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INVESTIGATION OF STARTUPS' SUSTAINABILITY: EMPIRICAL EVIDENCE FROM SAUDI ARABIA

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Abstract. Despite many government attempts, it is still unclear how individual startups grow and promote their sustainability-oriented market innovations and alter markets toward sustainable growth in Saudi Arabia. This research aims to uncover the factors that contribute to a startup's long-term viability and establish interrelationships among them. A two-phased method was used in this study. Empirical research on startups' sustainability was undertaken in the first phase to identify the most critical enablers from a list of factors found after a thorough literature review. A hierarchy-based model is built among the most critical enablers in the second phase, utilizing interpretative structural modeling (ISM). The study discovers that: (1) there are ten factors influencing entrepreneurial startups' sustainability that play different hierarchical roles; (2) the startup product/service & market position, as a key influencing factor of entrepreneurial startups' sustainability, can be cultivated and improved by enriched startup partnerships & resources, industrial and market; and (3) regulatory & political may indirectly affect startups' sustainability by affecting the entrepreneurial environment. Policymakers in Saudi Arabia might utilize the methodology described in this paper to design appropriate policies for enhancing startup sustainability.

Keywords: entrepreneurship; sustainability; enablers; multi-criteria decision making; interpretative structural modeling (ISM); startups; Saudi Arabia

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1. Introduction

The Global Entrepreneurship Monitor (GEM) is a worldwide collaboration that performs research on 66 economies throughout the globe, accounting for 82 percent of global GDP and 71 percent of the world's population. Every year, GEM brings together approximately 400 researchers from around the world and more than 100 institutions. GEM is the world's most significant research on entrepreneurship and entrepreneurial activity due to the participation of all of these persons and institutions (Bosma et al., 2021).

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GEM is the world's most prestigious entrepreneurship research institute. GEM started in 1999 as a collaboration between Babson College in the United States and London Business School in the United Kingdom, with the goal of better understanding why certain nations are more 'entrepreneurial' than others. For 20 years, GEM has given high-quality data on a wide range of entrepreneurship indicators in 114 economies via a massive, centrally organized multinational data gathering operation. GEM is a trusted resource for organizations all around the globe to help them make better decisions about how to increase the number and quality of entrepreneurship (Aloulou & Al-Othman 2021).

The GEM KSA National Report takes an in-depth look into entrepreneurship in Saudi Arabia. This covers surveys of public opinions, self-perceptions, entrepreneurial connections, and entrepreneur profiles. Despite the pandemics devastating effect on entrepreneurship, Saudi Arabia's overall entrepreneurial activity climbed by 24% from 2019 to 2020/21, according to the annual national report. Over the last three years, the Kingdom has seen a 65 percent growth in company ownership. According to the research, more than 90% of people think entrepreneurship is a good career option, and a third of Saudis want to start a firm in the next three years (Hill et al., 2022).

Indicators also demonstrate that progress in bridging the gender gap has been significant. Women were significantly less likely than males to see prospects (89 percent vs. 92 percent) and believe they had the skills to start a company (89 percent vs. 92 percent) (84 percent vs. 88 percent). On the other hand, fear of failure is virtually equal for both men and women (Alnemer 2021).

The goal of this study is to investigate the factors that contribute to a startup's long-term viability. This comprises looking at the factors that contribute to a startup's long-term viability and modeling their interplay using Interpretive Structural Modeling (ISM). This will reveal their strengths and weaknesses in terms of dependence and driving ability. The following section summarizes the entrepreneurial literature and the resources and processes used to reach the study's aim.

The remainder of the paper is laid out as follows: Section 2 of the literature review includes a list of every linked study. Section 3 discusses the materials and procedures used. The findings are presented in Section 4. Finally, Sections 5 and 6 provide the discussion and conclusions, respectively.

2. Literature Review

The present study examines various enabling factors for entrepreneurship implementation and maintenance. The relationships between startup sustainability enablers and performance measurements are studied using interpretive structural modeling, a well-established technique. A short literature review is offered in this area.

2.1 Entrepreneurship in Saudi Arabia

According to Almahdi (2020), entrepreneurship has a robust support system in Saudi Arabia. Regarding entrepreneurship, the Kingdom has been the Arab region's leader in regulatory changes. According to the current Doing Business (DB) survey, the nation rated 13th worldwide and first in the area in terms of business ease (World Bank 2016). Saudi Arabia climbed from 35th to first place in the DB's six metrics after utilizing French law as a model to revise its policies. It rose seven places from 28th to 21st position in the current World Economic Forum Global Competitive Index (GCI 2010-2011), indicating a robust and stable institutional framework, efficient markets, and sophisticated business environments (Schwab 2018). Saudi Arabia's real GDP was predicted to increase by 3.4 percent in 2010 and 4.5 percent in 2011. In recent years, the Kingdom has

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benefited from the passage of new foreign investment legislation, the formation of the Saudi Arabian General Investment Authority (SAGIA), and the privatization of state-owned firms.

However, inside the country's regulatory structure, firms continue to confront challenges, such as contract enforcement and labor disputes. According to a survey conducted by the Global Entrepreneurship Monitor (GEM) from May to October 2009, Saudi Arabia had the lowest Total Entrepreneurial Activity (TEA) rate among the region's factor-driven economies, with only 4.7 percent of the adult population (18–64 years old) actively involved in the startup of a new business or owning a young business less than three and a half years old (Kelley et al., 2016). Saudi Arabia could build a competitive economy and diversify beyond natural resources, according to a 2008 study by Michael Porter, if it was willing to take a strategic approach, make multiple improvements in its business environment, truly open up competition and entrepreneurship in the private sector, and commit to a sustained effort to equip Saudi citizens with new skills, attitudes, and mindsets (Porter 2008).

