Journal of Systems Thinking in Practice
JSTINP, *QUARTERLY*
Homepage: jstinp.um.ac.ir
Online ISSN: 2821-1669, Print ISSN: 2980-9460
Research Article
DOI: 10.22067/JSTINP.2023.81499.1052
JSTINP 2023; Vol. 2, No. 2

Developing the Framework of Entrepreneurship Education Ecosystem in Iranian Schools Using Soft System Methodology

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How to cite this article

Tayebnia, M., Karimi, A., Padash, H., Yazdani, H., 2023. Developing the Framework of Entrepreneurship Education Ecosystem in Iranian Schools Using Soft System Methodology. *Journal of Systems Thinking in Practice, 2*(2), pp.1-32. doi: 10.22067/JSTINP.2023.81499.1052.
URL: https://jstinp.um.ac.ir/article_43993.html.

ABSTRACT

This qualitative study aims to develop the framework for the entrepreneurship education ecosystem in Iranian schools. This study developed the ecosystem framework for entrepreneurship teaching in schools using Soft Systems Methodology. The Soft Systems Methodology is employed in a problematic situation that necessitates improvement. In the entrepreneurship education ecosystem of Iranian schools, the educational structure is unfavourable, and the students' entrepreneurial capacities have not been realized, so soft systems methodology was used to improve these conditions. This study adopted a methodology with seven processes, five of which are carried out in the real (physical) world, and three involve system thinking and the human mental world. The problematic situation of entrepreneurship education in schools was determined using Soft Systems Methodology, and the actors and relationships were designed. The conceptual models corresponding to the main actors were obtained from the interviews with the actors in this field. Finally, by combining models, the integrated model of developing the framework of the entrepreneurship education ecosystem in Iranian schools was obtained. Then, necessary actions to realize this desired model were brought from the perspective of each of the actors. The development of a structure by the Ministry of Education to establish offices of industries and start-ups in schools to involve students in entrepreneurial activities has been accomplished to achieve the desired model. This study has educational, theoretical, and policy benefits for entrepreneurship education in Iran and the world. The supporting elements of entrepreneurship education in Iranian schools and the essential strategies were described. The present study's academic contribution lies in developing the entrepreneurship education ecosystem, examining how its components interact, and identifying the necessary actions for each.

Keywords

Entrepreneurship education, Entrepreneurship in schools, Entrepreneurship education ecosystem, Entrepreneurial competencies, Soft systems methodology.

Article history

Received: 2023-03-14
Revised: 2023-06-23
Accepted: 2023-06-24
Published (Online): 2023-06-26

Number of Figures: 8 **Number of Tables: 8** **Number of Pages: 32** **Number of References: 73**

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1. Introduction

Entrepreneurship is an element in economic and social development due to its positive effect on innovation, competitiveness, and job creation (Luis-Rico et al., 2020). The role of entrepreneurship in accepting significant social challenges (Rae, 2010) has turned entrepreneurship education into a tool for empowering people and organizations to create social value for public benefits (Wilson et al., 2009). Also, entrepreneurship education is considered a tool to achieve a knowledge-based economy and deal with economic and social problems (Abdullah et al., 2009; Molaei et al., 2014; İlhan Ertuna and Gurel, 2011). Entrepreneurship training enables people to acquire the necessary skills to discover business ideas and introduce products or services to the market (Kimwolo et al., 2012). The goals of entrepreneurship education include acquiring knowledge in entrepreneurship, developing entrepreneurial skills, and developing personality traits, e.g., leadership or initiative (Breen, 2004). More knowledge about entrepreneurial skills and different aspects of entrepreneurship will help to have a realistic understanding of entrepreneurial activity (Ajzen, 2002).

Also, universities have developed entrepreneurship by teaching the knowledge and skills necessary to start and manage businesses (Wang et al., 2019). Many experts believe developing young people's entrepreneurial attitudes and skills should begin at school (Axelsson et al., 2015). Globally, experts assess the state of business education in schools as very low (Peña-Legazkue et al., 2019). Due to inefficient and traditional school curricula, young people do not communicate with necessary issues and topics. It makes students incapable of using available opportunities to strengthen creativity. To address these inefficiencies, a recommended course of action is to modify the curriculum structure (Hosseinikhah, 2002). In a traditional curriculum, special attention is mainly paid to theoretical topics, and students face practical and experimental issues less, so students only memorize the educational content. However, to teach entrepreneurship according to its nature, it is necessary to use educational methods that strengthen creativity in students and are based on practical work (Gibb, 2002).

Old and purely theoretical methods in entrepreneurship education cannot efficiently prepare students for entrepreneurship.. New educational methods should be used (Birami Erdy et al., 2019) to take advantage of new models of entrepreneurship education and nurture creative and innovative students as future entrepreneurs. (Mehrabi, 2017). According to the prevailing educational structure in Iranian schools, students are less likely to do entrepreneurial projects and practical actions (Vathghi, 2011). Therefore, the spirit and attitude of entrepreneurship have

yet to be significantly developed in students, and every year many students graduate without entrepreneurial skills (Qurbani, 2016).

In the existing educational structure, most entrepreneurship teachers lack an entrepreneurial mindset and attitude, and thus, they cannot make students interested while teaching entrepreneurship (Ork and Mahmudi-Bardzardi, 2015). Also, the communication between teachers and students is one-way, and it is impossible to challenge and encourage students to take entrepreneurial actions (Mohammadi, 2008). In the past years, entrepreneurship education has been noticed in Iranian schools, and changes have been made in the entrepreneurship education program. However, previous studies indicate that these changes are insufficient and need to review various dimensions of entrepreneurship education in Iranian schools (Fallah Haghighi et al., 2018). It has been demonstrated in previous studies (Ahmadpour Karimabadi, 2021; Hashemi et al., 2021; Yar mohammadzadeh et al., 2019; Omidi et al., 2018; Rezaei, 2019; HajiAghaee, 2019; Abolhasani, 2019; Mehrabi, 2017) that the current curriculum has been ineffective in nurturing an entrepreneurial spirit in learners. Furthermore, the educational system needs a clear plan to enhance student entrepreneurship. With this inefficient curriculum, schools do not have the required efficiency to train entrepreneurial and creative students (Yar mohammadzadeh et al., 2019).

Previous investigations show that measures taken by the Iranian educational system to teach entrepreneurship in schools could have been more effective and responded to the needs of society. In this regard, the officials and curriculum planners should consider an education program considering all aspects of entrepreneurship education. Therefore, research is necessary to develop a framework for the entrepreneurship education ecosystem in Iranian schools.

2. Literature review

The main goal of most entrepreneurship education is to develop entrepreneurial competencies (Lackéus, 2014). Entrepreneurship is usually created in early education, mainly through entrepreneurial projects. For example, student-led practical projects are done by producing goods, providing services, or organizing school events (Pelletier, 2007). Entrepreneurship projects are not used to teach how to start a business but to develop students' attitudes (Pelletier, 2007). Three educational goals are identified in the entrepreneurship literature (Breen, 2004):

(1) Gaining entrepreneurship knowledge to understand the phenomenon better. (Entrepreneurship as a learning content to be taught (knowledge)).
(2) Developing specific entrepreneurial skills to become an entrepreneur (Entrepreneurship as a job activity (skill)).

(3) Developing key personality traits, such as leadership and initiative, is crucial in fostering an entrepreneurial mindset (Entrepreneurship is a process through which a person develops a personality (attitude)).

Business education methods include forms of cooperation in coproduction, i.e., business environments in formal educational processes (Floris and Pillitu, 2019) or direct communication with business environments through projects (Hebles et al., 2019). Also, one recommendation is to include learning by acting as a vital part of education (Gibcus et al., 2012). Some educational approaches are problem-based learning (San Tan and Ng, 2006), project-based learning (Jones and English, 2004), and service-learning (Desplaces et al., 2009). Project-based learning allows students to work on a specific problem and create an "artifact" to solve it, i.e., a final product, such as a report, a model, or a video (Blumenfeld et al., 1991). Problem-based learning begins with a specific problem and ends with discussing possible solutions and further guidance (Helle et al., 2006). Service learning is classroom learning integrated with community service (including cleaning parks, visiting the older people, and providing food for those in need) (Spring et al., 2008). In Table 1, a comparison has been made between educational approaches and similarities and differences between entrepreneurial education with other educational approaches.

Table 1. Similarities and differences between entrepreneurial education and other educational approaches (Lackéus, 2015).

