups and entrepreneurial ventures, the Saudi Arabian government and various organizations have established business incubators across the country (Al-Mubarak et al., 2019; Al-Shehri et al., 2020). These incubators aim to provide a supportive ecosystem that helps entrepreneurs overcome challenges and enhance their chances of success (Othman et al., 2019). However, the effectiveness of these incubators relies on understanding the specific success factors that contribute to their optimal functioning.

This study's objective is to use interpretive structural modeling (ISM) to look into the aspects that contribute to business incubators' performance in Saudi Arabia. Policymakers, stakeholders, and business owners can obtain important insights on how to best create and run business incubators in the nation by identifying and analysing these aspects (Al-Hawari et al., 2017; Al-Mubarak et al., 2020). By promoting economic growth, innovation, and job creation, this study will improve Saudi Arabia's entrepreneurial ecosystem.

The Saudi Vision 2030 is a strategy plan that seeks to diversify the Saudi Arabian economy and change the country's reliance on oil by lowering oil dependence (The Council of Economic and Development Affairs, 2016). This study is in line with that plan. Business incubators are essential to accomplishing the goals of this vision because they offer the infrastructure and assistance startups and entrepreneurs need to succeed (Al-Hawari et al., 2017; Al-Shehri et al., 2020).

To maximise their contribution to the entrepreneurial ecosystem, it is necessary to evaluate the success determinants for business incubators in Saudi Arabia. By employing an interpretive structural modelling methodology, this study intends to close this research gap, empowering policymakers, stakeholders, and business owners to make well-informed decisions on the creation and management of business incubators. By doing so, the study will help foster economic growth, promote innovation, and create employment opportunities in Saudi Arabia.

II. LITERATURE REVIEW

Numerous academics have looked into the significance of the success variables for business incubators in the Saudi Arabian environment. In a study on business incubation and economic development in Saudi Arabia, Siddiqui et al., (2021) identified 10 crucial success characteristics that support the optimal operation of business incubators in the nation. These



variables include the incubator's location, its marketing and commercialization efforts, its relationships with other incubators, the clarity of its performance indicators, the suitability of its services, the culture of entrepreneurship, the management teams' experience, the availability of funding, and its entrance and exit procedures.

Accessibility to funding is a crucial success factor for business incubators, as it provides startups with the necessary financial resources to develop their ideas and scale their businesses (Amezcuca et al., 2013). Clear performance indicators allow incubators to assess the progress and growth of incubated ventures, ensuring their alignment with predefined goals (Hackett & Dilts, 2004). Effective entrance and exit processes facilitate the seamless integration of startups into the incubator and the successful transition of graduated ventures into the market (Mian & Watkins, 2016).

The suitability of services offered by the incubator plays a vital role in meeting the diverse needs of incubated ventures, providing them with mentorship, infrastructure, networking opportunities, and access to specialized resources (Alsheikh, 2009). An entrepreneurship culture within the incubator fosters a supportive environment that encourages innovation, risk-taking, and collaboration among entrepreneurs (Mian & Watkins, 2016).

Experienced management teams are crucial for providing guidance, mentorship, and strategic support to incubated ventures, leveraging their expertise to navigate challenges and maximize success (Hackett & Dilts, 2004). Intellectual property rights protection is essential for encouraging innovation and safeguarding the intellectual assets of incubated ventures (Acs et al., 2013). The location of the incubator influences the accessibility, connectivity, and support available to the incubated startups, with proximity to relevant networks, markets, and resources playing a significant role in their success (Mian & Watkins, 2016).

Marketing and commercialization strategies are critical for promoting and positioning incubated ventures in the market, enhancing their visibility, and attracting potential customers and investors (Alsheikh, 2009). Finally, building relationships and networking within the incubator ecosystem facilitates knowledge sharing, collaboration, and access to resources, creating a supportive network for incubated ventures (Hackett & Dilts, 2004).

According to the literature analysis, these success characteristics offer a thorough grasp of the essential components required for Saudi Arabian business incubators to succeed. To better understand their hierarchical relationships and relative relevance in the context of Saudi Arabia, it is necessary to further analyse and rank these aspects utilising an ISM-based analysis. This study attempts to close this knowledge gap and add to the body of knowledge about company incubation in Saudi Arabia.