The hurdles of starting a business today are more complicated and demanding than ever. Changes in technology, industrial innovation, product development, and severe rivalry and market laws have placed pressure on traditional management approaches, requiring them to alter. As a consequence, the number of startups and new firms that close, depart, or discontinue is relatively high (Westhead et al., 1993; Storey, 1994; Lussier, 1995; Wastson et al., 1998; Timmons, 1999; Bridge et al., 2012; Xiao et al., 2013; Daskalakis et al., 2013; Amankwah-Amoah, 2016; Hyder & Lussier, 2016; Cowling & Matthews, 2017; Vervoort, 2021). Small businesses, on the other hand, play a unique function in contemporary economies, boosting revenue, growth, and employment rates by responding to the market needs faster than large corporations (Acs, 1999; Thurik & Wennekers, 2004; Xiao, 2007; Savlovschi & Robu, 2011; Repushevskaya, 2022). Despite the importance of small businesses in the economy, they confront distinct challenges that negatively impact their performance and survival rate. Regardless of their adaptability and flexibility, they face unique challenges compared to major corporations, necessitating a reaction on their side. In reality, pinpointing the exact reasons why small businesses fail is difficult at best. Failure is a nebulous concept, and specifying its causes is difficult (Storey, 1994; Wastson et al., 1998; Timmons, 1999; Hamilton, 2006; Storey and Greene, 2010; Walsh & Bartunek, 2011; Wennberg & DeTienne, 2014; Brusco, 2022).

Whether small firms can boost economic development seems straightforward: entrepreneurs start enterprises, which generate employment and promote competition, resulting in higher productivity (Acs et al., 2008; Cowling, 2000; Daskalakis et al., 2013; Morrish & Hamilton, 2022). In truth, entrepreneurship is about establishing and maintaining commercial activity to realize a goal. Entrepreneurs see market gaps and create businesses to fill them (Diaz-Foncea & Marcuello, 2013; Bastida et al., 2021). As a result, they are risk takers who fuel change, innovation, and advancement in a country's economy (Longenecker et al., 2012; Saydaliev & Kadyrov, 2022). A country's total economic development is proportional to its amount of entrepreneurship (Acs, 2006; Xiao, 2007; Acs et al., 2008; Anshika & Singla, 2022). This has previously been shown in nations such as the United States, where entrepreneurial efforts from the 1970s and 1980s altered the economy by producing new employment in a variety of industries, broadening the national economic base (Smith, 2010; Bampoky et al., 2013; Kritikos, 2014; Drucker, 2015; Poonguzhali, 2021). As a result, entrepreneurship has risen to prominence and has become a hot issue among practitioners and academics, especially in its ability to develop new enterprises (Acs et al., 2014; De Silva & Wright, 2019). Small startup enterprises have the potential to increase their product and service offerings for customers while also increasing job possibilities, contributing to economic development in a variety of ways (Acs, 2006; Dima, 2021).

However, beginning a company may be difficult for various reasons. Learning about the significant obstacles to survival experienced by small business startups will help entrepreneurs get off on the right foot. As a result, this research aims to empirically add to the study of the characteristics of entrepreneurial company startups' sustainability in Saudi Arabia in the context of Saudi Vision 2030.

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Most small startups fail within three years, according to empirical evidence from developed economies (Argenti, 1976; Westhead et al., 1993; Storey, 1994; Lussier, 1995; Cowling, 2006; Ooghe & Prijcker, 2008; Amankwah-Amoah et al., 2021) and developing economies (Temtime & Pansiri, 2004; Al-Ghamri, 2016; Estrin et al., 2019 However, there is no data collected by the Saudi Arabian Authority of Small and Medium Enterprises to confirm the percentage of small startups that fail; however, given the evidence that small ventures face unique challenges in their early stages, it is reasonable to assume that failure in a complex developing country like Saudi Arabia is slightly higher or higher than failure in developed countries (Hameed & Irfan 2019).

2.2 Interpretive Structural Modeling (ISM)

ISM is a modeling tool for identifying and describing correlations between specific aspects that define a problem, ranking variables based on their effects' importance, and providing a managerial inference. Academics have used ISM to examine raw data and unclear situations across various disciplines. ISM transforms muddled and poorly articulated mental models of systems into observable, well-defined models that may be used for many problems (Sushil 2012).

Jabeen and Faisal (2018) classified enablers into four groups using a combination questionnaire and ISM approach. The study offers valuable insights into female entrepreneurs' perceptions of the UAE's entrepreneurial culture and a relationship model that can be used as a decision-making tool to improve female entrepreneurship.

Portuguese research (Banha et al., 2017) explored eleven obstacles and their linkages impacting the growth of the Portuguese entrepreneurial ecosystem using the ISM technique. The findings show a model represented by a flowchart consisting of ten barriers, three of which are located at the bottom of the model and have political-legislative features with a high level of range in all remaining barriers, implying that carefully measured political involvement could contribute to the improvement of the Portuguese entrepreneurship ecosystem.

Ebrahimi et al. (2022) employed ISM technique to compare variables gathered from the literature and validated by experts, using a qualitative approach. A questionnaire was constructed and disseminated to a small group of platform business and social network specialists to compare nine identified criteria. The research revealed that the strategic determinants in the growth of media entrepreneurship are eight aspects: opportunity, influencers, UX/UI, Strategic partners, resource control, platform governance, technological characteristics, and target audiences. The regulatory environment has been identified as a dependent variable affecting media entrepreneurship's success on platforms.