Most focus on:	Entrepreneurial education	Problem-based learning	Project-based learning	Service-based learning
Issues	X	X	X	X
Opportunities	X			X
Accuracy	X	X	X	X
Production of handicrafts	X		X	
Repeated experiences	X			
Actions in real world	X			X
Creating value for external stakeholders	X			X
Group work	X	X	X	X
Working for a long time	X		X	X
Newness/innovation	X			
failure risk	X			

2.1. Research background

The previous research on developing entrepreneurship education in schools will be reviewed here. The authors have proposed methods, approaches, and tools to improve school entrepreneurship education in these studies.

Luis-Rico et al., (2020) showed that practical aspects of entrepreneurship should be taught to students through expert stakeholders. They also showed that project-based learning methods

based on collaborative learning and service-based learning based on developing social and ethical entrepreneurial spirit suit entrepreneurship education. Sai et al., (2019) investigated the entrepreneurial skills of urban youth and created a model for entrepreneurial skills for Chinese youth. It analyzed 526 students aged 14 to 18 from four secondary and high schools. The findings showed that entrepreneurial skills are still average. Visiting to famous local companies, lectures by successful entrepreneurs to share experiences, and financial literacy and knowledge in personal finance are some of the most practical matters in learning entrepreneurship. Winarno et al., (2019) presented a model for entrepreneurship education through cooperation between high schools and SMEs in East Java. In this model, companies can hire graduates of vocational schools based on their needs. These schools can place them as their partners for cooperation in improving knowledge and curricula.

According to the recommendation by Chiloane-Tsoka (2016), the integration of entrepreneurship into education should commence at the elementary school level and continue through secondary school. Schools should collaborate with organizations like banks to create educational materials focusing on financial skills and competencies. It is recommended that high-school students have some work experience in the industry. This experience allows students to develop their skills beyond the classroom and boost their confidence before entering the business world. Zivkovic et al., (2015) investigated games' impact on developing creativity and innovation in schools. Using the Doris tool showed that imaginative games could create interest in expressing creativity, build self-confidence and strengthen creative thinking. Participants were allowed to express their ideas. The “Danish Foundation for Entrepreneurship-Young Enterprise” presented a development model, including four basic dimensions to be considered by teachers: (1) Entrepreneurship education should be based on students' practical actions in the form of teamwork, aiming to create value for others. (2) In this education, students should use their creativity to test their ideas and find new solutions with knowledge. (3) Entrepreneurship education should interact with the environment outside the school or university and interact with the culture, market, and professional actors of the society and learn from them. (4) Finally, it is necessary for entrepreneurship education to pay attention to attitudinal aspects like belief in one's ability, tolerance of uncertainty, and the risk of failure. These four basic dimensions are useful for all teachers who are developing new teaching content, teaching processes, and forms of assessment and examinations (Rasmussen and Nybye, 2013).

Huang et al., (2017) investigated the STEM-Inc project as an extracurricular program in high school. It includes a technology business incubator implemented in an after-school

program for junior high school students in several high schools in California. The purpose is to raise awareness among high school students and their parents regarding the available career paths in Science, Technology, Engineering, and Mathematics (STEM) while fostering student engagement and interest in these fields and related occupations. This project showed two aspects of engineering and business to the students. First, the engineering aspect is where students identify a real-world problem and look for a practical solution that requires engineering design, assembly, and testing. Second, the business aspect is where students learn the business value of the product chosen for a target market and look for ways to improve it by creating new business. Students formed teams of 3 to 6 people and shared common ideas. During this process, they learned various steps to design and build a business and moved towards creating prototypes. Students reported that learning skills like identifying connections between mathematics, science, and engineering result from the project activities. They learned several business and entrepreneurial skills from it. Barma et al., (2017) describe the experimental process of creating a hybrid activity between school and work and show how 9th to 11th-grade students enrolled in a general education program experienced entrepreneurship in a project called FAST. It responded to a call for proposals from Quebec province officials in eastern Canada, emphasizing joint action and collaboration between researchers and school partners to increase student sustainability and educational achievement. This experimental process also included agreements between schools and businesses so that young people could choose more freely when they attend classes and work. Through this, high-school students can start their own business at school. Table 2 presents a summary of the research background.

Table 2. A summary of research background

Researcher	Research title	Findings
Luis-Rico et al., (2020)	Entrepreneurial Interest and Entrepreneurial Competence Among Spanish Youth: An Analysis with Artificial Neural Networks	Using project-based learning (based on cooperative earning) and service-based learning (based on developing social and moral entrepreneurial spirit) methods. Practical aspects of entrepreneurship should be taught to students through expert stakeholders to increase their intention.
Sai et al., (2019)	A model for youth entrepreneurship skills of the community-based leadership training for the urban youth in China	Three important activities for entrepreneurship education: 1. Visiting famous local companies. 2. Successful entrepreneurs give lectures to share their experiences with young people. 3. Financial literacy and personal finance activities.
Winarno et al., (2019)	Integration of vocational school and Small-Medium Enterprises (SMEs) learning: An effort of elevating entrepreneurship spirit	The working relationship of high-school or vocational school students with SME companies improves students' entrepreneurial skills and attitudes. These companies can be good partners for schools in improving knowledge and curricula.

Researcher	Research title	Findings
	based on strength and weakness in East Java	
Chiloane-Tsoka (2016)	Factors influencing the perceptions of youth entrepreneurship development in South Africa	Teachers need to be trained in entrepreneurial and business skills. To develop entrepreneurial financial skills, schools can cooperate with other institutions like banks to create educational materials focusing on financial skills and competencies. High-school students can experience working in industry for a while in their education. Educational institutions can introduce a mentorship approach to help students cooperate practically in entrepreneurial investments.
Zivkovic et al., (2015)	Fostering creativity by a specially designed Doris tool	Games are utilized as an educational method to foster the development of creativity and innovation. Using the Doris tool indicated that an imaginative game can foster interest in expressing creativity, building participant confidence, and reinforcing creative thinking.
Rasmussen and Nybye., (2013)	Entrepreneurship Education: Progression Model.	Entrepreneurship education should be based on students' practical actions, where they work in teams that create value for others.
Huang et al., (2017)	Using business entrepreneurship practices to engage middle school students in STEM learning: Three years' perspective	Taking part in a business 'incubator' in an after-school program, including two aspects: engineering and entrepreneurship. Doing projects to create solutions for real-world problems, including engineering, computer science, and business concepts.
Barma et al., (2017)	Early stages in building hybrid activity between school and work: the case of PénArt	Setting up a business for students in school and producing and selling products by them. Using cooperative education method. The participation of students in entrepreneurship competitions is encouraged.

Each study had a different perspective regarding entrepreneurship education in schools and did not adopt a comprehensive approach. None of the researchers attempted to understand it comprehensively and did not use Soft Systems Methodology as an appropriate methodology to improve the problematic situation. Therefore, using Soft Systems Methodology, this study examines all aspects of entrepreneurship education in schools, identifies all actors in this field, and defines necessary actions.

3. Method

Education in the entrepreneurship field has multiple aspects (such as economic, cultural, social, and moral), making it a complex and difficult field (Bacigalupo et al., 2016). This complexity partly explains the problem of reaching a consensus about the entrepreneurship education model. Therefore, various educational models have been proposed (Bernal-Guerrero et al., 2020). Due to the shortcomings in the entrepreneurship educational system, researchers have proposed different educational methods for entrepreneurship education (Linton and Klinton, 2019). Therefore, this study uses soft systems methodology to improve this problematic

situation. People face social events and incidents that require deliberation. In soft systems methodology (SSM), such conditions are considered problematic situations that need improvement. This methodology has seven steps, five occurring in the real world and three in the human mental world with systemic thinking (Checkland and Poulter, 2020).

Step 1: Understanding the problematic nature of the situation
It is done in the real world; only the situation should be identified.

Step 2: Description of the situation of the problem
The researcher uses rich pictures to show essential views of the situation, administrative processes, and existing structures. The rich picture shows the contradictions and differences in the problematic situation (Checkland and Poulter, 2020).

Step 3: Root definition
In this step, the researcher enters the systems world (Checkland and Haynes, 1994). They express root definitions by using main viewpoints regarding the situation. Root definition describes the desired system and seeks to define the goals and participants. Using Clients, Actors, World view, Owners, and Environment (CATWOE) analysis, the obtained root definitions can be completed. In CATWOE analysis, the researcher aims to identify customers, actors, transformation process, worldview, owners, and environment to enrich the root definitions by using them (Checkland and Poulter, 2007). In Table 3, the definition of CATWOE analysis elements is discussed.

Table 3. The definition of CATWOE analysis elements is discussed.