III. MATERIALS AND METHODS

An intensive literature research approach was carried out to determine the success determinants for business incubators in Saudi Arabia. The screening of literature from scientific databases, including journal articles and conference proceedings, was done in a methodical manner. The literature search utilized keywords such as "business incubators," "success factors," "Saudi Arabia," "interpretive structural modeling (ISM)," and "entrepreneurship." The inclusion criteria comprised studies that focused on business incubation and identified specific success factors relevant to the Saudi Arabian context.

The identified literature provided a comprehensive overview of the success factors for business incubators, particularly in relation to the Saudi Arabian context. The next step involved extracting the success factors and compiling them for further analysis. These success factors included accessibility to funding, clear performance indicators, effective entrance and exit processes, the suitability of services, entrepreneurship culture, experienced management teams, intellectual property rights, the location of the incubator, marketing and commercialization, and relationship and networking of the incubator.

To explore the relationships among these success factors and model their dependencies, an interpretive structural modeling (ISM) approach was employed. This approach is widely utilized in research to uncover hierarchical structures and analyze relationships among factors (Kannan et al., 2008; Mandal & Deshmukh, 1994). The ISM analysis was conducted in several steps, as follows:

1. Based on the criteria from the literature review that were extracted, list the set of success factors that will be researched.
2. Identify the contextual relationships among the success factors using symbols such as "V" (leading to), "A" (led by), "X" (mutual influence), and "O" (no relationship).
3. Create a structural self-interaction matrix (SSIM) to show the contextual interactions between the success criteria in pairs.
4. Form the initial reachability matrix (IRM) based on the data entries of the SSIM, following the replacement rules for each symbol.
5. Apply a transitivity test on the IRM to form the final reachability matrix (FRM) and determine the levels of the success factors through the development of the partition matrix (PM).

6. Categorize the success factors into linkages, dependents, drivers, and autonomous factors based on the FRM and PM.
7. Prioritize the success factors into the identified levels and structure the final ISM model accordingly.
8. The data collection method involved experts with a range of experiences in entrepreneurship, business management, industrial and mechanical engineering, energy efficiency, and successful entrepreneurial enterprises. These experts participated in confirming the extracted success factors and providing valuable insights and analogies to contribute to the modeling process.

The ISM analysis facilitated the exploration of the hierarchical relationships and prioritization of the success factors for business incubators in Saudi Arabia. The findings of the ISM-based investigation will be presented and discussed in the subsequent sections of this study.

IV. RESULTS AND DISCUSSION

The seven steps of the ISM application were followed to accomplish the study's goals. First, Table 1 presents the lengthy literature review process's list of success determinants for business incubators in Saudi Arabia. These success factors include accessibility to funding, clear performance indicators, effective entrance and exit processes, the suitability of services, entrepreneurship culture, experienced management teams, intellectual property rights, the location of the incubator, marketing and commercialization, and relationship and networking of the incubator.

Table 1: Most success factors for BIs in Saudi Arabia

CSFs for BIs	Acronym
Accessibility to funding	BIF1
Clear performance indicators	BIF2
Effective entrance and exit process	BIF3
The suitability of services	BIF4
Entrepreneurship culture	BIF5
Experienced management teams	BIF6
Intellectual property rights	BIF7
Location of the incubator	BIF8
Marketing and commercialisation of incubator	BIF9
Relationship and networking of the incubator	BIF10

The contextual linkages among the success criteria were also identified by a panel of specialists with varied backgrounds in entrepreneurship, business management, and successful ventures. The structural self-interaction matrix (SSIM) was created as a result of this procedure, as shown in Table 2. The SSIM serves as a foundation for modelling the interactions using ISM by illuminating the pair-wise contextual linkages between the researched success variables.

Table 2: The structural self-interaction matrix (SSIM).

BIFs	BIF10	BIF9	BIF8	BIF7	BIF6	BIF5	BIF4	BIF3	BIF2	BIF1
BIF1	A	A	A	V	A	A	A	A	A	
BIF2	V	V	V	V	A	V	V	V		
BIF3	O	O	A	V	A	O	X			
BIF4	O	O	A	V	A	O				
BIF5	O	X	A	O	A					
BIF6	V	V	V	V						
BIF7	O	O	O							
BIF8	O	V								
BIF9	X									
BIF10										

Thirdly, following the replacement rules presented earlier, the initial reachability matrix (IRM) was formed based on the SSIM, as presented in Table 3. The IRM captures the initial relationships between the success factors, highlighting whether one factor leads to the existence of another or if there is a mutual influence or no relation.