Parto Afkanan et al. (2021) created a pattern for restarting small and medium-sized unsuccessful entrepreneur's firms using interpretative structural modeling and multi-criteria decision-making methodologies. Lack of experience, lack of reform and developmental attitude, frustration and lack of reinvestment, lack of government financial support, turbulent economic situation, consumer value changes, instability of government laws, lack of motivation and willingness to re-enter the business and market, insufficient training and lack of irrational advice and targeting, lack of knowledge of the target market, lack of modern technology, and lack of value were among the findings.

Wei et al. conducted research utilizing ISM approach on variables impacting entrepreneurial learning from failure (2019). (1) There are 15 factors influencing entrepreneurial learning from failure that play different hierarchical roles, according to the study; (2) entrepreneurs' self-efficacy, as a key influencing factor of entrepreneurial learning from failure, can be cultivated and improved by enriched entrepreneurs' successful career experience. Furthermore, emotion regulation following an entrepreneurial failure is a key influencing factor of entrepreneurial learning from failure, and emotion management is regarded as an important part of entrepreneurship education;

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(3) entrepreneurial education may indirectly affect entrepreneurship learning from failure by affecting entrepreneurs' self-efficacy; (4) economic conditions, policy support, industry characteristics, and cultural.

Raeesi et al. (2013) identified and supported eleven general impediments to entrepreneurship in the literature. Understanding the relationships among these obstacles may aid decision-makers in identifying effective overcoming methods since they are not separate and unrelated. This work uses interpretative structural modeling (ISM) to simulate these interactions, which has been proved to be a valuable tool for evaluating systematic interactions between obstacles. We divide barriers into two categories: inside and outside, and we demonstrate that interior barriers are reliant on outside barriers using the ISM-based model. As a result, a tainted and unsupportive corporate environment emerges as a primary impediment to entrepreneurship.

Despite the fact that the ISM technique has only been used in a few studies on startup sustainability, the current study proposes a systematic strategy for assessing and prioritizing interactions among enablers for the successful building of entrepreneurship, intending to fill the highlighted gap. Next, the resources and processes used to achieve the research study's purpose are described.

3. Materials and Methods

In order to identify the enablers of startup sustainability, a comprehensive literature review was conducted. This necessitated a rigorous approach to searching the literature for enablers in previously published studies in scientific databases. The recovered enablers to startup sustainability were then studied using the ISM approach, and relationships between them were modeled to determine their dependency and driving capacities classifications. This was done by engaging the support of 31 entrepreneurs to gather information on key enablers. The experts were tasked with evaluating the extracted enablers for startup sustainability, providing insightful and valuable analogies to feed into their models, and discovering the contextual links between them. Entrepreneurs having successful companies in Saudi Arabia have shared their own experiences. All of the entrepreneurs in this research regularly attended academic and/or social activities linked to entrepreneurship. Until all possible pair combinations of enablers were exhausted, each entrepreneur was asked to determine if each of the extracted enablers affected another enabler and the direction of influence.

According to some research, ISM's application may be summarized into seven phases (Kannan et al., 2008; Mandal & Deshmukh, 1994).

1. Make a list of the components you want to look into. In this paper, the components are the enablers of startups' sustainability.
2. Find the contextual ties between the enablers using four symbols:

• V: if enabler i is present, enabler j is present.
• A: if enabler j is present, enabler i is present.
• X: if both enablers i and j result in the other's appearance.
• O: if enablers i and j don't have any kind of connection.

3. Create a structural self-interaction matrix (SSIM) that represents the pair-wise contextual interactions between the enablers under consideration.
4. To generate the initial reachability matrix (IRM), apply the following replacement rules to the SSIM data values:

• V: will become 1 for entry (i, j) and become 0 for entry (j, i).
• A: will become 0 for entry (i, j) and become 1 for entry (j, i).
• X: will become 1 for both entries (i, j) and (j, i).
• O: will become 0 for both entries (i, j) and (j, i).

5. Use a transitivity test on the IRM to confirm that, for example, if the I enabler leads to the presence of the j enabler and the j enabler leads to the existence of the k enabler, then the i enabler leads to the existence of the k

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enabler. As a result, 0–1 entries may be validated, and the resultant matrix is the FRM. Then, by constructing the partition matrix in each iteration, the levels of all enablers are determined repeatedly (PM).

6. Enablers are classified as links, dependents, drivers, or autonomous by the FRM.
7. Enablers are prioritized into the number of established and recognized levels in accordance with the FRM and PM, and the final ISM form may then be constructed.

The outcomes of the use of the ISM technique are then provided, along with a discussion of the findings.

4. Results

The study's goals were met using the seven steps of the ISM application listed above. First, as indicated in Table 1, a list of enablers was produced from the extensive literature study process. Second, a group of specialists aided in the identification of enabler-to-enabler contextual linkages. The SSIM in Table 2 must be developed as the third step toward modeling interactions among enablers using ISM to demonstrate pair-wise contextual links between the enablers. Fourth, using the SSIM supplied in Table 2 and the replacement criteria mentioned above, the IRM was generated as shown in Table 3. The transitivity criterion was used in the IRM in Table 3 as the fifth stage of ISM to verify all (0, 1) elements, resulting in the FRM displayed in Table 4. According to the transitivity rule, if IEn1 leads to IEn2, then IEn2 leads to IEn3, and so on, until all enablers have been exhausted. As a consequence, in the FRM presented in Table 4, some initial entries in the IRM are changed from a 0 to a 1 and denoted with a (*). Each enabler's driving and dependent powers (IEn1–XEn5) are represented by the sums of the entries in the FRM's rows and columns.