Title	Definition
Customers	Victims/beneficiaries of conversion
Actors	Members doing the conversion
Transformation	What is transformed by the system
Worldview	What gives meaning to transformation
Owners	Members who can stop the transformation
Environment	Limitations that can affect the system

Step 4: Conceptual model
The researcher seeks to create a conceptual model using root definitions and system rules. The resulting conceptual model includes different views on the issue, which shows a consensus.

Step 5: Comparing the conceptual model with the real world
Here, the researcher compares the obtained conceptual model with the actual world to see possible differences (Checkland and Winter, 2006).

Steps 6 and 7: Identifying desirable and possible changes and taking action

The researcher seeks to find changes to improve the system. These changes should have desirability and possibility simultaneously (Checkland, 1994). Next, the changes should be implemented. An operational plan must be adjusted first (Checkland and Winter, 2006).

3.1. Reliability and validity

The researcher's consideration increases the credibility of the study, accurate question formulation, monitoring of the interview process, data collection, and information analysis (Riege, 2003). Data collection up to saturation, adopting a specific, transparent procedure for selecting sentences, coding, and analyzing them improved transformability (Riege, 2003).

To conduct Soft System Methodology, it was imperative to gather perspectives from managers, teachers, and experts in entrepreneurship education. Therefore, targeted interviews were conducted with experts and specialists familiar with various dimensions of entrepreneurship education in schools. Semi-structured interviews were used to understand the situation of the problem and to find different worldviews regarding the way of teaching entrepreneurship in schools. Considering the researcher's familiarity with this field and the research objectives, selected experts qualified to answer were interviewed. Here, sampling was done purposefully. Characteristics of the participants are given in Table 4;

Table 4. Characteristics of participants in investigating the inefficiency of current state of entrepreneurship education in schools

No.	Responsibility	Area of expertise
1	Principal	Educational management
2	General manager of the Ministry of Education	Curriculum design
3	University professor in entrepreneurship education	Entrepreneurial research
4	University professor in entrepreneurship education	Entrepreneurial research
5	Entrepreneurship mentor	Guiding students in the field of business
6	Member of Parliament	Policy-making
7	Industry manager	Management of big industries
8	Start-up manager	Management of knowledge-based company
9	Students' parents	Start-up business
10	Students interested in entrepreneurship	Entrepreneurial projects

The interview questions were designed according to the review of previous studies. Interviews were conducted deeply and in a semi-structured format. The details of the interview protocol are given in Table 5.

Table 5. The structure of conducting the interview

Question group code	Question code	Sub-question code	Questions
CRQ1			**Students' participation in and support of entrepreneurial activities in school**
	TQ1		Which voluntary people and groups support entrepreneurship education in schools?
		IQ1	How do volunteers support entrepreneurial activities?
		IQ2	What equipment do volunteers provide for students?
CRQ2			**Methods of entrepreneurship education in schools**
	TQ1		Explain common methods of entrepreneurship education in Iranian schools.
	TQ2		Do Iranian schools have new methods for entrepreneurship education based on experiencing entrepreneurial activity and being in entrepreneurial situations?
CRQ3			**Assessment and evaluation of entrepreneurship education in schools**
	TQ1		Is the students' interactions a basis for teachers' evaluation?
		IQ1	Is the evaluation done based on how much external stakeholders are satisfied with the students?
		IQ2	Is the evaluation done based on whether students have learned something from external stakeholders or not?
		IQ3	Is the evaluation done based on the quality of students' homework (e.g., creating value for others)?
CRQ4			**Entrepreneurial learning outcomes in schools**
	TQ1		How is the students' theoretical knowledge reinforced in entrepreneurship education?
	TQ2		What skills are reinforced in students regarding entrepreneurship?
	TQ3		What insights and attitudes are reinforced in students after entrepreneurship education?
CRQ5			**The way of timing entrepreneurship education**
	TQ1		Are entrepreneurship classes held weekly?
	TQ2		Is entrepreneurship education done during different subject?
	TQ3		Are entrepreneurial activities done as extracurricular activities in school?
	TQ4		Is enough time allocated to discussions about entrepreneurship education among teachers?
CRQ6			**Educational infrastructure**
	TQ1		Do they use effective, capable mentors of the entrepreneurship field?
	TQ2		Does the principal support entrepreneurship education enough?
	TQ3		Does the school have enough supportive environment for entrepreneurship education?
CRQ7			**Curriculum design**
	TQ1		Is curriculum design based on the needs of different parts of business?
	TQ2		Do the students cooperate in choosing the method of entrepreneurship education?
	TQ3		How does curriculum help to train entrepreneurial people?

4. Results

4.1. Steps 1 and 2: Knowing the situation of the problem

The resulting rich picture was drawn in Figure 1 after conducting semi-structured interviews and analyzing the answers. This diagram shows key actors in entrepreneurship education, their interactions, and difficulties and factors. Standard signs have been used to draw a rich picture, described in Table 6.

Table 6. General guide to rich picture

Row	Figure	Explanation
1	Small rectangle	Main actor, secondary actor, entrepreneurship education process
2	Large rectangle	Close environment
3	Arrow sign	The relationship between the actors and their activities towards each other and their role in entrepreneurship education (the direction of the arrow is meaningful)
4	Cloud picture	Roles and duties expected from the actor

4.1.1. Description of the rich picture

The Ministry of Education is among the key actors in school entrepreneurship education. It has a key role in formulating and executing educational policies in entrepreneurship. The problem situation shows that no appropriate educational content has been designed and formulated according to the current needs of society. Also, this Ministry has taken no effective action to train and use teachers having entrepreneurial views and approaches. Some of the goals of this Ministry are: training an entrepreneurial generation, training the human resource, and decreasing social issues such as poverty. Among its goals, the Ministry aims to enhance the organization's position at a global level and improve the quality of educational services.

Schools are another key actor in entrepreneurship education, in charge of executing educational programs and evaluating the number of students' achievements. Schools can carry out entrepreneurship education by creating appropriate educational contexts, allocating time and classrooms, and employing entrepreneurship education. In the current situation, entrepreneurship education has a lower priority for schools than other fields. Generally, schools allocate the time of entrepreneurship courses to other courses, or if they hold this course, they just focus on theoretical aspects.

The other vital actors are the students' parents. Parents can help improve their children's status in entrepreneurship by following their children's educational status and having financial and non-financial support. Since being accepted into university is a top priority for students, entrepreneurship education is unimportant for parents who support their children just to be accepted into universities. As the most significant actors, students have essential tasks. They need to reinforce and develop their knowledge and skills and raise their potential to set up a business in the future. They need to participate in entrepreneurship education programs actively and do their tasks and assignments carefully. Regarding the weakness of entrepreneurship programs at schools and not using new teaching methods in this field, students do not have enough motivation to do entrepreneurial activities.

Industries, start-up companies, science and technology parks, and accelerators are vital actors. Using the existing potentials of these actors can increase the efficiency of curriculum execution. They can also share their facilities, knowledge, and experiences with students to improve their knowledge, skills, and attitudes toward becoming entrepreneurs. Many potentials have yet to be used in the current situation due to the weak connection between these actors and the country's educational system.

The Islamic Consultative Assembly is also one of the critical actors in enacting necessary laws and allocating the required budget and credit in this field. Developing the entrepreneurship ecosystem requires formulating and enacting supportive laws so all actors can use their maximum potential. Also, allocating a sufficient budget is one of the crucial needs in entrepreneurship to achieve the depicted goals.