Table 3: The initial reachability matrix (IRM).

	BIF1	BIF2	BIF3	BIF4	BIF5	BIF6	BIF7	BIF8	BIF9	BIF10
BIF1	1	0	0	0	0	0	1	0	0	0
BIF2	1	1	1	1	1	0	1	1	1	1
BIF3	1	0	1	1	0	0	1	0	0	0
BIF4	1	0	1	1	0	0	1	0	0	0
BIF5	1	0	0	0	1	0	0	0	1	0
BIF6	1	1	1	1	1	1	1	1	1	1
BIF7	0	0	0	0	0	0	1	0	0	0
BIF8	1	0	1	1	1	0	0	1	1	0
BIF9	1	0	0	0	1	0	0	0	1	1
BIF10	1	0	0	0	0	0	0	0	1	1

The IRM was then subjected to the transitivity rule in order to guarantee the relationships' logical coherence. This involves determining if the existence of one success factor precedes the existence of another and, if so, whether it then precedes the existence of other success factors. The transitivity rule was used to create the final reachability matrix (FRM), which is shown in Table 4. The FRM represents the hierarchical relationships among the success factors, with (*) indicating the entries that were converted from 0 to 1 during the transitivity test.

Table 4: The final reachability matrix (FRM).

	BIF1	BIF2	BIF3	BIF4	BIF5	BIF6	BIF7	BIF8	BIF9	BIF10	Driving Power
BIF1	1	0	0	0	0	0	1	0	0	0	2
BIF2	1	1	1	1	1	1	1	1	1	1	10
BIF3	1	0	1	1	0	0	1	0	0	0	4
BIF4	1	0	1	1	0	0	1	0	0	0	4
BIF5	1	0	0	0	1	0	1	0	1	1	5
BIF6	1	1	1	1	1	1	1	1	1	1	10
BIF7	0	0	0	0	0	0	1	0	0	0	1
BIF8	1	0	1	1	1	0	1	1	1	1	8
BIF9	1	0	0	0	1	0	1	0	1	1	5
BIF10	1	0	0	0	1	0	1	0	1	1	5
Dependence power	9	2	5	5	6	2	10	3	6	6	

The reachability set, the antecedent set, and the interaction set were then divided into three primary sets in order to define the levels of all success variables in the structural model. The success factors that each factor reaches are all shown in the reachability set, illustrating how they interact with one another. The set of factors that lead to a certain success factor is represented by the antecedent set, illustrating how they have an impact on it. The interaction set displays the variables that cross over in the reachability and antecedent sets, indicating that they can be disregarded from further level assignment consideration. Iterations were carried out on each created partition matrix (PM) based on this process of elimination and level assignment until all factors were used up and levels were established. The application of this algorithm resulted in five iterations, classifying the success factors into five levels (Level I-Level V), providing valuable insights into their hierarchical relationships and relative importance for the success of business incubators in Saudi Arabia, as shown in Table 5.

Table 5: Reachability matrix into different levels

	Reachability set	Antecedent set	Intersection	Level
BIF1	1	1,2,3,4,5,6,8,9,10	1	2nd
BIF2	2,6	2,6	2,6	5th
BIF3	3,4	2,3,4,6,8	3,4	3rd
BIF4	3,4	2,3,4,6,8	3,4	3rd
BIF5	5,9,10	2,5,6,8,9,10	5,9,10	3rd
BIF6	2,6	2,5	2,5	5th
BIF7	7	1,2,3,4,5,6,7,8,9,10	7	1st
BIF8	8	2,6,8	8	4th
BIF9	5,9,10	2,5,6,8,9,10	5,9,10	3rd
BIF10	5,9,10	2,5,6,8,9,10	5,9,10	3rd

The findings of the ISM analysis in this study, which classified the success criteria for business incubators in Saudi Arabia into distinct levels, are depicted in Figure 1 and offer significant new information. According to their respective relevance and interdependencies, the success criteria were grouped.

Intellectual property rights become a crucial success factor at the initial level. This emphasizes the significance of safeguarding intellectual property and promoting innovation within the incubator environment.

Moving to the second level, accessibility to funding is identified as a key success factor. This highlights the importance of ensuring that incubated businesses have access to financial resources and investment opportunities to support their growth and development.