Table 1. Enablers to Startups Sustainability

Acronym	Enabler	Description	References
		Internal Enabler	
IEn1	Processes	*Processes* may include: the distribution process (customer relationship and investments in the distribution process), internal governance mechanisms (formalization of the organization such as written rules, procedures, and instructions), internal processes, and knowledge management processes (access to external knowledge and information sources, and formalization of knowledge management processes).	• Groenewegen et al., (2012) • Giarratana (2004) • Kawakami et al., (2012) • Savarese et al., (2016) • Song et al., (2010)
IEn2	Product/Service & Market Position	*Product/ Service & Market Position* may include: competitiveness (competitor reactions to the startup's offering, and uniqueness of product/service), customers (past sales, and status of the customers a startup has reputation & signaling), innovativeness of the startup (R&D activities, uniqueness of innovation), market positioning of the startup (geographical location, geographical location, and growth of the startup, geographical location and social outcome orientation of the startup, and participation in competitions/awards), technology (role of technology in the business model), and maturity of startup (startup age).	• Koster & André (2014) • Pitkänen et al., (2014) • Khaire (2010) • Stam & Wennberg (2009) • Alon et al., (2018) • Dumont et al., (2016) • Mueller et al., (2008) • van Stel & Suddle (2008) • Kachlami (2017) • Mendoza-Abarca et al., (2015) • Khefacha & Belkacem (2016) • Arend (2003) • Song et al., (2008)
IEn3	Partnerships & Resources	*Partnerships & Resources* may include: advising bodies (board members), funding situation (funding approach & funding availability), incubators & accelerators (duration of the incubator or accelerator program a startup takes part in, network of an incubator or accelerator that	• Takahashi et al., (2018) • Florin et al., (2003) • Vanacker et al., (2011) • Qian Ye (2017) • Van Praag et al., (2005)

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		supports a startup, and participation in an incubator or accelerator program, services an incubator or accelerator provides to a startup), and intellectual property (patents), investors (age, size and expertise of investors, attributes & capabilities of investors, geographical proximity between investors and startup, investment experience, investor behavior, IPO underwriters, and types of investors), network of startup (background of network partners, number and type of cooperation's along the value chain, number and type of formal networks, relationships with organizations beyond the own industry, and relationships with organizations in the own industry), and network of entrepreneurial management team (background of people in network, board roles in other ventures, and relationships to investors).	• Harada (2003) • Choonwoo Lee et al., (2001) • Lall et al., (2020) • Engel (2004) • Alexy et al., (2012) • Croce et al., (2018) • Niemann (2011) • Stubner et al., (2007) • Cumming et al. (2017) • Alemany (2006) • Shane & Stuart (2002) • Pangarkar & Wu (2013) • Dutta & Hora (2017) • Bellavitis et al., (2014) • Stam & Elfring (2008)
IEn4	Vision & Strategy	*Vision & strategy* may include: business model (ambidexterity of the business model (combination of novelty and efficiency), efficiency/productivity of the business model, fit between strategy and team experience, the role of innovation and technology in the business model, and targeted industry sector/segment), customers (geographic location of the customers' startup targets), planning (business plan), and strategy (degree of diversification in terms of customers/ markets and products).	• Balboni et al., (2019) • Shrader & Siegel (2007) • Dvir et al., (2010) • Kohn & Wewel (2018) • Aspelund et al., (2007) • Schueffel et al., (2011) • Sleuwaegen & Onkelinx (2014) • Blesa et al., (2008) • Almodóvar & Rugman (2014)
IEn5	Team	*A team* may include: capabilities in the startup (available capabilities, and investments in new capabilities), employees (existence and type of employee incentives, number and type of employee degrees, and a number of employees), entrepreneurial team (age, attitude, behavior, capabilities, characteristics, decision-making style, duration of having resided in the location/area of the startup, education, experiences, gender, motivation, personality, strategic variety, team composition, team demographics, and team wealth), and organizational design (similarity of organizational structure and roles compared to incumbents).	• Chen (2009) • Terjesen et al. (2011) • Westerman et al., (2008) • Larrañeta et al. (2014) • Garnsey et al., (2006) • Baum & Locke (2004) • Yitshaki (2012) • Hughes et al., (2007) • Wang et al. (2017) • LeBrasseur et al., (2003) • Wu (2007) • Martínez-Fierro et al., (2020) • Smolka et al. (2018) • Read et al., (2009) • Dahl & Sorenson (2012) • Streletzki & Schulte (2013) • Delmar & Shane (2006) • Dick et al., (2013) • Florin et al., (2003) • Barba-Sánchez & Martínez-Ruiz (2009) • Alsos et al., (2006) • de Mol et al., (2020) • Mai & Zheng (2013) • Yamakawa et al. (2015) • Mueller et al., (2017) • Frank et al., (2007) • Eesley et al., (2014) • Jin et al. (2017) • Chen & Thompson (2015) • Hvide & Møen (2010)

