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## ORIGINAL RESEARCH ARTICLE

# The Function of Social Entrepreneurship Knowledge in Realizing Sustainable Development of Northern Iranian Villages

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## ABSTRACT

This research aims to identify the function of social entrepreneurship knowledge in realizing sustainable development of northern Iranian villages. In this research, using the opinions of experts, indicators, components, and dimensions were identified explanatorily. Regarding the method of extracting these indicators, it should be noted that this was done by examining the existing theoretical foundations and implementing the interview text using the Brown and Clark theme analysis method in ATLAS TI software. In this regard, interviews were conducted until theoretical saturation with 20 urban planning and rural management experts, then the interview text was analyzed using coding. Thematic analysis was based on 6 level two constructive themes, 24 level one constructive themes, and 72 primary themes. The constructive themes include economic themes, social themes, cultural themes, environmental themes, institutional and governance themes, and technological and innovative themes. Achieving sustainable development in the villages of northern Iran requires a combination of production optimization, increasing the added value of products, financial management, activity substitution, reducing economic risk, multidisciplinary entrepreneurship, local cooperation networks, trust, social groups and associations, education and skills training, access to resources, economic independence, and participation in local decision-making. These components reinforce each other, and only with a comprehensive and coordinated approach can sustainable, resilient, and inclusive development be achieved. When the local community is empowered, participatory, and has mutual trust, and resources and opportunities are managed in a fair and sustainable manner, the path to sustainable development is paved and people's lives improve in the short and long term. ©authors.

## 1. Introduction

The villages of northern Iran play an important role in the country's economy and cultural identity due to their rich natural resources, unique geographical location, and rich local culture (Chenari et al, 2019; Azmat, 2013; Vachani et al, 2008). However, these regions face numerous challenges in development. The indiscriminate migration of rural people to cities, environmental degradation due to unsustainable exploitation of natural resources, and the reduction in the efficiency of traditional agricultural systems are among the most important problems of these villages (Shabbir et al, 2025). On the other hand, the lack of appropriate infrastructure, limited access to educational and health services, and weakness in local resource management have posed serious obstacles to the economic and social development of these regions (Abdullah et al, 2024). Therefore, the need for solutions to achieve sustainable development in the villages of northern Iran is increasingly felt. Sustainable development of villages means achieving economic growth while preserving the environment and improving the quality of life of local communities. In many villages in northern Iran, traditional agriculture, fishing, and local tourism are the main sources of household income, but climate change, water pollution, and inefficient land use threaten the economic security of residents (Tejeida-Padilla et al, 2025). In addition, the migration of the younger generation to cities to achieve better job and educational opportunities has reduced the active labor force and increased the elderly population in villages. These issues indicate that without coherent planning and supportive policies, the economic development of these regions will be jeopardized and the Sustainable Development Goals will not be achieved (Hariram et al., 2023).

One of the most important aspects of sustainable development is strengthening social and economic infrastructure. Access to health and education services, appropriate transportation networks, and information and communication technology infrastructure

can pave the way for improving the well-being and empowerment of rural communities. In addition, promoting sustainable agriculture, protecting natural resources, and promoting ecological tourism are considered effective strategies for sustainable development (McKercher, 1993).

Research has shown that active participation of local people and cooperation between the government, private sector, and non-governmental organizations can play an important role in the success of sustainable development programs (Ciolac et al, 2019; Turyakira et al, 2025). Given the economic, social, and environmental importance of the villages of northern Iran, it is essential to examine the factors affecting sustainable development and provide operational solutions. Development planning should be based on a precise understanding of local capacities and limitations and be designed in a way that preserves the long-term interests of the local community and the environment (Belias et al, 2022).

Creating supportive policies, developing sustainable infrastructure, empowering people, and using modern technologies in agriculture and tourism are among the measures that can pave the way for sustainable development (Doozandeh Ziabari et al, 2025). Addressing these issues not only helps improve the living conditions of rural residents, but can also play an important role in preserving the culture and environment of these areas (Rezky et al., 2024; Zhao, 2025).

Social entrepreneurship knowledge plays a very important role in empowering rural communities and achieving sustainable development. In the northern regions of Iran, where there are diverse natural and cultural resources, social entrepreneurship can contribute to economic and social growth by identifying the real needs of the community and creating creative solutions based on local capacities (Lane et al, 2022; Calzada, 2023). This knowledge includes understanding the processes of creating social value, developing community-based projects, and the ability to manage limited resources in a sustainable manner. By utilizing social entrepreneurship knowledge, villagers can create new economic opportunities, while

preserving the environment, and playing an active role in development decision-making (Algieri et al., 2018).

One of the main functions of social entrepreneurship knowledge is to empower local individuals and groups. This empowerment includes improving managerial, technical, and social skills that allow individuals to take their projects from idea to implementation (Milano et al., 2019). In many villages in northern Iran, youth and women play a key role in economic activities, and developing social entrepreneurship knowledge can pave the way for increased participation (Pato et al., 2021). By increasing the skills and self-confidence of individuals, society will be able to manage economic and social projects in a sustainable manner and reduce dependence on foreign aid (Li, 2022). Social entrepreneurship knowledge also improves the productivity of natural resources and the environment. In northern Iranian villages, resources such as agricultural land, forests, and surface and groundwater are of particular importance. Using innovative and sustainable methods of exploiting these resources, based on social entrepreneurship knowledge, can reduce environmental damage while increasing economic opportunities. For example, implementing organic farming projects, sustainable tourism, or handicrafts based on local culture can both generate income and protect the environment (Asgari et al., 2022; Barros et al., 2011).

Another important aspect of the function of social entrepreneurship knowledge is the creation of effective networks and collaborations among stakeholders. These networks include interactions between local community members, government institutions, the private sector, and non-governmental organizations (Perelygina et al., 2022; Kusumastuti et al., 2023). Using social entrepreneurship knowledge, individuals can develop skills in collaboration, communication, and collective project management. These collaborations lead to resource sharing, experience exchange, and strengthening social capital in the rural community, paving the way for the

implementation of large and impactful projects (Liu et al., 2022). Another function of social entrepreneurship knowledge is to develop the ability to solve complex problems and face challenges. In the villages of northern Iran, problems such as climate change, declining economic resources, and youth migration require creative and flexible solutions. Social entrepreneurship knowledge helps individuals analyze problems, prioritize them, and provide local and operational solutions using available resources. This ability, in addition to increasing the efficiency of development projects, increases the resilience of society to crises and economic fluctuations (Herutomo et al., 2022).