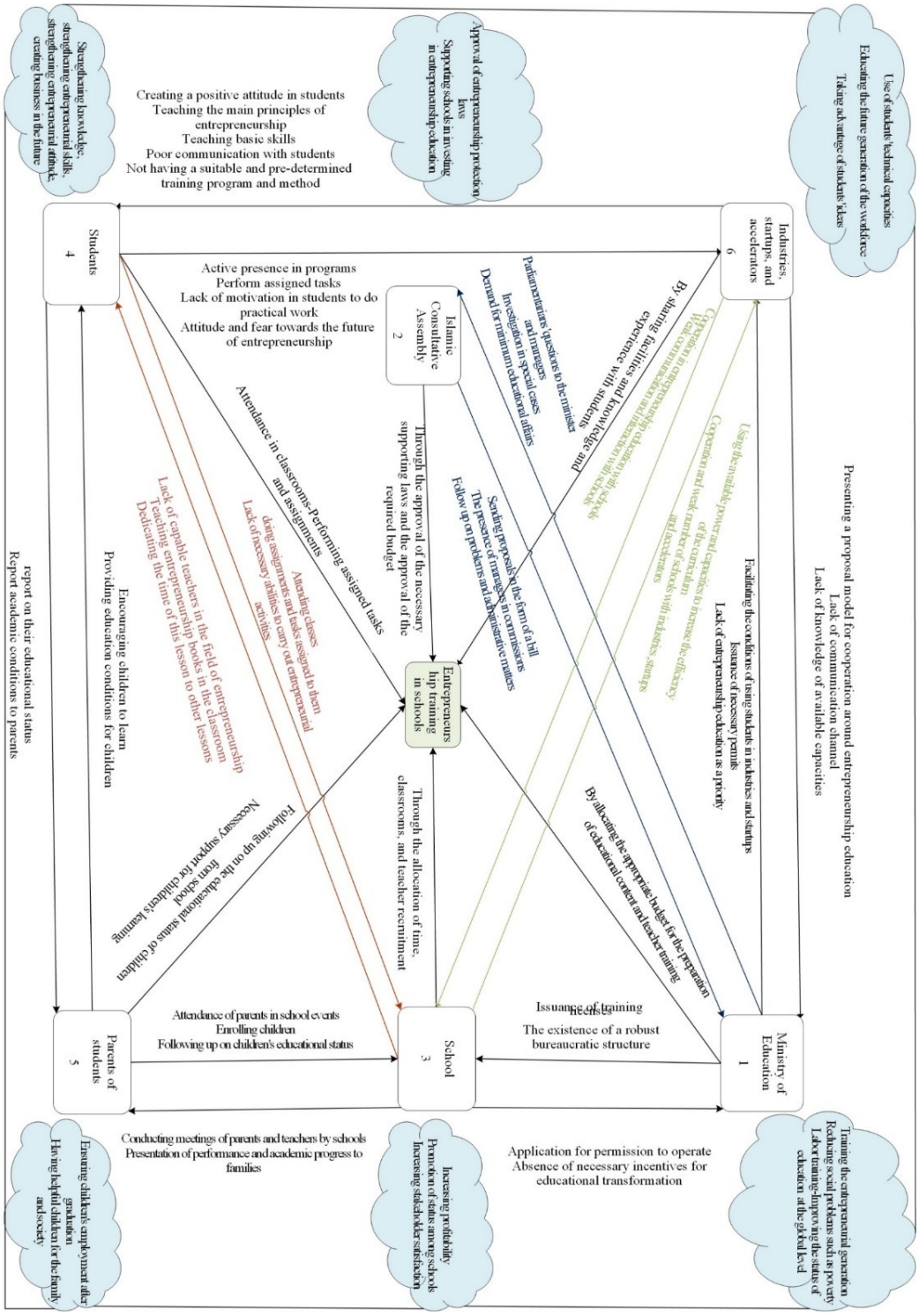

Figure 1. Rich picture

4.2. Step 3: Providing root definitions

Here, root definitions have been formulated and elaborated. Table 7 describes the elements of CATWOE, standing for Customers, Actors, Transformation, Worldview, Owner, and Environment.

Table 7. General guide to rich picture

Actor	Customers (C)	Actors (A)	Transformation (T)	Worldview (W)	The owner (o)	Environment (E)
Islamic Consultative Assembly	*Government *Ministry of Education	* Ministry of Education * Government * School management unit	* Enact protective laws * Supervise the implementation of the promulgated rules	* Reducing backwardness compared to other countries * Creating and strengthening the driving force of entrepreneurship in society	*Government	*Lack of proper infrastructure in the country * Topics related to implementation costs
Ministry of Education	* School management unit * School owners	*Parliament * School management unit	* Examining the status of entrepreneurship education in the country and the world and communicating the necessary instructions to schools * Prioritizing entrepreneurship education	* Creating a spirit of creativity and dynamism in students * Training the entrepreneurial generation	*Government	*Insufficient financial resources *Lack of expert and efficient teachers *Attitude of schools towards entrepreneurship course
School management unit	*Ministry of Education *School owner *Students *Parents of students	* Ministry of Education *The owner	* Preparing conditions in the school * Taking advantage of new methods of entrepreneurship education * Supervising the performance of the teaching staff	* Improving the level of the school among other schools * Developing entrepreneurship dimension in students * Creating profitability for the school	*Owner of the school * Ministry of Education	*Need a lot of time for practical training * The high cost of providing infrastructure *Lack of expert teachers in this field

Actor	Customers (C)	Actors (A)	Transformation (T)	Worldview (W)	The owner (o)	Environment (E)
Industries, startups, science and technology parks, and accelerators	*Schools *Students	* Ministry of Education *Students *Schools	* Providing physical capacities * Sharing knowledge and experience * Creating an entrepreneurial attitude in students	* Utilizing the capacities of students towards their goals.	*Ministry of Education *Schools	* Time limit for the presence of students in the learning environment. *Limited budget to provide facilities * Low cultural level and attitude of parents of students in this area.
students	*School management unit *Parents of students	* School management unit * Parents of students	* Active participation in educational programs * Providing suggestions to improve programs	* Acquiring knowledge, skills, and insights necessary in life * Preparing to start your own business after graduation	*Parents of students *School management unit	* Existence of a competitive atmosphere of passing percentage in the national entrance exam among schools * Downplaying the importance of this lesson in school
Parents of students	* School management unit *Students	* Students * School management unit	* Follow up on the educational status of children from school * Active presence in the Parents and Teachers Association * Supporting and encouraging students to participate in entrepreneurship programs	* Reducing children's job concerns after graduation * Raising creative and entrepreneurial children	*School management unit	* Low cultural level and low knowledge of parents of students in this area. Parents of * students are very busy

4.3. Step4: Model making

Conceptual models in entrepreneurship education drawn in figures 2 to 8 using standard signs:

- A big circle with continuous lines: (main actors).
- A small circle with continuous lines: (activity/secondary actor).
- Circle shape with discontinuous lines: (ecosystem).
- Arrow sign: (connection and continuity of activities, the direction of the arrow indicates the sequence of events)

4.3.1. The islamic consultative assembly (ICA or parliament) model

The ICA Model consists of five stages, depicted in Figure 2. In the first stage, the ICA conducts research and gains information regarding the topics through ICA Research Center. It also investigates universal legislative experiences and evaluates strong and negative points. In this stage, ICA receives suggested bills through communication and interaction with the Ministry of Education and reviews them. Furthermore, there are regular communications between ICA and Planning and Budget Organization to allocate and enact a sufficient budget.

In the second stage, the vision and expectations of law implementation should be investigated, and optimal goals should be formulated clearly. In the third stage, all aspects of this law are reviewed, and it will be enacted in ICA. Then, it will be proclaimed to the associated institutions to be enforced. As the laws are proclaimed, supervisory mechanisms for the exact enforcement of laws should be determined and formulated. In the final stage, ICA should ask for reports from those institutions and organizations in charge of law implementation.

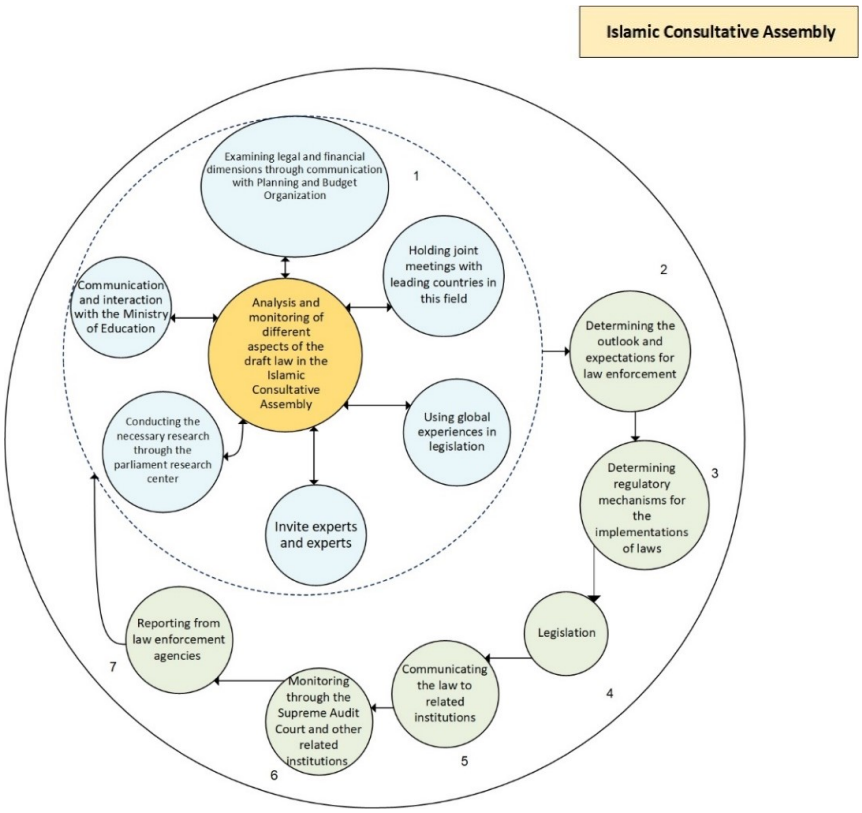

Figure 2. Conceptual model of the support of ICA

4.3.2. The conceptual model of industries, startups, science and technology parks, and accelerators

The conceptual model of industries, startups, science and technology parks, and accelerators consists of seven stages, depicted in Figure 3. In the first stage, representatives of industries,