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External Enabler			
XEn1	Entrepreneurial Ecosystem	*Entrepreneurial ecosystem* may include: local ecosystem, knowledge context of a startup, and proximity to urban business districts.	• Raspe & Oort (2011) • Honjo (2004)
XEn2	Industrial & Market	*Industrial & market* may include: differentiators in an industry (relevance of sustainability), the economic condition of a region (unemployment rate), the economic condition of an industry (level of collective optimism among industry peers), industry cluster (strength of a cluster of related industries), investors (venture capital availability), suppliers (supplier accessibility), and target markets (entry barriers, market dynamism, and market growth).	• Schick et al., (2002) • Anglin et al., (2018) • Wennberg & Lindqvist (2010) • Robinson, & McDougall (2001)
XEn3	Regulatory & Political	*Regulatory & Political* may include: institutional environment (strength and efficiency of institutions), regulation (bankruptcy regulation and costs of doing business due to the government regulation), and support policies/subsidies (continuity of support policies that could affect the startup, generosity of support policies that could affect the startup, and usage of support policies through the startup).	• Batjargal et al., (2013) • Eberhart et al., (2017) • Georgallis & Durand (2017) • Söderblom et al., (2015) • Alonso-Nuez & María J. (2012) • Norrman & Bager-Sjögren (2010)
XEn4	Socio-cultural	*Socio-cultural* may include: community entrepreneurial culture (entrepreneurial perception of community entrepreneurial culture), and social norms and culture (degree of social supportiveness in the cultural context and performance orientation of social norms and culture).	• Coleman & Kariv (2014) • Laskovaia et al. (2017) • Seo & Lee (2019)
XEn5	Technological	*Technological* may include: infrastructure and quality of the infrastructure.	• Sarma & Marszalek (2020)

Table 2. The structural self-interaction matrix

Enabler	IEn1	IEn2	IEn3	IEn4	IEn5	XEn1	XEn2	XEn3	XEn4	XEn5
IEn1		V	O	X	O	V	O	V	V	A
IEn2			A	A	A	V	A	O	A	A
IEn3				A	A	V	X	A	O	A
IEn4					V	V	V	V	O	A
IEn5						V	V	A	A	A
XEn1							A	O	O	A
XEn2								A	A	O
XEn3									A	A
XEn4										A
XEn5										

Table 3. The initial reachability matrix

Enabler	IEn1	IEn2	IEn3	IEn4	IEn5	XEn1	XEn2	XEn3	XEn4	XEn5
IEn1	1	1	0	1	0	1	0	1	1	0
IEn2	0	1	0	0	0	1	0	0	0	0
IEn3	0	1	1	0	0	1	1	0	0	0
IEn4	1	1	1	1	1	1	1	1	0	0
IEn5	0	1	1	0	1	1	1	0	0	0
XEn1	0	0	0	0	0	1	0	0	0	0
XEn2	0	1	1	0	0	1	1	0	0	0
XEn3	0	0	1	0	1	0	1	1	0	0
XEn4	0	1	0	0	1	0	1	1	1	0
XEn5	1	1	1	1	1	1	0	1	1	1

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Table 4. The final reachability matrix

Enabler	IEn1	IEn2	IEn3	IEn4	IEn5	XEn1	XEn2	XEn3	XEn4	XEn5	Driving Power
IEn1	1	1	1*	1	1*	1	1*	1	1	0	9
IEn2	0	1	0	0	0	1	0	0	0	0	2
IEn3	0	1	1	0	0	1	1	0	0	0	4
IEn4	1	1	1	1	1	1	1	1	1*	0	9
IEn5	0	1	1	0	1	1	1	0	0	0	6
XEn1	0	0	0	0	0	1	0	0	0	0	1
XEn2	0	1	1	0	0	1	1	0	0	0	4
XEn3	0	1*	1	0	1	1*	1	1	0	0	6
XEn4	0	1	1*	0	1	1*	1	1	1	0	7
XEn5	1	1	1	1	1	1	1*	1	1	1	10
Dependence Power	3	9	8	3	6	10	8	5	4	1	

* changed from 0 to 1 due to transitivity rule

As a result, a partition matrix was created to specify the levels of all enablers (IEn1–XEn5) in the structural model. The "reachability set" is the initial set, and it displays all the enablers that an enabler can reach for each enabler. The "antecedent set," or collection of variables that have previously gone through that enabler, is the second set. The "interaction set," which represents the set of enablers that overlap between the reachability and antecedent sets, implying that they may be deleted, and a level may be attributed to the enabler based on this, is the third set. This elimination and level assignment procedure is used for each created partition matrix in iterations until all enablers are exhausted, and levels are determined. In iterations, this elimination and level assignment procedure is used for each created partition matrix until all enablers have been exhausted and levels have been determined. The adoption of the provided approach resulted in seven iterations classifying the enablers into eight levels (Level I–Level VIII), as shown in Table 5.

Table 5. Partition matrix and enabler levels—all iterations of ISM computations.

Iteration 1				
Enabler	Reachability Set	Antecedent Set	Intersection	Level
IEn1	IEN1, IEN2, IEN3, IEN4, IEN5, XEN1, XEN2, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn2	IEN2, XEN1	IEN1, IEN2, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	IEN2	
IEn3	IEN2, IEN3, XEN1, XEN2	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	IEN3, XEN2	
IEn4	IEN1, IEN2, IEN3, IEN4, IEN5, XEN1, XEN2, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn5	IEN2, IEN3, IEN5, XEN1, XEN2	IEN1, IEN4, IEN5, XEN3, XEN4, XEN5	IEN5	
XEn1	XEN1	IEN1, IEN2, IEN3, IEN4, IEN5, XEN1, XEN2, XEN3, XEN4, XEN5	XEN1	I
XEn2	IEN2, IEN3, XEN1, XEN2	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	IEN3, XEN2	
XEn3	IEN2, IEN3, IEN5, XEN1, XEN2, XEN3	IEN1, IEN4, XEN3, XEN4, XEN5	XEN3	