In addition to economic and environmental aspects, social entrepreneurship knowledge plays an important role in strengthening the cultural and social identity of villages. Given the cultural and historical diversity of northern Iran, using this knowledge can pave the way for preserving local values and traditions. Social projects based on local culture, handicrafts, traditional arts, and cultural tourism not only generate income, but also strengthen the sense of belonging and social capital among community members. This allows sustainable development to be accompanied by the preservation of cultural and social identity, and economic growth to be aligned with social development (Scuttari et al., 2021; Wolf et al., 2010).

It can be said that social entrepreneurship knowledge is a key tool for achieving sustainable development in the villages of northern Iran. This knowledge helps communities manage social and environmental issues while growing economically, increase public participation, and create sustainable job opportunities (Stylidis et al., 2023). By expanding this knowledge among rural communities, innovative models for agriculture, tourism, handicrafts, and local services can be created that, in addition to promoting economic well-being, also lead to environmental protection and promotion of social capital.

Therefore, it is essential to pay attention to the functions of social entrepreneurship

knowledge in planning and policy-making for the development of rural areas in northern Iran. Sustainable development is not only not possible without utilizing social entrepreneurship knowledge, but also the implementation of projects without the active participation of the local community and regardless of existing resources and capacities will fail. Education, empowerment, and the creation of appropriate infrastructure to spread this knowledge can pave the way for sustainable development in these areas and play a vital role in preserving the environment, improving the quality of life, and strengthening the cultural identity of the community. Therefore, the research seeks to answer the question of how social entrepreneurship knowledge functions in achieving sustainable development in northern Iranian villages?

## 2. Literature Review

### *Social Entrepreneurship Knowledge*

Social Entrepreneurship Knowledge is a set of skills, experiences, and theoretical and practical understanding that enable individuals and communities to identify and manage social and economic opportunities and create sustainable social value. This knowledge is a combination of management abilities, creativity, innovation, and a deep understanding of social issues and is used to solve community problems and promote public welfare. Unlike traditional entrepreneurship, which focuses primarily on financial profit, social entrepreneurship seeks to create long-term positive social and environmental impacts and places the interests of the community and its individuals at the center of its activities (Dale et al, 2010).

Social Entrepreneurship Knowledge includes a detailed understanding of community needs, identifying available resources, and designing innovative solutions to solve complex problems. This knowledge includes planning, project management, communication, leadership and empowerment skills, and enables individuals to create projects with high social value using limited resources. In addition, social

entrepreneurship knowledge includes the ability to analyze problems, predict economic and social impacts, and design sustainable models that provide long-term benefits to society. The application of this knowledge in local communities, especially in rural and underserved areas, is very effective (Wang et al, 2024). By utilizing social entrepreneurship knowledge, individuals will be able to create new job opportunities, increase community participation, and provide solutions to preserve the environment and improve the quality of life. Overall, social entrepreneurship knowledge is a vital tool for sustainable development, community empowerment, and creating positive changes at the local and national levels, and plays an important role in coordinating economic, social, and environmental goals (Han, 2020).

### *Sustainable Rural Development*

Sustainable rural development refers to a process that aims to improve the quality of life of rural communities by preserving natural, cultural, and economic resources for future generations (Wang et al, 2022). This concept goes beyond mere economic growth and focuses on the balance between economic, social, and environmental aspects. Sustainable rural development aims to increase people's well-being, reduce poverty, empower local communities, and protect natural resources in a long-term manner, and emphasizes the creation of sustainable employment opportunities, improving social services, and preserving the environment (Dimitriadou et al., 2021)

One of the key features of sustainable rural development is the optimal and balanced use of natural and human resources. In rural areas, agriculture, animal husbandry, handicrafts, and tourism are important economic resources, and the sustainable use of these resources is essential to maintain ecosystem health and prevent environmental degradation (Shayan et al, 2022). In addition, sustainable rural development requires strengthening infrastructure, including access to education, health, technology, and transportation, so that local communities can

access economic and social opportunities (Karampela et al, 2021).

Sustainable rural development also emphasizes the active participation of local people in the decision-making process. Empowering communities, creating collaborative networks, and strengthening social capital can pave the way for the implementation of successful and sustainable projects. This approach ensures that development is designed according to local needs and capacities and reduces potential negative impacts. Sustainable rural development is a comprehensive approach that simultaneously pursues economic growth, social justice, and environmental protection. This concept is a key tool for promoting well-being, reducing migration from villages to cities, and preserving the cultural and natural identity of rural communities, leading to the creation of resilient, self-sufficient, and sustainable communities (kiadaliri et al, 2024).

### 3. Method

This research aims to design and develop a model of the functioning of social entrepreneurship knowledge in achieving sustainable development in northern Iranian villages. To achieve the aforementioned goal, thematic analysis method has been used, which is one of the valid qualitative approaches for analyzing interview data and identifying content patterns and hidden themes in the data texts. In this method, the data are systematically coded and then categorized into main themes. Brown and Clark's thematic analysis method is one of the valid and widely used approaches in qualitative data analysis that is used in various fields of social and psychological research (De Sordi, 2024). This method was introduced in 2006 by Virginia Brown and Claire Clark and is used especially in studies that require in-depth and systematic analysis of textual data. Brown and Clark's thematic analysis specifically identifies and interprets hidden themes or patterns in the data and systematically extracts and analyzes them. This method analyzes data at different stages and allows researchers to gain a deeper

understanding of the experiences and perspectives of individuals or groups.

Purposive sampling was used in this study. This method allows the researcher to select individuals or groups who have appropriate information and experiences in the field of research. For this purpose, 20 experts and experts in the field of urban development and rural management were selected as research samples. These individuals had sufficient expertise and experience in the field of rural development and entrepreneurship.

A semi-structured interview tool was used to collect data. This tool allows the researcher to ask main questions and flexibly ask sub-questions and follow-ups during the interview, depending on the interviewees' answers. This type of interview provides a space for participants to freely and in detail express their opinions, thereby obtaining richer information about the challenges and needs of a decision support system in conditions of disruption. The interviews were conducted individually and for 45 to 60 minutes. The data obtained from the interviews were examined using thematic analysis. In this method, the following steps were taken:

*Getting to know the data:* In this stage, all interviews were listened to carefully and notes were taken. Then, the interview texts were fully transcribed so that the researcher could gain a complete understanding of the data (Mees-Buss et al, 2022; Irungu et al, 2023).