startup companies, science and technology parks, and accelerators cooperate. It will help investigate cooperation opportunities between the actors, schools, and students. These actors should use the existing potential among students and macro-planning for educating and employing them as future human resources. It should be investigated in detail what services and instructions these actors can provide to reinforce and improve students' technical and non-technical competencies. Studying the universal experiences of the connection between industry and schools and using the researchers' and professors' potential in the country helps design the required structure and processes. The optimal cooperation model should be selected in the next stage regarding all sides' existing conditions, limitations, and expectations. Then, the Ministry of Education should approve the cooperation model and proclaim to those organizations under its supervision. Next, this cooperation should be implemented as a pilot project in several areas. Then, it should be revised and edited using the feedback from selected schools. Afterward, the proposed package should be implemented all around the country. Finally, it should be revised and edited again according to the feedback.

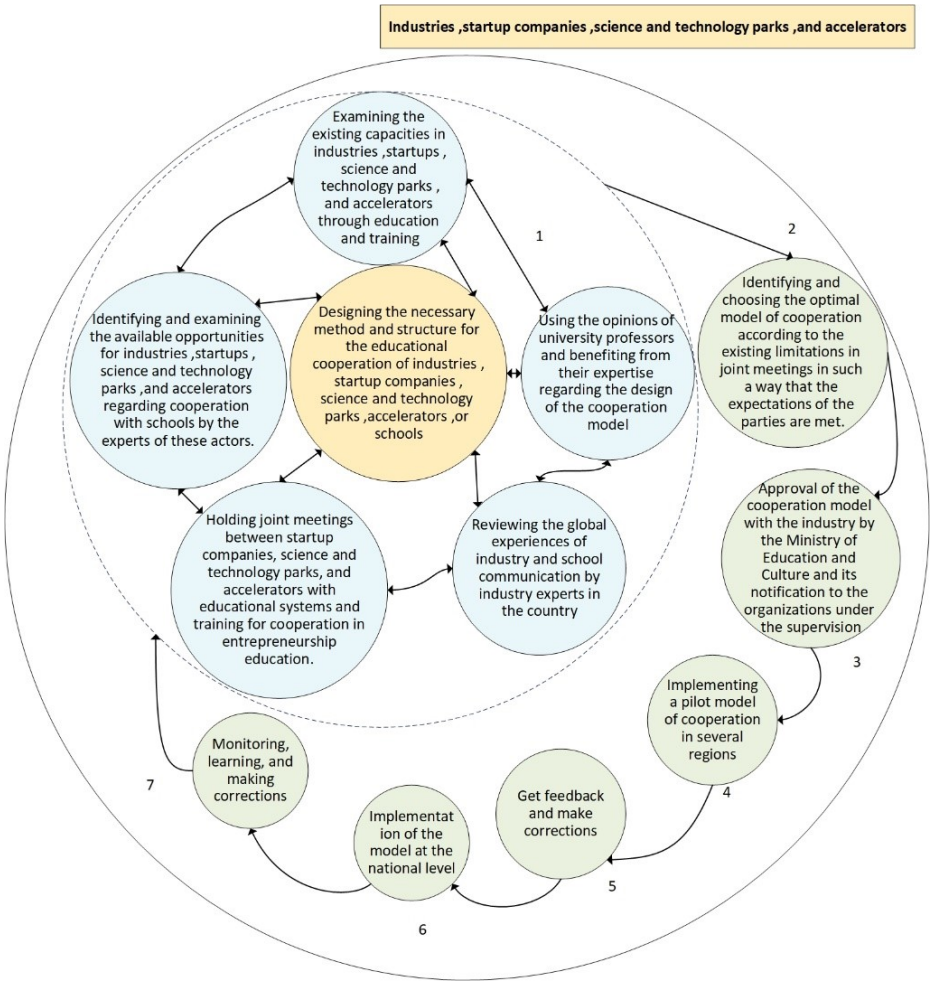

Figure 3. Conceptual model of supporting industries, startups, science and technology parks, and accelerators

4.3.3. The conceptual model of the ministry of education

The conceptual model of the ministry of education consists of five steps, depicted in Figure 4. First, different aspects of entrepreneurship education and curriculum should be investigated. It can be carried out in various ways: reviewing the educational models of leading schools (domestic and foreign), receiving the expert teachers' views and recommendations, consulting university professors and researchers in this field, studying the latest research achievements, and cooperating with the ministries of leading countries in entrepreneurship education and using their experiences. Next, findings should be prioritized, rated, and then monitored. The third step consists of two parts. In the first part, the execution mechanism and decision for the intended program should be determined, followed by conducting meetings with the Planning and Budget Organization to secure financing. In the second part, some meetings should be held between the parliament and the Ministry of Education. Afterward, the curriculum should be implemented, and then according to the feedback, it should be revised and edited.

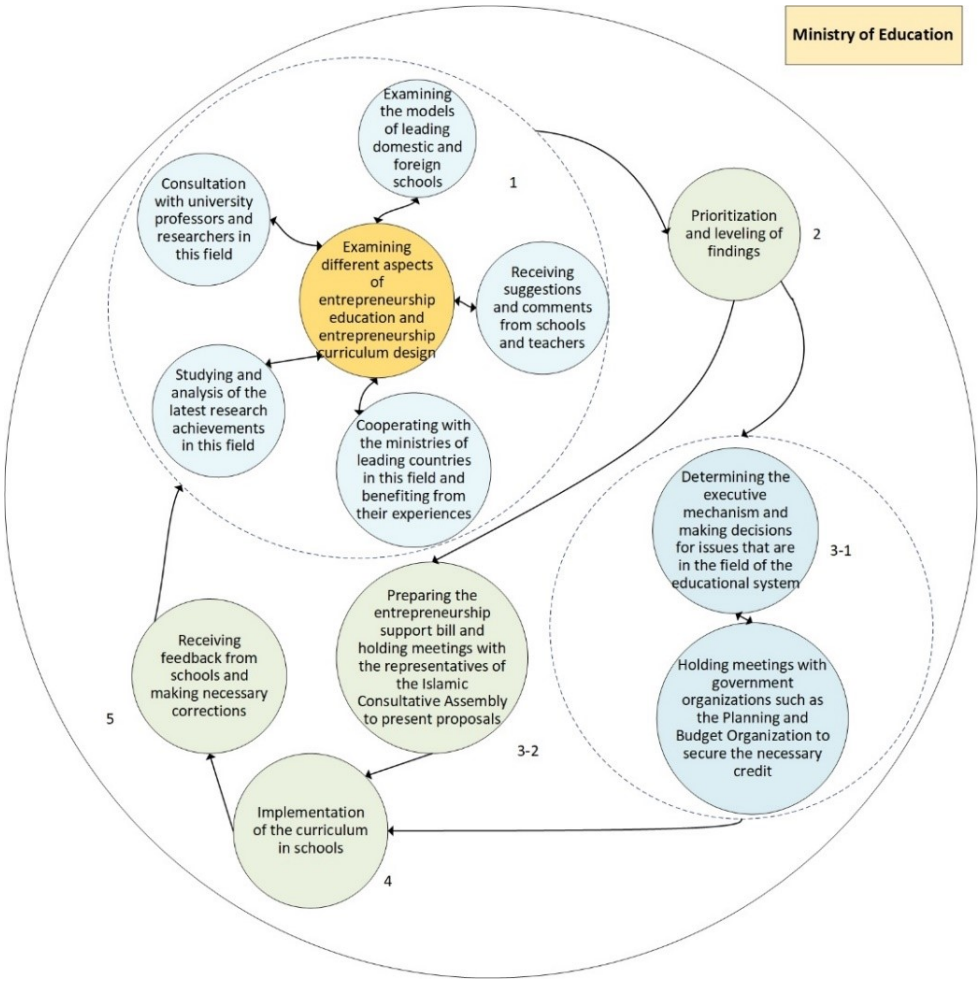

Figure 4. Conceptual model of the ministry of education's support

 DOI: 10.22067/JSTINP.2023.81499.1052

4.3.4. The conceptual model of schools

The conceptual model of schools consists of five parts, depicted in Figure 5. First, the school starts to identify educational methods, considering its facilities and potential. For this purpose, some actions can be carried out: consulting and cooperating with industries, cooperating with leading centers in entrepreneurship, using the entrepreneurs' potential for entrepreneurship education, using the potential of students' parents, and cooperating with professors and students in entrepreneurship. Second, the proposed solutions and methods should be prioritized based on the existing limitations and resources. Third, there should be a negotiation with stakeholders to execute the entrepreneurship education program and to provide prerequisites for high-quality and practical education. Next, the curriculum will be executed, and finally, monitoring, learning, and necessary revisions in the program will be done. While carrying out the abovementioned processes, the school should check the performance of its rivals so that it can become more prepared to provide educational services.