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XEn4	IEN2, IEN3, IEN5, XEN1, XEN2, XEN3, XEN4	IEN1, IEN4, XEN4, XEN5	XEN4	
XEn5	IEN1, IEN2, IEN3, IEN4, IEN5, XEN1, XEN2, XEN3, XEN4, XEN5	XEN5	XEN5	
Iteration 2				
Enabler	Reachability Set	Antecedent Set	Intersection	Level
IEn1	IEN1, IEN2, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn2	IEN2, XEN1	IEN1, IEN2, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	IEN2	II
IEn3	IEN2, IEN3, XEN2	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	IEN3, XEN2	
IEn4	IEN1, IEN2, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn5	IEN2, IEN3, IEN5, XEN2	IEN1, IEN4, IEN5, XEN3, XEN4, XEN5	IEN5	
XEn2	IEN2, IEN3, XEN2	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	IEN3, XEN2	
XEn3	IEN2, IEN3, IEN5, XEN2, XEN3	IEN1, IEN4, XEN3, XEN4, XEN5	XEN3	
XEn4	IEN2, IEN3, IEN5, XEN2, XEN3, XEN4	IEN1, IEN4, XEN4, XEN5	XEN4	
XEn5	IEN1, IEN2, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	XEN5	XEN5	
Iteration 3				
Enabler	Reachability Set	Antecedent Set	Intersection	Level
IEn1	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn3	IEN3, XEN2	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	IEN3, XEN2	III
IEn4	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn5	IEN3, IEN5, XEN2	IEN1, IEN4, IEN5, XEN3, XEN4, XEN5	IEN5	
XEn2	IEN3, XEN2	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	IEN3, XEN2	III
XEn3	IEN3, IEN5, XEN2, XEN3	IEN1, IEN4, XEN3, XEN4, XEN5	XEN3	
XEn4	IEN3, IEN5, XEN2, XEN3, XEN4	IEN1, IEN4, XEN4, XEN5	XEN4	
XEn5	IEN1, IEN3, IEN4, IEN5, XEN2, XEN3, XEN4, XEN5	XEN5	XEN5	
Iteration 4				

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Enabler	Reachability Set	Antecedent Set	Intersection	Level
IEn1	IEN1, IEN4, IEN5, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn4	IEN1, IEN4, IEN5, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn5	IEN5	IEN1, IEN4, IEN5, XEN3, XEN4, XEN5	IEN5	IV
XEn3	IEN5, XEN3	IEN1, IEN4, XEN3, XEN4, XEN5	XEN3	
XEn4	IEN5, XEN3, XEN4	IEN1, IEN4, XEN4, XEN5	XEN4	
XEn5	IEN1, IEN4, IEN5, XEN3, XEN4, XEN5	XEN5	XEN5	
Iteration 5				
Enabler	Reachability Set	Antecedent Set	Intersection	Level
IEn1	IEN1, IEN4, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn4	IEN1, IEN4, XEN3, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
XEn3	XEN3	IEN1, IEN4, XEN3, XEN4, XEN5	XEN3	V
XEn4	XEN3, XEN4	IEN1, IEN4, XEN4, XEN5	XEN4	
XEn5	IEN1, IEN4, XEN3, XEN4, XEN5	XEN5	XEN5	
Iteration 6				
Enabler	Reachability Set	Antecedent Set	Intersection	Level
IEn1	IEN1, IEN4, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
IEn4	IEN1, IEN4, XEN4	IEN1, IEN4, XEN5	IEN1, IEN4	
XEn4	XEN4	IEN1, IEN4, XEN4, XEN5	XEN4	VI
XEn5	IEN1, IEN4, XEN4, XEN5	XEN5	XEN5	
Iteration 7				
Enabler	Reachability Set	Antecedent Set	Intersection	Level
IEn1	IEN1, IEN4	IEN1, IEN4, XEN5	IEN1, IEN4	VII
IEn4	IEN1, IEN4	IEN1, IEN4, XEN5	IEN1, IEN4	VII
XEn5	IEN1, IEN4, XEN5	XEN5	XEN5	VIII

Using Cross-Impact Matrix Multiplication Applied to Classification (MICMAC) and the FRM's estimated dependence and driving powers determined in Table 4, all enablers (IEn1–XEn5) were classified or sorted into four groups in the sixth stage of ISM. Linking, dependent, driver and autonomous enablers are all types of enablers. The values associated with each enabler were used as (x, y) coordinates to build the dependency versus driving power curve. As a result, their categories were defined, and the chart's four quadrants were separated into four quadrants, as illustrated in Figure 1.

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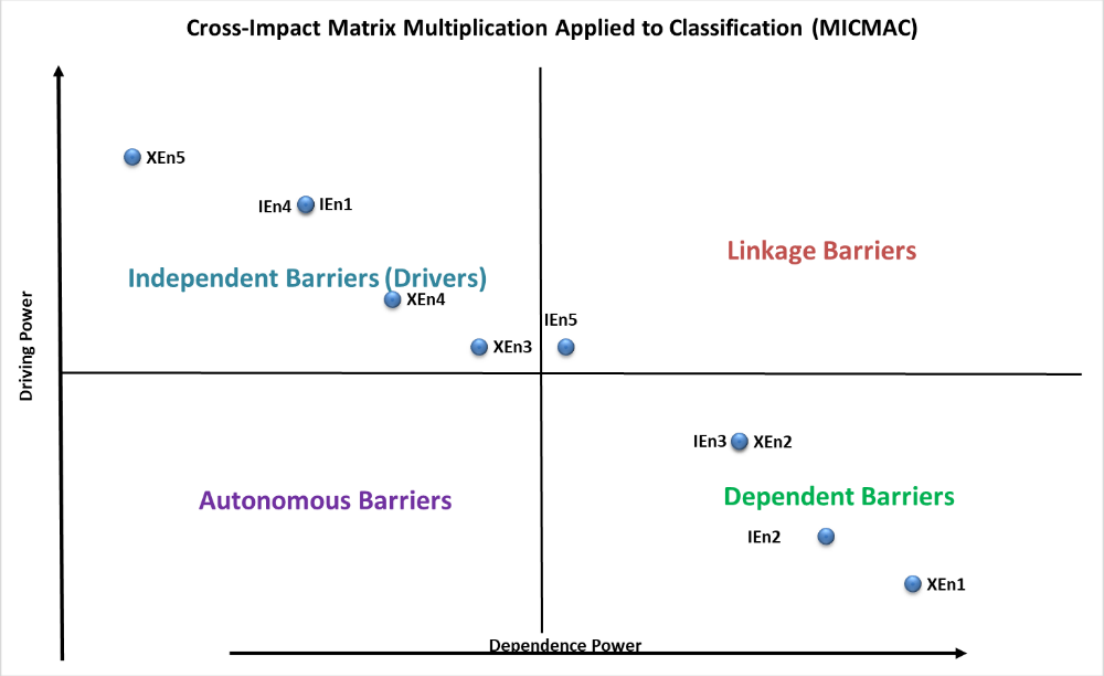