*Data coding:* In the next stage, using open coding, the data were categorized and the main concepts were extracted from the text. The codes were initially defined without prejudice in order to extract more precise concepts from the data.

*Identifying themes:* The identified codes were grouped to identify the main themes. These themes were directly related to the research questions and objectives of the study (Vears et al, 2022).

*Reviewing themes:* After initial themes were identified, they were reviewed to ensure their accuracy and validity. This step involved reviewing categories and codes to remove duplicates or additions and

combining similar themes (Schreier et al, 2020).

*Defining and naming themes:* The final themes were named and defined to present the results and interpret the research. These themes serve as key elements in understanding and analyzing the identification of effective factors (O'Connor et al, 2020).

Various qualitative validation methods were used to increase the validity and confidence in the results. These methods include the use of assessment techniques by research members. In the triangulation method, data from different sources and multiple perspectives were examined to independently confirm the accuracy of the results. Also, the results obtained from the content analysis were reviewed and confirmed with the research participants to ensure that the findings reflect their real experiences and opinions. The methodology of this research has identified effective factors by using content analysis and semi-structured interviews (Mayring, 2019).

In this section, the results of data analysis are presented. First, the demographic characteristics of the experts in the study are presented. Then, a structural self-interaction matrix is formed based on the experts' viewpoint mode. The interpretive structural modeling (ISM) method in MICMAC software version was used for data analysis.

Interpretive structural modeling was introduced by Andrew Sage in 1977. In this method, the underlying indicators of the subject under study are first identified, and then the relationships between these factors and the way to achieve progress by these factors are presented. The structural-interpretive model analyzes the relationship between indicators by analyzing indicators at several different levels. The structural-interpretive model can be used to analyze the relationship between multi-variable characteristics that are defined for a problem. Structural-interpretive modeling is a methodology for creating and understanding relationships between elements of a complex system. In other words, structural-interpretive modeling is an interactive process in which a set of different and interrelated elements are structured into a comprehensive systematic model.

**4. Findings**

The qualitative part of this study was conducted based on the perspectives of 19 managers and experts in the field of construction. In terms of gender, 13 are male and 6 are female. Finally, 8 people have between 10 and 15 years of work experience and 11 people have more than 15 years of work experience, which is specified in Table 1 by their frequency.

*Table 1. Demographic characteristics of experts*

Percentage	Frequency	Demographic characteristics	
66%	13	Male	Gender
34%	6	Female	
42%	8	10 to 15 years	Work Experience
58%	11	Over 15 years	
25%	5	Master's degree	Education
75%	14	PhD	
100%	19	Total	

**Content Analysis and Coding by Brown and Clark**

*Step 1: Familiarization with the Data*

In order for the researcher to become familiar with the depth and breadth of the data, it is necessary to immerse himself in it to some extent. Immersion in the data usually involves repeated rereading of the

data and active reading of the data (searching for meanings and patterns).

*Step 2: Creating Initial Codes*

Step 2 begins when the researcher reads and becomes familiar with the data. This step involves creating initial codes. Codes identify features of the data that the analyst finds interesting. The coded data are

different from the units of analysis through software programs. In this study, (themes). Coding can be done manually or manual coding was used.

**Table 2.** Initial codes for expert interviews

Interview	Primary theme
Agriculture in villages becomes both more productive and more efficient. With new methods, the correct use of fertilizer and water, and the appropriate timing of planting and harvesting, more produce can be produced with less effort. When production improves, farmers' lives become easier and their income becomes more stable.	Optimizing agricultural production
Farmers or local handicrafts produce more value. For example, instead of selling fresh tomatoes, we turn them into paste or other products. This creates more income and new jobs in the village.	Increasing the added value of local products
That is, families learn to plan their money and income better. When expenses and savings are managed properly, life becomes easier and families can better afford expenses in times of need.	Managing household financial resources
Sometimes some products or jobs are no longer profitable. Substitution means that people learn to choose a product or activity that is both marketable and sustainable. This prevents family income from decreasing and the village economy from remaining strong.	Substituting products and activities
This means reducing the risk of losses in economic activities. With the right financial plans, diversification of products and agricultural insurance, families can survive even when the going gets tough.	Reducing economic risk
Encourage people to work in several areas at the same time. For example, agriculture, small-scale tourism and handicrafts. This will make family incomes more stable and create more job opportunities in the village.	Encouraging multidisciplinary entrepreneurship
That is, people will work together and share their experience and resources. When farmers or producers are together, they can do bigger things and solve problems more easily.	Local cooperation networks
People will trust each other and know that whoever helps the other will help in return. Trust makes cooperation easier and group activities more successful.	Mutual trust between individuals
Form local groups to discuss and make decisions about village work. These groups can give ideas, identify problems and implement joint programs so that everyone benefits.	Social groups and associations
Teaching skills that really help people's lives, such as better farming techniques, working with new technology or marketing products. When people are trained, they work more effectively and earn more.	Targeted education and skills training
People can access facilities such as loans, land, tools or markets to sell their products. When access is easier, the possibility of economic and social growth in the village increases.	Access to resources and opportunities
Families and individuals can earn their own income and are less dependent on foreign aid or the government. This increases the self-confidence of the community and makes decisions more independent.	Strengthening economic independence
People have an opinion on important village matters and have a role in decision-making. When everyone participates in decisions, decisions are better implemented and community satisfaction increases.	Participation in local decision-making

*Step 3: Searching for Selective Codes*

This step involves categorizing the various codes from the previous step into selective codes and organizing all the summaries of the coded data. In fact, the researcher begins to analyze his codes and considers how the different codes can be combined to create an overall theme. In this step, 24 selective codes (indicators) were obtained by the researcher with the help of the supervisors and consultants. In this step, the researchers discarded incomplete or irrelevant codes as well as duplicate codes to achieve this number of selective codes.

*Step 4: Formation of sub-themes (components)*

The fourth step begins when the researcher creates a set of themes and subjects them to basis sense. This step includes two steps of reviewing and refining and shaping the sub-

themes. The first step involves reviewing the summaries of the codings. In the second step, the validity of the sub-themes with the data set is considered. At this stage, the researcher reached 50 sub-themes (components).