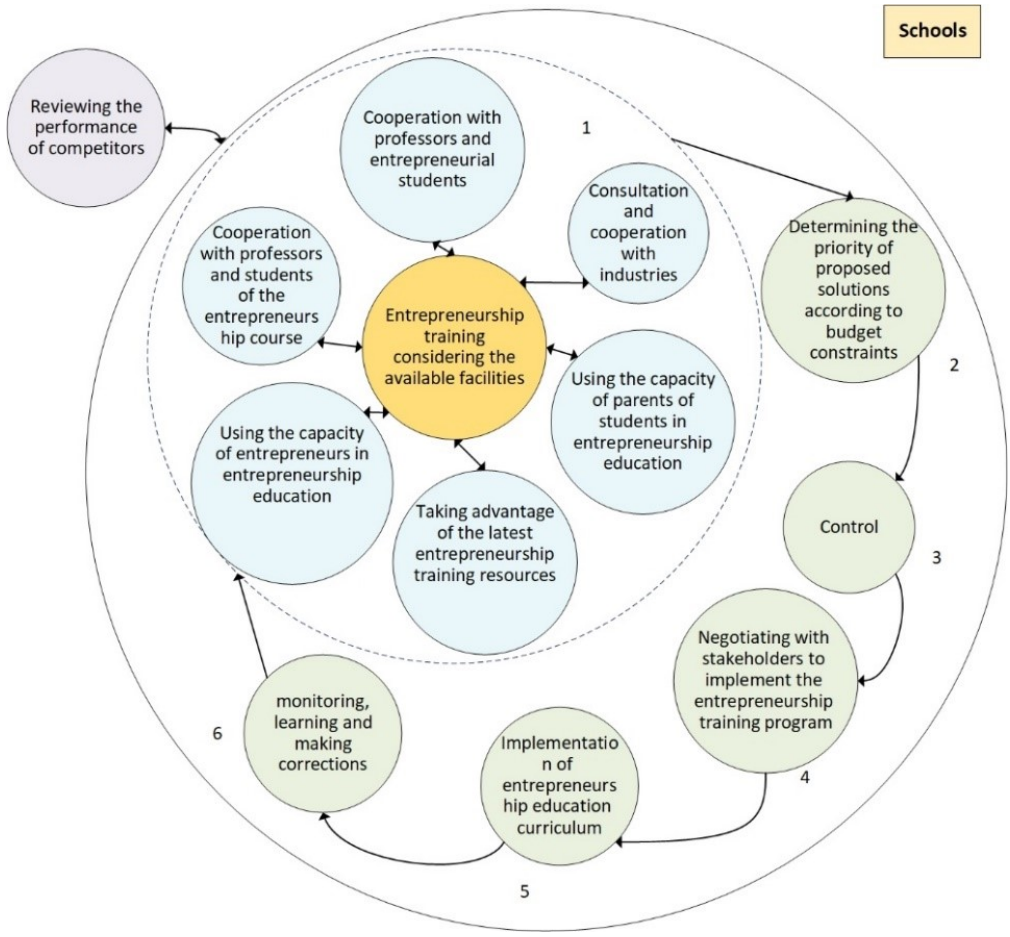

Figure 5. Conceptual model of schools' participation

4.3.5. The conceptual model of students' parents

The conceptual model of students' parents consists of five steps, depicted in Figure 6. First, students' parents can play an effective role in entrepreneurship education and improving the quality of its execution at schools. They can do it through actively participating in school events, offering suggestions to the school management and educational board, giving reports of students' performance outside the school, and providing their potential and social interactions. Second, suggested views and opinions should be summed up with the parent's help. Third, volunteer parents willing to cooperate in entrepreneurship education should determine their roles in helping entrepreneurship education. Next, parents should cooperate and participate in executing educational programs. Eventually, the results should be evaluated and revised wherever necessary.

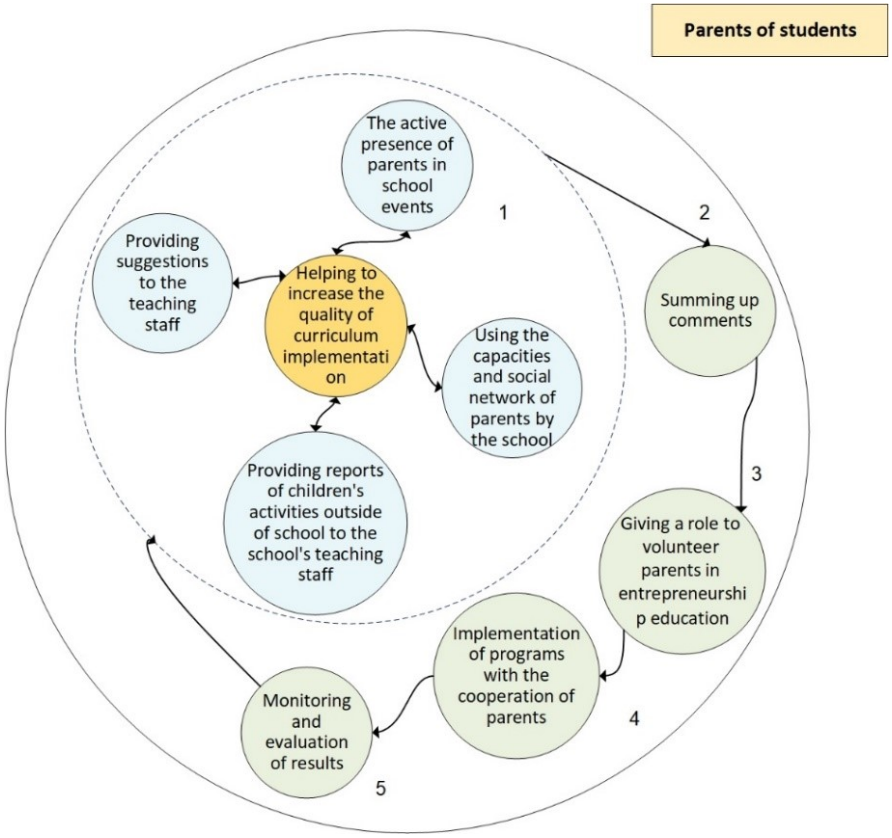

Figure 6. Conceptual model of students' parents' participation

4.3.6. The conceptual model of students

The conceptual model of students consists of four steps, depicted in Figure 7. In entrepreneurship education, students must play an active role in learning. First and foremost, it is essential to consider the needs of students, encompassing their knowledge, skills, and attitudes. It involves understanding students' specific requirements and learning objectives to

design and implement effective entrepreneurship education programs tailored to their needs. Also, students' opinions regarding how to execute programs should be considered as much as possible. Entrepreneurship mentors should design programs to give students a fair share of material and spiritual outputs. While designing entrepreneurship programs, doing practical activities of delegating responsibilities to students can positively affect their entrepreneurial competencies. Second, the designed programs will be executed. Having executed the programs, students must actively participate in program evaluation. Eventually, any necessary revision should be done based on feedback and learning.