Figure 1. Startups sustainability clustering diagram

Results of this study's ISM, shown in Tables 1–5 and Figures 1 and 2, demonstrate that the targeted experts have categorized all enablers into three categories: independently derived, dependent, and linked. No independently derived enabling mechanisms have been found. Experts involved in this research have also categorized the ten discovered enablers of startups' long-term viability into eight distinct degrees of importance.

This suggests that XEn5, Technological, has the largest amount of dependency on other enablers and displays a lesser level of driving strength among other enablers to startups' sustainability. According to the findings, the second level of enablers (Processes "IEn1" and Vision & Strategy "IEn4") have a direct impact on the outcome. A lack of vision and strategy (e.g., business model, ambidexterity of a business model, efficiency/productivity of a business model, fit between strategy and the team experience, the role of innovation and technology in a business model, and business model) is to blame for the infrastructure's inadequacy. It is thus safe to say that this collection of enablers has had a direct impact on Socio-culture, which in turn has had an impact on Regulations and Politics, which in turn has had an impact on Startup Team Capabilities (XEn4) (IEn5). A product/service & market position (XEn2) is immediately impacted by team enabler (IEn3), which is directly influenced by the product/service & market position (XEn2) (IEn2). To sum it up, the entrepreneurial ecosystem (XEn1) has the most effect on all of the enablers, which comprise the third through eighth levels with the greatest driving force.

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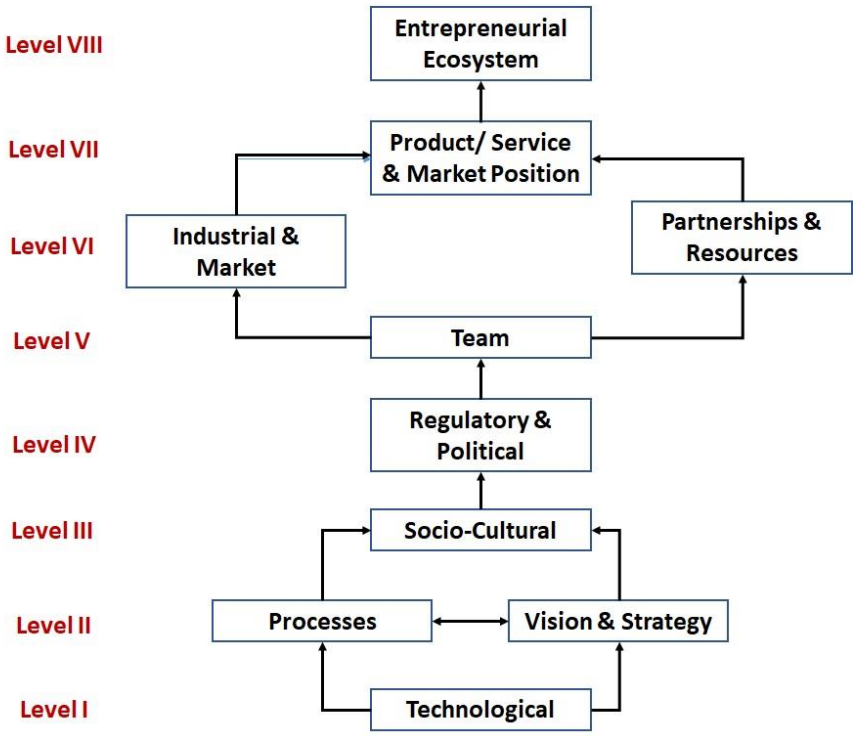

Figure 2. The final ISM digraph of enablers to startups sustainability

5. Discussion and Limitations

According to the report, the entrepreneurial environment is critical to the long-term viability of businesses. There are no barriers to new ideas in Saudi Arabia's entrepreneurial environment. FinTech ExPermit was created by the Saudi Capital Market Authority (CMA) to allow equity crowdfunding platforms to operate in the country. On the heels of this, the Saudi Arabian Monetary Agency (SAMA) has set up an experimentation zone to test different digital payment systems and has given many banks and enterprises experimental permits. There was also a group called Fintech Saudi that brought together essential players to encourage a culture of innovation inside the financial industry in Saudi Arabia.

Additionally, several support firms have popped out from the PIF subsidiary TAQNIA, which is dedicated to creating value from technology. BIAC, Riyadh TAQNIA Fund, and Research Products Development (RDP), a technological development and commercialization center, are just a few examples of organizations that fall under this category (Ashri, 2019). Another key enabler is the ability to use a company's operations, vision, and strategy in conjunction with various resources and partners. The entrepreneurial environment may be built by accepting these enablers one at a time.