*Step 5: Defining and Naming Sub-Themes (Main Dimensions)*

The fifth stage begins when there is a satisfactory picture of the themes. At this stage, the researcher defines and re-arranges the main themes that he presented for analysis. Then he analyzes the data within them. By defining and reviewing, the nature of what a theme discusses is determined and it is determined which aspect of the data each main theme contains. At this stage, the researchers finally reached 6 main themes (main dimensions) after going back and forth

among the sub-themes, which can be explained in the context of interest.

*Step 6: Preparing the Report*

The sixth stage begins when the researcher has a set of main themes that are completely abstract and consistent with the contextual

structures in the research. This stage includes the final analysis and writing of the report, which will be presented at the end. 6 constructive themes and 24 initial codes were identified.

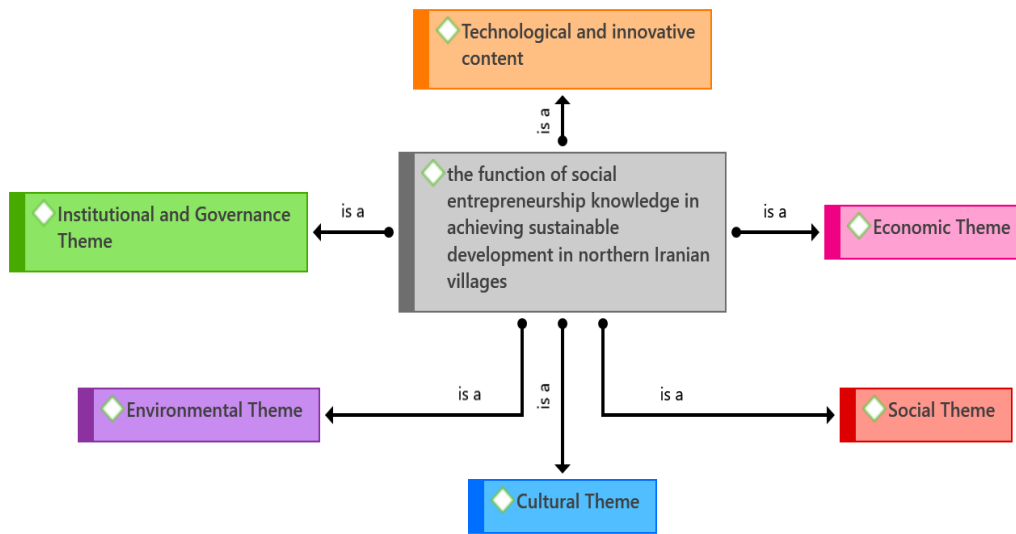
*Table 3. Factors affecting the function of social entrepreneurship knowledge in achieving sustainable development in northern Iranian villages*

Primary theme	Constructive content of level one	Constructive Theme Level Two
Local job opportunities	Creating sustainable employment in villages	Economic Theme
Household income stability		
Seasonal or permanent employment		
Non-agricultural activities	Diversifying economic activities (agriculture, handicrafts, rural tourism)	
Development of local crafts and arts		
Rural tourism and ancillary services		
Optimization of agricultural production	Increasing productivity and income of rural households	
Increasing the added value of local products		
Management of household financial resources		
Substitution of products and activities	Reducing dependence on a single-product economy	
Reducing economic risk		
Encouraging multidisciplinary entrepreneurship		
Local cooperation networks	Promoting social capital and trust among villagers	Social Theme
Mutual trust between individuals		
Social groups and associations		
Targeted education and skills training	Empowering vulnerable groups (women, youth, unemployed)	
Access to resources and opportunities		
Strengthening economic independence		
Participation in local decision-making	Strengthening local participation and social solidarity	
Group and participatory activities		
Joint development projects		
Training courses and workshops	Increasing the level of education, skills and indigenous knowledge	
Transfer of traditional and modern knowledge		
Collective learning and exchange of experience		
Reproduction of local customs	Revival of indigenous values and identity and local traditions	Cultural Theme
Strengthening the cultural identity of the younger generation		
Maintaining traditional lifestyles		
Preservation of traditional crafts and arts	Protecting cultural heritage and handicrafts	
Restoration and maintenance of historical monuments		
Transferring traditional skills to the new generation		
Creating innovative products with local identity	Integrating innovation with indigenous culture in entrepreneurship	
Designing creative businesses based on tradition		
Using technology in cultural production and marketing		
Formation Participatory groups and associations	Promoting a culture of cooperation and collective learning	
Sharing experience and skills		
Educational activities and group workshops		
Management of water and soil resources	Sustainable use of natural resources (water, soil, forests)	Environmental Theme
Reducing illegal exploitation of forests		
Preserving biodiversity		
Using solar and wind energy	Expanding renewable energies in villages	
Replacing fossil fuels with clean energy		
Installing and maintaining sustainable energy systems		
Separating and recycling waste	Waste management and pollution reduction	
Reducing the consumption of plastic and chemicals		
Local environmental campaigns		
Using natural and biological fertilizers	Promoting sustainable and organic agriculture	
Observing crop rotation and soil management		
Reducing the consumption of pesticides and chemicals		
Providing financial assistance and facilities	The role of the government and local institutions in supporting social entrepreneurship	Institutional and Governance Theme
Consulting and training support		
Creating local participation opportunities		
Passing incentive laws for social businesses	Creating supportive policies and laws	
Supporting regulations for rural women and youth		
Facilitating business registration and licensing processes		
Improving roads and local transportation	Developing rural infrastructure (transportation, internet, education)	
Access to the Internet and digital networks		
Establishing training centers and skill workshops		
Establishing cooperative associations and networks	Strengthening the network of cooperation between the government, the private sector and the local community	
Joint local development projects		
Exchanging experience and resources among stakeholders		
Utilizing precision and smart agriculture	Use New technologies in agriculture	Technological and

Systems Modern Tourism Management	and tourism	innovative content
Monitoring Natural Resources with Digital Technology		
Selling Agricultural Products and Handicrafts Online		
Digital Marketing and Advertising	Use New technologies in agriculture and tourism	
Creating Social Commerce Platforms		
Virtual Classes and Courses		
Native Skills Training Apps	Digital learning and online education for rural people	
Online Knowledge and Experience Exchange		
Sustainable and Community-Based Income Models		
Combining Economic Activities with Social Goals	Digital learning and online education for rural people	
Developing Creative Products and Services for Society		

*Developing Creative Products and Services for Society*

The final model, based on 6 constructive themes, emerged with 24 initial codes in Figure 1.