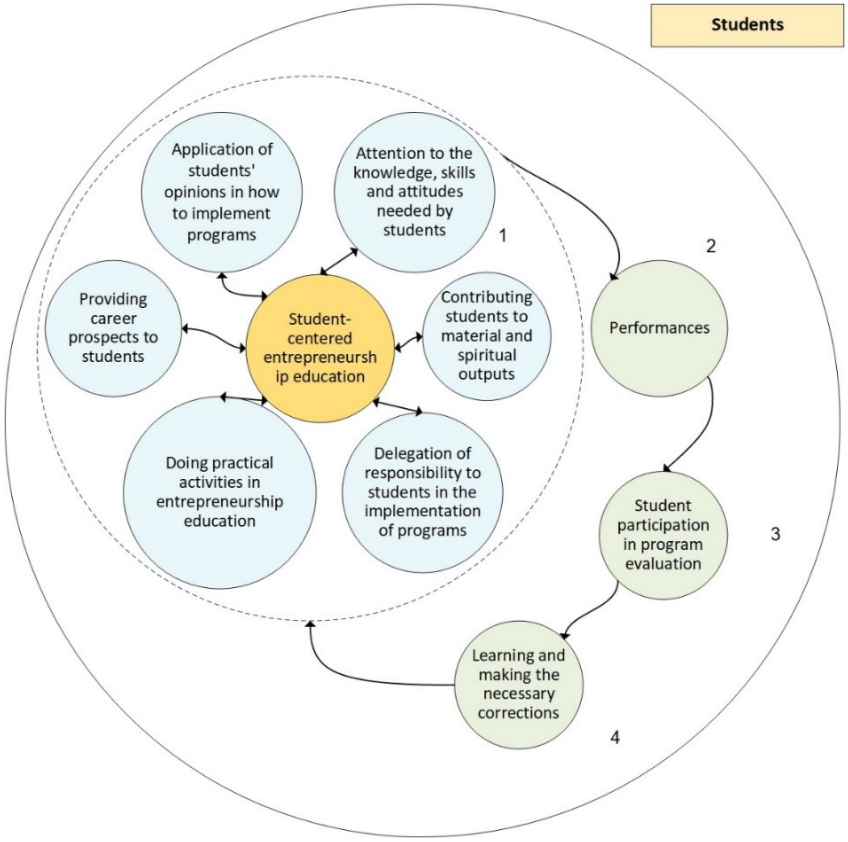

Figure 7. Students' conceptual model

4.4. Step 5: Hybrid model

The hybrid model for curriculum development at schools using the conceptual models is depicted in Figure 8. The model obtained from the conceptual models of the main actors includes five stages. First, problem definition should be done about the related topic. In order to achieve this, challenges and issues should be reviewed and prioritized by creating a think tank and holding various meetings with key actors. For this purpose, using experts' opinions and considering the existing limitations is essential. This step is done in the problem definition ecosystem.

Second, after the clear problem definition, the best approach and model to solve the problem should be selected. Due to achieving this goal, it is necessary to conduct case studies, review domestic and foreign research conducted on this issue, review the educational systems of leading countries, hold meetings with governing and legislative institutions, and receive the opinions and views of actors. This step is done in the model presentation ecosystem.

Third, control should be done before action. It means that before implementing the educational model, experts and professionals should check all aspects and effects of the intended model. The developed model should be implemented in a few selected schools or educational districts to accomplish this. It allows for a focused and controlled application of the model, enabling valuable data collection and feedback for further refinement and evaluation. Then the results should be checked to do any necessary revisions.

Fourth, the entrepreneurship education model should be implemented in the country's schools. Due to facilitate this goal, it is crucial to determine the implementation requirements of the model. It includes identifying the necessary resources. Moreover, there is a need to prepare the minds of schools to implement the entrepreneurship education model. Then, performance indicators of entrepreneurship education at schools should be defined. Moreover, finally, the entrepreneurship education model should be implemented to raise students' knowledge, skills, and attitudes. This stage is done in the implementation ecosystem.

Fifth, control should be done after action. It means controlling performance metrics of implementation and execution of entrepreneurship education should be done. Furthermore, reports should be received from the main actors about the implementation. At the end of this stage, learning will happen. Due to finishing this cycle, it can be continued until the optimal result is obtained. Upon completion, there are additional potential activities that can be pursued. These include: designing a mechanism to ensure the methodology aligns with the problem and investigating the universal procedures of entrepreneurship education at schools.

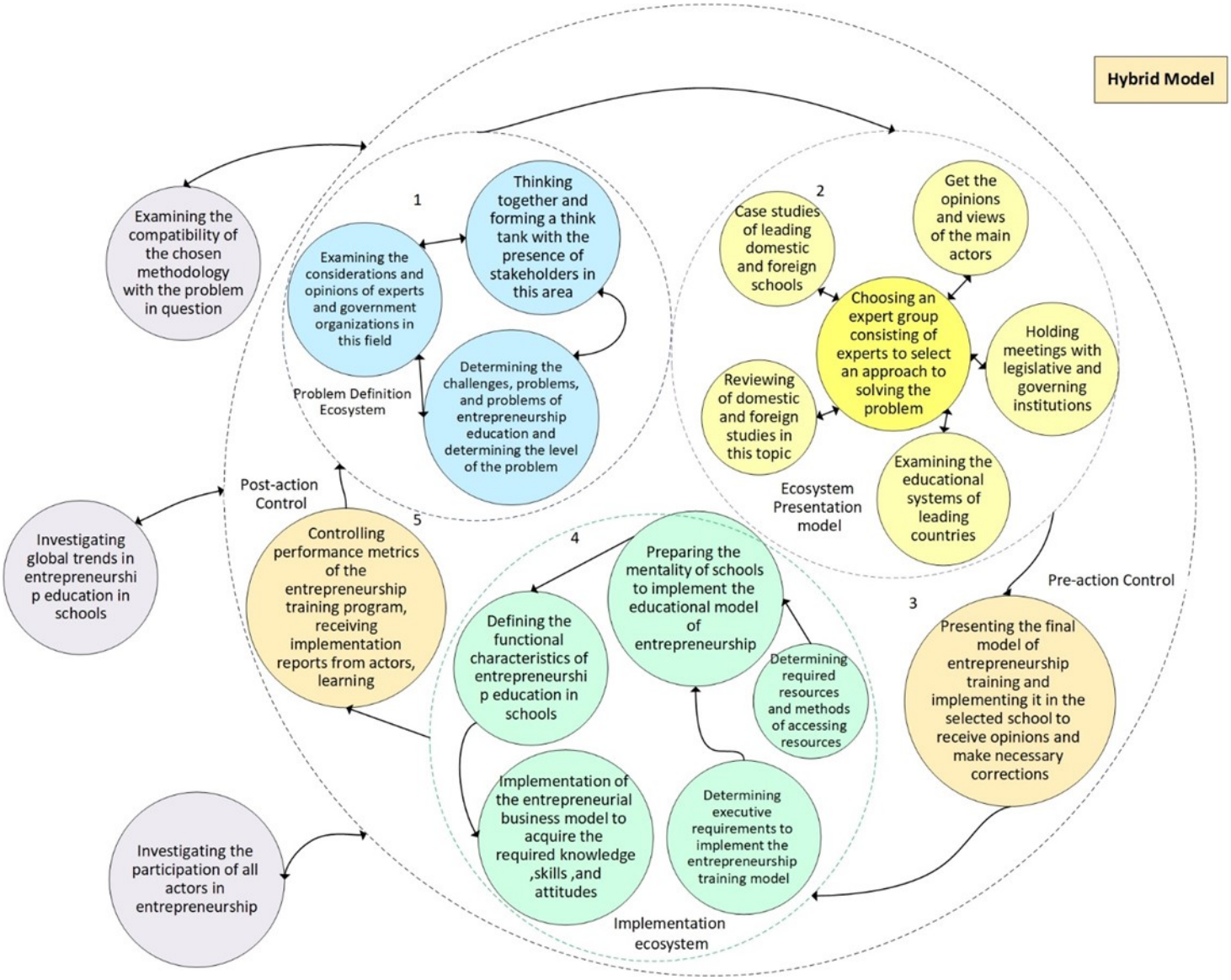

Figure 8. The final model resulting from the conceptual models of key actors in schools

4.5. Step 6 and 7: Changing and doing related actions

If the optimal curriculum model is to be practical, changes should be made in the current system. Some of these actions and related measures are unavailable and must be created. On the other hand, some others exist, but they are not carried out with appropriate mechanisms. So, it needs to be changed how it carries them out. Table 5 depicts all required actions and measures for each existing ecosystem for entrepreneurship education at schools. Table 8 shows the actions and measures necessary for each school's ecosystems.