The theoretical contribution of this paper is divided into three parts. First, we identified ten influencing elements of startups' sustainability based on literature research. We suggested a hierarchical model of influencing startup sustainability using the expert approach based on the ISM method of system dynamics. The majority of Saudi Arabian research has concentrated on female entrepreneurship (Islam et al., 2018), post-materialistic ideals (Alammari et al., 2019), female entrepreneur environmental problems (Alkhaled & Berglund, 2018), and characteristics that influence the entrepreneurial success (Al-Tit et al., 2019). Only one research (Abdulghaffar & Akkad, 2020) looked at various variables impacting startup sustainability on two levels, including internal and external factors, without looking at how they interrelate. This work conducts in-depth research and presents

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researchers with a user-friendly ISM (as illustrated in Figure 2). Second, this paper shows that industrial & market factors (Differentiators in an industry, Economic condition of a region, Economic condition of an industry, Industry cluster, Investors, Suppliers, and Target markets), as well as partnerships & resources (Advising bodies, Funding situation, Incubators & accelerators, Intellectual property, Investors, Network of startups, and Network of entrepreneurial management team), can have direct effects on startup sustainability as a key factor. Industrial & market (Schick et al., (2002); Anglin et al., (2018); Wennberg & Lindqvist (2010)) and collaborations & resources (Takahashi et al., (2018); Lall et al., (2020); Croce et al., (2018)) have also been emphasized by certain academics. This adds to our understanding of how industrial and market conditions, as well as relationships and resources, impact startup sustainability. Furthermore, this research incorporates current research aspects and frameworks, allowing for a more in-depth examination of sustainability theory as well as an empirical investigation of startup sustainability.

Our study results have three implications for entrepreneurs and companies looking to develop entrepreneurial ecosystems. This article first lays out a route for entrepreneurs to follow to enhance their chances of becoming more sustainable. The industry and market, as well as relationships and resources, demand special consideration since they might directly impact the startup's long-term viability. Entrepreneurs should maintain a high level of competitiveness (competitor reactions to the startup's offering and uniqueness of product/service), customers (past sales, and status of customers a startup has reputation & signaling), innovativeness of the startup (R&D activities, uniqueness of innovation), market positioning of the startup (geographical location, geographical location and growth of the startup, geographical location and social outcome orientation of the startup), and market positioning of the startup (geographical location, geographical location, and growth Second, regulatory and political factors may have an indirect impact on the startup's long-term viability by altering the entrepreneurial team. To provide entrepreneurs with appropriate support, the institutional environment (institutional strength and efficiency), regulation (bankruptcy regulation and costs of doing business due to government regulation), and support policies/subsidies (continuity of support policies that could affect the startup, generosity of support policies that could affect the startup, and usage of support policies through the startup) are all required. Third, technological, process, vision, strategy, and socio-cultural variables must be considered (Horne & Fichter, 2022). To create an excellent social atmosphere and environment for entrepreneurial activities, the socio-cultural (entrepreneurial perception of community entrepreneurial culture, degree of social supportiveness in the cultural context, and performance orientation of social norms and culture) must provide vigorous support and openness.

The research design that was used in this study includes several limitations. Due to the exploratory nature of this research, we cannot apply the perspectives of the business owners we interviewed here to any other set of institutional or political conditions. However, all this knowledge is valuable since every entrepreneur has an engaging story about their personal experience starting a business. We believe that the theoretical model can be used in various settings. Consequently, it is hard to determine whether or not the strategies discussed in this article are really effective or making an impact. Even though those who responded are highly experienced in their separate fields as entrepreneurs, it would still be necessary to use different methods to analyze this data.

Conclusions

Impact startups may help the sustainability transition by effectively scaling up their "sustainability-oriented market innovations" and "transforming markets towards sustainable development," as discussed in this article. Most elements influencing startups' success and establishing links between business ventures' social or environmental repercussions remain unknown. The interpretive structural modeling (ISM) method was used to study the linkages between distinct enabling components since they are not entirely stand-alone. The stages of the ISM process were designed based on the advice of industry professionals. This diagram of startup sustainability enablers helps us to understand how they interact together.

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The three primary contributions we provide to science result from our work. If you want your business to have a better shot at long-term viability, this article offers a path to follow. The startup's long-term sustainability may be directly impacted by the industry and market, as well as the startup's ties and resources. A startup's competitiveness, customer base, R&D activities, uniqueness of its innovation, and market positioning should all be maintained at a high level by entrepreneurs. This may have a direct influence on the startup's long-term sustainability by changing the entrepreneurial team. It is necessary to have a strong and efficient institution and regulations (bankruptcy regulations and the costs of doing business due to government regulation) to support entrepreneurs. A third factor to examine is the influence of various socio-cultural and technical factors (Horne & Fichter, 2022). For entrepreneurial activities to thrive, the socio-cultural (entrepreneurial perceptions, degree of social support, and performance orientation of social norms and culture) must give active support and openness to the community's entrepreneurial culture.

According to this research, ten main factors contribute to a company's long-term survival. System dynamics (Sushil, 2012) from ISM was utilized to provide a comprehensive picture of the links and interrelationships among the many factors affecting startup long-term viability. This study classified internal and external facilitators. Processes, goods or services, and market position; partnerships; resources; vision; strategy; team; entrepreneurial ecosystem; regulatory; political; socio-cultural & technological; are all facilitators to success in a commercial context.

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