*Figure 2. The Function of Social Entrepreneurship Knowledge in Realizing Sustainable Development of Northern Iranian Villages*

Based on the thematic analysis, the researchers carefully examined the data and categorized the findings at different levels:

- 72 primary themes: These are the smallest units of information extracted from the data. They can be considered as sentences, points, or small ideas in interviews, questionnaires, or other sources. This level represents the fine details of the data.
- 24 Level One Constructive Themes: This is a higher level of analysis. The researchers grouped the primary themes together to create larger, more relevant concepts. In other words, the 72 primary themes were summarized into 24 Level One themes that represent more meaningful patterns and relationships.
- 6 Level Two Constructive Themes: At this level, the 24 Level One themes were further categorized and transformed into 6 more general and comprehensive categories. These six broad themes define the main areas

of research and form the analytical framework.

The broad themes identified are:

1. Economic theme: includes issues related to income, employment, production, and markets.
  2. Social theme: relates to human relations, community participation, education, and social welfare.
  3. Cultural theme: includes traditions, norms, values, and cultural identity.
  4. Environmental theme: deals with the protection of natural resources, climate change, and environmental sustainability.
  5. Institutional and governance theme: relates to the role of government, organizations, policies, and laws.
- Technological and innovative theme: includes the use of technology, innovations, and new methods in activities.
- With this hierarchical structure, researchers have transformed complex data into understandable and analyzable concepts and

have identified six key areas to focus on in their study. This process helps in decision-making, policy-making and designing targeted development programs.

**ISM MODEL**

The ISM methodology helps to bring order to the complex relationships between elements of a system. It can also prioritize and level the elements of a system, which greatly helps managers to better implement the designed model. Interpretive Structural Model (ISM) design is a method for examining the effect of each variable on other variables; it is a comprehensive approach to measuring the relationship and is used to develop the model framework to enable the overall research objectives.

- Formation of a structural self-interaction matrix

The first step in structural-interpretive modeling is to calculate the internal relationships of the indicators. To reflect the internal relationships between the indicators, the experts' perspective is used. The research components were coded as shown in Table 4.

**Table 4. Coding of the components**

TM	OBJECTS
C01	Economic Theme
C02	Institutional and Governance Theme
C03	Environmental Theme
C04	Cultural Theme
C05	Technological and innovative content
C06	Social Theme
C07	Function of social entrepreneurship knowledge in achieving sustainable development in northern Iranian villages

**Table 5. SSIM structural self-interaction matrix**

C7	C6	C5	C4	C3	C2	C1	OBJECT
V	V	X	V	V	A		C1
V	V	V	V	V			C2
V	V	A	V				C3
V	V	A					C4
V	V						C5
V							C6
							C7

**Formation of the received matrix**

The received matrix is obtained by converting the structural self-interaction matrix into a two-valued matrix of zero and one. In the received matrix, the main diagonal elements are set to one. Therefore, the received matrix of the ISM technique is presented in Table 6.

**Table 6. Received matrix of identified indicators**

C7	C6	C5	C4	C3	C2	C1	
1	1	1	1	1	0		C1
1	1	1	1	1		1	C2
1	1	0	1		0	0	C3
1	1	0		0	0	0	C4
1	1		1	1	0	1	C5
1		0	0	0	0	0	C6
	0	0	0	0	0	0	C7

**Determining Relationships and Leveling Dimensions and Indicators**

To determine the relationships and leveling of criteria, the set of outputs and the set of inputs for each criterion must be extracted from the received matrix.

□ Reaching set (row elements, outputs or impacts): The variables that can be reached through this variable.

□ Prerequisite set (column elements, inputs or impacts): The variables through which this variable can be reached.

The set of outputs includes the criterion itself and the criteria that it is affected by. The set of inputs includes the criterion itself and the criteria that affect it. Then, the set of two-way relationships of the criteria is determined.

**Table 7. Set of inputs and outputs (effects) for each variable**

OUTPUT	INPUT	OBJECT
6	3	C1
7	1	C2
4	4	C3
3	6	C4
6	3	C5
4	6	C6
1	7	C7

For variable  $C_i$ , the reach set (output or effects) includes the variables that can be reached through variable  $C_i$ . The prerequisite set (input or effects) includes the variables that can be reached through variable  $C_i$ .

After determining the reach set and prerequisite set, the intersection of the two sets is calculated. The first variable whose intersection of the two sets is equal to the reachable set (outputs) will be the first level. Therefore, the elements of the first level will have the most influence in the model. After determining the level, the criterion whose level is known is removed from the entire set and the set of inputs and outputs is formed

again, and the level of the next variable is obtained.

Table 8. Determining the first level in the ISM hierarchy

OBJECT	OUTPUT	INPUT	COMMON	PLACEMENT
C1	C01- C03-C04-C05-C06-C07	C01-C02-C05	C01-C05	2
C2	C01-C02-C03-C04-C05-C06-C07	C02	C02	1
C3	C03-C04-C06-C07	C01-C02-C03-C05	C03	3
C4	C04-C06-C07	C01-C02-C03-C04-C05-C06	C04-C06	4
C5	C01- C03-C04-C05-C06-C07	C01-C02-C05	C01-C05	2
C6	C04-C06-C07	C01-C02-C03-C04-C05-C06	C04-C06	4
C7	C07	C01-C02-C03-C04-C05-C06-C07	C07	5

Therefore, variables C02 are first-level variables. After identifying the first-level variable(s), these variables are removed and the set of inputs and outputs is calculated without considering the first-level variables. The common set is identified and the variables that have the same common set as the input set are selected as second-level variables.

- Variables C01-C05 are second-level variables.
- Variable C03 are third-level variables.
- Variable C04-C06 are fourth-level variables.
- Variable C07 is fifth-level variable.

The final pattern of levels of identified variables is shown in the figure. In this

figure, only the meaningful relationships of the elements of each level on the elements of the lower level as well as the meaningful internal relationships of the elements of each row are considered.

*Influence-Dependency Analysis (MICMAC Diagram)*

In the (ISM) model, the interrelationships and influences between criteria and the relationship between criteria at different levels are well illustrated, which leads to a better understanding of the decision-making space by managers. To determine the key criteria, the influence and dependence of the criteria are formed in the final access matrix. The power-dependency diagram for the variables under study is shown in Figure 2.