Table 8. Necessary actions for optimal entrepreneurship education in schools

Is the situation favourable?	The current way of doing it.	Does it exist in the real world?	Action (conceived activities)	Ecosystem
no	according to circumstance	Rarely	Cooperating with ministries of leading countries, benefiting from their experiences	Education
no	It doesn't exist	no	Permitting companies to establish offices in schools	
no	If it happens	To some extent	Receive comments and suggestions from schools and teachers	
no	Usually a command	incompletely	Study and analysis of the latest research achievements	
To some extent	If it happens	It exists	Holding meetings with government organizations such as the Planning Organization to secure the necessary credit	
To some extent	according to circumstance	To some extent	Preparing the entrepreneurship support bill and holding meetings with the representatives of ICA to present proposals	
no	passive	rarely	Cooperation with professors and students of entrepreneurship in the form of a coach	schools
no	It doesn't exist	no	Consultation and cooperation with industry representatives	
no	It doesn't exist	no	Providing offices and other facilities to companies for permanent presence in schools, defining how students work with companies with the aim of benefiting each other.	
no	randomly	very limited	Using the capacities of students' parents in entrepreneurship education	
no	It doesn't exist	no	Cooperation with leading educational centers in entrepreneurship	
no	It doesn't exist	no	Taking advantage of the latest entrepreneurship education resources	
To some extent	Custom- made	yes	Use of global experiences in legislation	Islamic Consultative Assembly
To some extent	according to circumstance	yes	Asking experts	
no	It doesn't exist	no	Incentive plans for the presence of companies in schools	
no	It doesn't exist	no	Applying students' opinions on how to implement programs	Students
no	It doesn't exist	no	Contributing students to material and spiritual outputs	
no	It doesn't exist	no	Cooperation of students with established offices and companies in schools to strengthen entrepreneurial skills	
no	passive	To some extent	Providing career prospects to students	
no	according to circumstance	To some extent	Delegating responsibility to students in the implementation of programs	
To some extent	according to circumstance	It exists	Cooperation of students in the implementation of programs	

Is the situation favourable?	The current way of doing it.	Does it exist in the real world?	Action (conceived activities)	Ecosystem
no	Often in the form of theory - lack of coverage of practical and motivational aspects	To some extent	Equipping students with necessary knowledge, skills, and attitudes	
no	It doesn't exist	no	Student participation in program evaluation	
no	passive	To some extent	Provide feedback on students' activities at home and outside the school	Parents of students
no	It doesn't exist	no	Allowing and encouraging students to participate in company activities during non-class hours	
no	according to circumstance	rarely	Making suggestions to the management staff	
no	It doesn't exist	no	Implementation of programs with the cooperation of parents	
no	according to circumstance	yes	Sharing knowledge and experiences with students	Industries, startups, science and technology parks, and accelerators
no	It doesn't exist	no	Establishing a permanent office by industries in schools to use students' capacities, defining tasks for students to strengthen their entrepreneurial skills, and companies taking advantage of students' potential.	
no	according to circumstance	yes	Sharing available equipment and resources for entrepreneurship education	
no	it doesn't exist	no	Using students' ideas and sharing them in the project	

5. Discussion

Students' parents play a critical role in entrepreneurship education by providing economic and spiritual support. Related results are consistent with Lee-Gosselin and Grise (1990) on the effect of teaching the values of hard work, independence, and honesty on children's entrepreneurial characteristics. Also, research (Floris and Pillitu, 2019) acknowledges the role of parents in accompanying children in producing entrepreneurial products. The capacities of startup companies, science and technology parks, and accelerators can increase the efficiency of implementing entrepreneurship education programs. They can share their facilities, knowledge, and experience with students to improve their attitudes, knowledge, and skills as future entrepreneurs. The findings of this study are consistent with Kurowska-Pysz (2014) and (Huang et al., 2017) based on the positive impact of scientific entrepreneurship incubator program on students' managerial and entrepreneurship competencies and skills, the research of Hebles et al., (2019) based on the necessity of direct communication of students with business environments, the study of Winarno et al., (2019) and Athayde (2009) based on the working relationship of high school students with companies to increase students' entrepreneurial skills

and attitude, research of Chiloane-Tsoka (2016) based on the experience of working in the industry for students and the industry's support for students.

The Ministry of Education should apply policies that create students' motivation. The results are consistent with Morakinyo and Akinsola (2019), Floris and Pillitu (2019) and Pelletier (2007). Schools are responsible for implementing educational programs and evaluating the student's achievements. Schools can strengthen students' entrepreneurial skills by creating a suitable educational environment, using the latest methods of entrepreneurship education, allocating time, and hiring an entrepreneurship teacher. The results of this section are consistent with the findings of Evgrafova et al., (2019), Lubis et al., (2019), Steinke and Fitch (2007), Kenworthy-U'Ren et al., (2006), Sagar et al., (2012) and Sai et al., (2019). Students are responsible for the essential tasks as the main actors. They should strengthen and develop their knowledge and skills by actively participating in entrepreneurship training programs, performing assigned tasks, and increasing their capabilities to create a future business. The results of this section were consistent with Blenker et al., (2011), Roth et al. (2007), Maritz and Brown (2013), Izquierdo and Buelens (2011), Herger and Bodarky (2015), and Pruett (2012). As a significant actor, ICA can approve the required laws and allocate the budget. The results of this section were consistent with Floris and Pillitu (2019), European Commission (2013), Adekiya and Ibrahim (2016), Lindh and Thorgren (2016). Also, the approval of protective laws by the ICA and the identification of incentive plans by the Ministry of Education to establish startups in schools can significantly affect entrepreneurial education.

6. Conclusion

Nowadays, due to the inefficient educational system in schools, students do not communicate with necessary subjects in their lives. It causes students to be unable to use life opportunities (Hosseinikhah, 2002). By creating an efficient educational system, it is possible to train creative and innovative students as future entrepreneurs (Mehrabi, 2017). Therefore, this research aims is to develop an entrepreneurship education ecosystem to achieve this goal. In the current situation where emerging a problem, Soft System Methodology can be an appropriate tool for designing an entrepreneurship education ecosystem in Iranian schools.

The main steps are to design and implement an entrepreneurship education programs in Iranian schools, problem-definition ecosystem, model presentation, and implementation ecosystem. In problem-definition ecosystem, the consensus among actors and forming a think tank to identify entrepreneurship challenges are among the desired model's necessities. In a

model-presentation ecosystem, it is necessary to extract the material model by using case studies, studying previous research, interacting with educational systems of leading countries and their achievements, and holding meetings with relevant governing institutions. In an implementation ecosystem, the mindset of schools should be changed to implement entrepreneurship education model, and schools should find an attitude regarding implementing this issue. The resources should be determined.

The actions obtained to realize the desired model:

- Creating a think tank in the Ministry of Education with experts and actors.
- Approval of protective laws by ICA and definition of incentive plans by the Ministry of Education (Morakinyo and Akinsola., 2019) to establish start-ups in schools and to involve students, using students' ideas (Huang et al., 2017).
- Applying students' opinions in implementing programs, cooperation in implementing programs, and contributing to students'material and spiritual outputs (Herger and Bodarky, 2015).
- Cooperation of schools with entrepreneurship professors and students in the form of mentors, using the capacities of students' parents in entrepreneurship education by schools. (Lee-Gosselin and Grise, 1990)
- Using world experiences in legislation by ICA, cooperating with ministries of leading countries, preparing a bill to support entrepreneurship, and holding meetings with representatives of ICA to present proposals (Floris and Pillitu, 2019).
- Implementing programs with the cooperation of parents and providing feedback on students' activities at home and outside the school by parents (Floris and Pillitu, 2019).

The present research has significant educational, theoretical, and policy outcomes for entrepreneurship education in Iran. In this research, the components of the entrepreneurship education ecosystem in Iranian schools and the required approaches to improve the activities of this ecosystem were indicated. Also, the way of interaction between the components of this ecosystem and the needed actions for each part are among the contributions of this research.

7. Limitations and suggestions

The unfamiliarity of the interviewees with soft systems was a limitation of this study. It could affect the incompleteness of the rich picture of interviews.

Iran's current entrepreneurship curriculum and education needs to improve, and requiring a general reform in its structure. The following is a list of practical recommendations: Establishing a permanent office by industries in schools to use students' capacities, defining tasks for students to strengthen their entrepreneurial skills, taking advantage of students' potential, Sharing available equipment and resources for entrepreneurship education by companies, using students' ideas and sharing them in the project, creating a think tank in the Ministry of Education using the experts, authorities, and the actors of this field, designing the

entrepreneurship education model with the pivotal role of the Ministry of Education and piloting it in some regions. The following is a list of useful recommendations for future research in soft systems methodology: Determining the interactions among actors and the critical activities for each of them in the problem-definition ecosystem, determining the interactions among actors and the critical activities for each of them in the model-presentation ecosystem, determining the interactions among actors and the critical activities for each of them in the implementation ecosystem, using other experienced expert actors in this field to reinforce the optimal model, interviewing more experts with different views to increase the richness of rich picture.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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