The third level encompasses several critical success factors. The effective entrance and exit process ensures a streamlined and supportive mechanism for businesses entering and leaving the incubator. The suitability of services focuses on providing tailored and relevant support services to incubated ventures, aligning their specific needs and requirements. Entrepreneurship culture emphasizes the creation of an environment that fosters an entrepreneurial mindset, encouraging innovation, risk-taking, and collaboration among incubated entrepreneurs. Additionally, the marketing and commercialization of incubators play a crucial role in attracting potential entrepreneurs, investors, and stakeholders, while relationship building and networking opportunities within the incubator foster collaboration and synergistic partnerships among incubated ventures.

The fourth level highlights the significance of the location of the incubator. The strategic selection of a favorable location can provide access to necessary resources, industry clusters, and networks, enhancing the chances of success for incubated businesses.

Lastly, at the fifth level, experienced management teams and clear performance indicators are identified as vital success factors. Competent and experienced management teams contribute to effective leadership, mentorship, and guidance for incubated entrepreneurs, fostering their growth and success. Clear performance indicators enable the monitoring and evaluation of the incubator's performance and the progress of incubated ventures, ensuring accountability and providing valuable insights for continuous improvement.

Understanding the hierarchical structure and interdependencies among these success factors is crucial for the effective design, management, and support of business incubators in Saudi Arabia. By addressing these success factors and creating an enabling environment, policymakers, stakeholders, and entrepreneurs can enhance the overall effectiveness and impact of business incubators in driving economic growth and fostering entrepreneurial development.

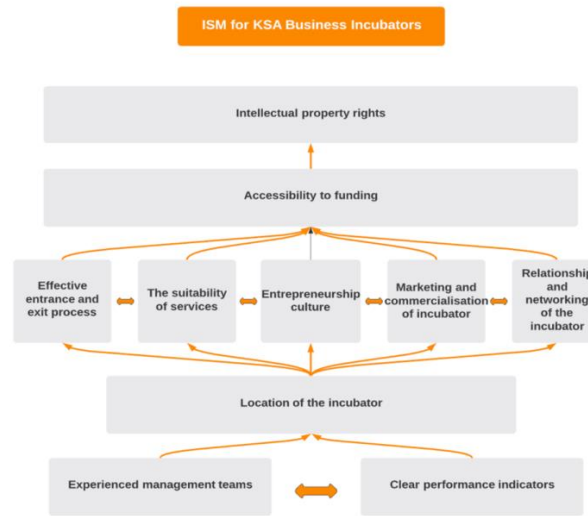


Figure 1: Final diagram of the relationships among success factors

V. CONCLUSION

The ISM technique was used in this study's analysis to discover and classify the success determinants for business incubators in Saudi Arabia. The results emphasise the significance of numerous elements at various stages within the incubator ecosystem. At the first level, intellectual property rights became apparent as a crucial success factor, highlighting the necessity of safeguarding innovation. At the second level, the availability of financial resources for enterprises in incubators was emphasised as a crucial component. Accessibility to capital was recognised as this factor.

The third level success factors encompassed the effective entrance and exit process, the suitability of services, entrepreneurship culture, marketing and commercialization of incubators, and relationship building and networking. These factors contribute to creating a supportive environment, fostering innovation and collaboration among incubated entrepreneurs.

The location of the incubator emerged as a significant success factor at the fourth level, highlighting the importance of strategic positioning to access resources and industry networks. Finally, experienced management teams and clear performance indicators were identified as vital success factors at the fifth level, emphasizing the importance of competent leadership and effective monitoring and evaluation.

Designing and running business incubators in Saudi Arabia requires an understanding of the hierarchical structure and interdependencies among key success criteria. Policymakers, stakeholders, and business owners may improve the overall effectiveness and impact of business incubators in promoting entrepreneurial development and generating economic growth by addressing these elements and establishing an enabling environment.

It is critical to recognise this study's constraints. Based on the knowledge and perceptions of the experts involved in this study, the success elements were categorised. Therefore, further research involving a broader range of stakeholders and empirical validation is recommended to enhance the robustness of the identified success factors and their relationships.

Overall, this study offers insightful information about the success criteria for Saudi Arabian business incubators. The findings can guide policymakers, incubator managers, and entrepreneurs in developing targeted strategies and policies to optimize the performance and impact of business incubators, ultimately contributing to the growth and success of the entrepreneurial ecosystem in the country.

VI. REFERENCES

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