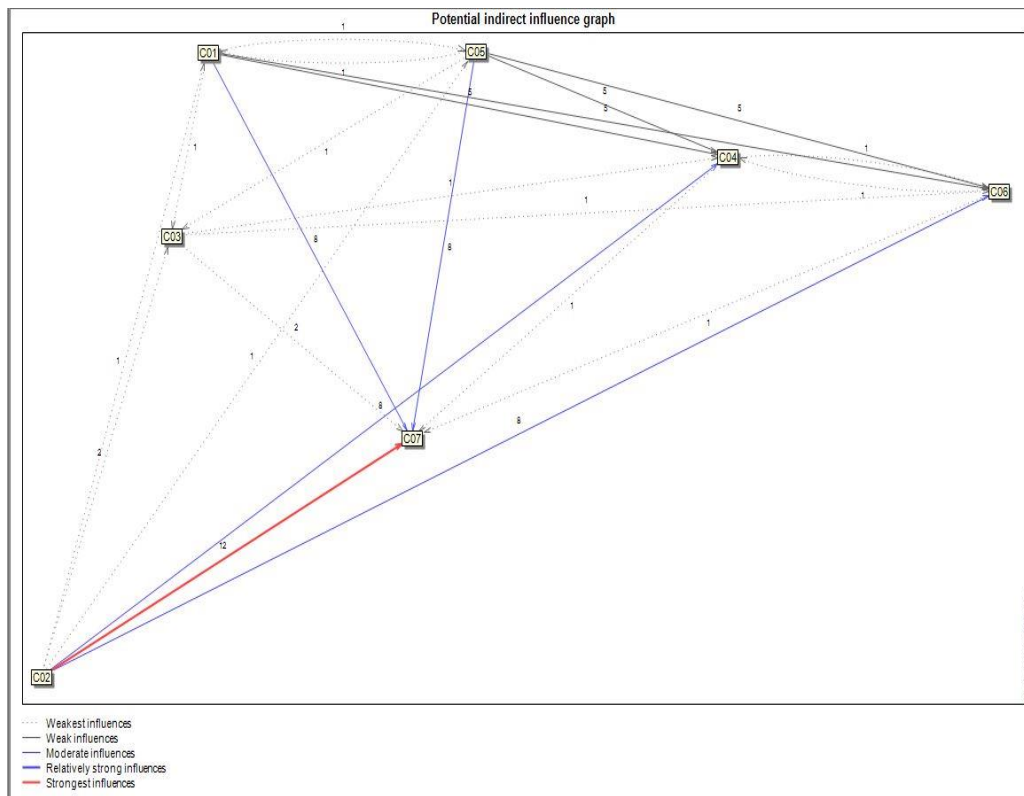


Figure 2. Influence and degree of dependence of research variables

## 5. Discussion

Thematic analysis was based on 6 level two constitutive themes, 24 level one constitutive themes and 72 primary themes. The constitutive themes include economic theme, social theme, cultural theme, environmental theme, institutional and governance theme and technological and innovative theme. The results of the thematic analysis show that the research data can be categorized in a hierarchical manner and the 72 primary themes have provided a basis for understanding the details and patterns in the society or phenomenon under study. These primary themes represent the individual points, ideas and experiences of the participants that have been carefully extracted and have provided the basis for deeper analysis.

In the next stage, 24 level one constitutive themes have been formed from the combination and aggregation of the primary themes. This level clarifies meaningful patterns and relationships between concepts and provides a more comprehensive view of the issues under study. The aggregation of primary themes at level one has enabled the identification of important trends and patterns in the data. Finally, the six constituent themes at level two, namely economic, social, cultural, environmental, institutional and governance, and technological and innovative themes, provide a general and transparent framework for analyzing the findings. These macro-themes identify the main areas affecting the research topic and allow for a focus on targeted policies, strategies, and actions. Shojaee Ara et al. (2022) obtained results consistent with the present study. Taherinezhad et al. (2024) confirmed the results obtained.

Overall, thematic analysis with this hierarchical structure shows that the study not only identified details, but also managed to identify six key areas affecting the phenomenon in question by integrating information. These results can help in planning, decision-making, and designing effective development and management solutions and provide a framework for future actions. Social entrepreneurship knowledge

at the rural level in northern Iran can act as a major driver of sustainable economic transformation. By emphasizing the identification of local opportunities and the use of local capacities, this knowledge provides the conditions for the establishment and consolidation of small and medium-sized businesses based on local resources. For example, the use of agricultural products, handicrafts, and local tourism capacities can help create added value and create sustainable employment. Such activities, in addition to reducing unemployment rates in rural areas, lead to a more equitable distribution of income and a reduction in heavy dependence on the urban economy. In other words, social entrepreneurship, by linking current knowledge and local traditions, provides the basis for making the rural economy resilient to macroeconomic crises.

In the social dimension, social entrepreneurship knowledge plays an important role in empowering the local community. This knowledge not only focuses on improving the skills and competencies of individuals, but also strengthens social capital in the form of cooperation, trust and cohesion among rural residents. The development of social businesses can actively involve vulnerable groups such as women, youth and low-income people in the production and management process and strengthen the sense of social belonging and collective identity. Also, in the light of this knowledge, patterns of voluntary participation and social responsibility spread among villagers, which results in reducing social inequality and increasing justice in the distribution of resources. As a result, the rural community moves from a passive state to an active actor on the path to sustainable development.

The function of social entrepreneurship knowledge in the cultural field helps to preserve, reproduce and promote cultural heritage and local values. Many villages in northern Iran have traditions, rituals and specific skills in the field of handicrafts, local foods and local arts, which, if properly utilized by entrepreneurial knowledge, can be transformed into cultural-economic goods

and services. In addition to protecting cultural identity, this process provides the opportunity to introduce local culture to domestic and foreign tourists and strengthens the sense of cultural pride among the younger generation. In fact, by creating a link between culture and economy, social entrepreneurship knowledge prevents traditions from being forgotten and marginalized, on the one hand, and on the other hand, it turns local culture into a source of economic and social growth. One of the most important aspects of sustainable development in rural areas is the environmental dimension, in which social entrepreneurship can play a key role. Social entrepreneurship knowledge teaches villagers how to use natural resources responsibly while creating new economic opportunities. According to Asgari et al. (2022), using sustainable agricultural practices, optimizing water resources, or developing green tourism can protect the environment and increase the quality of life. Also, this knowledge helps reduce the negative impacts of human activities on the ecosystem by promoting innovative ideas in waste management, renewable energy, and protecting forests and beaches. Shabbir et al (2025) showed that social entrepreneurship creates a bridge between economic development and environmental protection, which is one of the most prominent requirements of sustainable development.

The exploration of the function of social entrepreneurship knowledge in realizing the sustainable development of northern Iranian villages reveals a profound and dynamic interplay between local capacities, cultural traditions, economic opportunities, and social innovations. Northern Iran, with its rich agricultural lands, diverse ecosystems, and deeply rooted communal traditions, presents a unique context in which social entrepreneurship can act not merely as a tool of economic improvement but as a catalyst for holistic transformation. The findings and reflections in this study underscore the fact that knowledge in social entrepreneurship is not limited to technical expertise or business acumen; rather, it encompasses a deep awareness of social structures, cultural

sensitivities, environmental realities, and long-term developmental aspirations. Sustainable development in these villages is most viable when entrepreneurship is infused with the social mission of inclusivity, resilience, and environmental stewardship, ensuring that progress does not come at the cost of cultural erosion or ecological depletion.

At the core of this argument lies the recognition that traditional models of rural development, heavily reliant on either governmental support or external aid, have historically failed to achieve lasting results in northern Iranian villages. These approaches often lacked participatory elements and overlooked local capacities. In contrast, social entrepreneurship introduces a bottom-up framework, where knowledge about community needs, resources, and social values guides innovation. Such knowledge provides villagers with the ability to design initiatives that align with both their cultural heritage and modern developmental demands. In this sense, social entrepreneurship knowledge bridges the gap between tradition and modernity, enabling communities to reinterpret their inherited practices through a lens of sustainability and to transform them into opportunities for economic and social advancement.

Moreover, the role of social entrepreneurship knowledge becomes evident when considering the multidimensional nature of sustainable development itself. Development in northern Iranian villages cannot be narrowly understood in economic terms alone; it must incorporate social justice, environmental conservation, empowerment of marginalized groups, and cultural preservation. Knowledge in social entrepreneurship enables individuals to envision solutions that address these intersecting priorities simultaneously. For example, an initiative that develops eco-tourism rooted in local cultural heritage does more than create jobs; it strengthens community pride, conserves the environment, and provides a platform for women and youth to participate actively in the economy. Without knowledge of how to integrate these diverse aspects into a

coherent venture, the promise of sustainable development would remain unattainable.

## 6. Conclusion

The conclusion from the study of the various components of sustainable rural development shows that achieving growth and prosperity in the northern regions of Iran requires a comprehensive and multifaceted approach that simultaneously considers economic, social, and environmental aspects. Optimization of agricultural production is one of the main foundations of this path. When farmers can increase their productivity with modern and scientific methods, not only will more produce be produced, but the pressure on natural resources will be reduced and the rural economy will become more sustainable.

Increasing the added value of local products also plays an important role in economic development. Converting raw products into higher-value goods creates new job opportunities and increases household income. This action will revitalize the rural economy and provide the opportunity for reinvestment in local activities. Along with managing household financial resources, families will be able to plan their income and expenses in a way that will remain stable in different economic conditions and reduce financial risk.

Substitution of products and activities and reduction of economic risk are also important components. When a society learns to be flexible in the face of market or climatic changes and has diverse economic activities, its vulnerability is reduced. This economic diversity allows villagers to continue their lives even in difficult conditions and benefit from existing opportunities. In addition, encouraging multidisciplinary entrepreneurship is of particular importance; when people work in several fields, more stable income and wider job opportunities are created and the society moves towards self-reliance. Local cooperation networks and mutual trust between individuals are the basis for strengthening social capital and collective cooperation. A society whose people trust each other and share their resources and

experiences is able to implement large and effective projects. Social groups and associations also provide a platform for joint thinking and decision-making and enable participatory planning.

Targeted education and skills training and access to resources and opportunities play a key role in empowering individuals. When people learn the skills needed to produce, market and manage resources and have access to credit, land, tools and markets, the capacity of a community for sustainable growth increases. This empowerment paves the way for greater economic independence and allows families to be less dependent on external aid. Local decision-making enables real sustainable development to be achieved. When people are involved in decision-making, projects are designed and implemented according to the real needs and capacities of the community and their chances of success increase. The combination of all these components shows that sustainable rural development is only possible through a comprehensive and simultaneous approach to economic, social and environmental issues.

Achieving sustainable development in the villages of northern Iran requires a combination of production optimization, increasing the added value of products, financial management, activity substitution, reducing economic risk, multidisciplinary entrepreneurship, local cooperation networks, trust, social groups and associations, education and skills training, access to resources, economic independence, and participation in local decision-making. These components reinforce each other, and only with a comprehensive and coordinated approach can sustainable, resilient, and inclusive development be achieved. When the local community is empowered, participatory, and has mutual trust, and resources and opportunities are managed in a fair and sustainable manner, the path to sustainable development is paved and people's lives improve in the short and long term. The economic transformation of the villages of northern Iran will be sustainable when social entrepreneurship is institutionalized as an applied knowledge in

the daily lives of villagers. This knowledge has the capacity to free the local economy from dependence on traditional jobs and lead it towards more diverse, resilient, and value-added activities. Creating small businesses based on sustainable agriculture, handicrafts and indigenous tourism not only creates sustainable employment but also makes the village resilient to economic crises.

In the social dimension, social entrepreneurship can become a platform for the development of social capital and the cohesion of the rural community. When women and youth play a role and take responsibility in the form of social and economic projects, trust and solidarity are strengthened among residents. This process prevents unnecessary migration and increases the sense of belonging to the hometown. In this way, the village becomes a dynamic environment where participation, cooperation and social justice are institutionalized.

In the cultural field, indigenous capacities and traditional heritage will become more valuable when they are linked to the logic of social entrepreneurship. Local skills such as handicrafts, traditional foods and indigenous rituals can be offered in the form of cultural products or tourist attractions. This bond not only preserves and transmits culture to future generations, but also allows the village's cultural identity to be introduced to the national and global levels. Such an approach will strengthen self-esteem and cultural pride among villagers.

Environmental sustainability in northern Iran is a vital necessity that can be transformed into a development opportunity with the knowledge of social entrepreneurship. The use of low-consumption agricultural practices, the development of green tourism, and the responsible exploitation of forests and beaches are examples of this path. When villagers directly benefit from the benefits of environmental protection through entrepreneurial projects, their motivation to protect natural resources increases. As a result, the environment will not be a victim of development, but rather its main pillar.

At the institutional level, sustainable success is achieved when village governance moves from a centralized and unilateral mode to a networked and participatory model. Cooperation between local councils, NGOs, the government, and the private sector will ensure that decisions are made based on the real needs of the community. Transparency, accountability, and justice in resource allocation will be other outcomes of such an approach. In this context, social entrepreneurship can become a tool for empowering local institutions and improving governance capacity.

Innovation and technology make sense when they are linked to the real needs of the rural community. Digital platforms for marketing agricultural products, smart farming to increase productivity, and technological solutions for waste management are examples of this link. When villagers learn the necessary skills through social entrepreneurship, they will be able to offer their products to larger markets and improve the quality of local services. This path will reduce the gap between the city and the countryside and improve the position of the village in the economy and society.

The social dimensions of entrepreneurship knowledge are particularly significant in northern Iranian villages, where kinship networks, communal norms, and religious traditions strongly shape everyday life. Social entrepreneurship requires more than introducing innovative ideas; it requires the ability to engage with these social dynamics and to mobilize collective action. Knowledge of social entrepreneurship empowers local leaders and innovators to align their projects with community values, ensuring legitimacy and long-term participation. For instance, projects that emphasize cooperative models resonate strongly with the collectivist orientation of rural Iranian society, making them more likely to succeed and endure. Such knowledge is not generic but deeply contextual, requiring a nuanced understanding of local governance systems, informal community leadership, and the socio-cultural role of gender.

Economically, the function of social entrepreneurship knowledge is most clearly

visible in the diversification of livelihoods. Northern Iranian villages, traditionally reliant on agriculture, face multiple challenges including market volatility, climate change, and migration pressures. Knowledge of social entrepreneurship provides villagers with the skills to design alternative income-generating strategies that reduce dependency on single sectors. Initiatives in agro-processing, handicrafts, sustainable tourism, and renewable energy demonstrate how knowledge empowers communities to leverage local resources more creatively and efficiently. This diversification not only raises incomes but also enhances resilience against external shocks, aligning perfectly with the principles of sustainability.

Equally important is the environmental dimension of sustainable development, which holds particular urgency in northern Iran given the fragility of its ecosystems, from the Caspian coastline to the forests of Gilan and Mazandaran. Traditional development models often neglected environmental consequences, leading to deforestation, soil degradation, and water pollution. Social entrepreneurship knowledge introduces an ecological consciousness into development initiatives, equipping entrepreneurs with the awareness and skills to design environmentally responsible ventures. For example, knowledge about circular economy practices can guide local businesses in reducing waste, recycling agricultural byproducts, and minimizing ecological footprints. This environmental literacy embedded in social entrepreneurship knowledge ensures that economic growth in villages does not undermine ecological sustainability, a lesson that is particularly critical in regions heavily dependent on natural resources.

The empowerment of marginalized groups, particularly women and youth, is another area where the knowledge of social entrepreneurship demonstrates transformative potential. In many northern Iranian villages, traditional social structures often limit women's economic participation and youth's opportunities for leadership. Social entrepreneurship knowledge,

however, provides tools for designing inclusive models that create space for these groups to thrive. Women-led cooperatives in handicrafts, food processing, or eco-tourism not only generate income but also challenge restrictive gender norms and expand women's agency. Similarly, youth entrepreneurship programs supported by knowledge transfer in innovation, digital tools, and business management provide younger generations with alternatives to migration and unemployment. This inclusion is not a byproduct but a central component of sustainable development, since social cohesion and intergenerational equity are vital to the long-term resilience of rural communities.

Additionally, the knowledge component of social entrepreneurship fosters a culture of continuous learning and adaptation. Sustainable development is not a static achievement but an ongoing process that requires responsiveness to new challenges, from climate shifts to technological disruptions. Villages equipped with social entrepreneurship knowledge are better prepared to experiment, evaluate outcomes, and scale successful initiatives. This culture of adaptive learning ensures that communities remain proactive rather than reactive, positioning them as active agents of their development rather than passive recipients of external interventions.

From a governance perspective, the diffusion of social entrepreneurship knowledge also enhances the relationship between villagers and state institutions. Historically, rural development programs in Iran have often suffered from top-down approaches with limited local ownership. Social entrepreneurship, by contrast, encourages bottom-up governance and greater community participation in decision-making. Knowledge in this field empowers villagers to articulate their needs, design their solutions, and negotiate more effectively with governmental bodies and NGOs. This participatory approach reduces dependency, increases accountability, and fosters trust between the state and rural populations. In the long run, such knowledge-driven engagement contributes to

more democratic forms of rural governance aligned with principles of sustainability.

Another critical function of social entrepreneurship knowledge lies in its ability to reframe development narratives. For too long, villages in northern Iran have been depicted as backward, dependent, or in need of external rescue. Knowledge of social entrepreneurship disrupts this narrative by highlighting the agency, creativity, and resilience inherent within rural communities. By enabling villagers to identify their strengths, mobilize resources, and create innovative solutions, social entrepreneurship knowledge reframes them as active drivers of development rather than passive subjects of it. This shift in narrative has profound psychological and cultural implications, boosting self-confidence, reinforcing community pride, and creating a shared vision of sustainable futures.

Furthermore, knowledge transfer in social entrepreneurship is not limited to formal education or training programs; it occurs through networks, mentoring, peer-to-peer learning, and experiential practices. In northern Iranian villages, where oral traditions and community-based learning remain strong, this informal knowledge transfer is particularly effective. Experienced social entrepreneurs can mentor emerging ones, creating a virtuous cycle of innovation and sustainability. Such mechanisms of knowledge sharing build social capital, strengthen trust, and reinforce collective resilience. Over time, the institutionalization of such knowledge through local schools, cooperatives, and NGOs ensures that the momentum of sustainable development is not lost with generational changes.

The global dimension of social entrepreneurship knowledge also deserves emphasis. While the focus here is on northern Iranian villages, these communities are not isolated from global currents of knowledge, markets, and technologies. Social entrepreneurship knowledge provides villagers with the skills to connect local initiatives to global networks, whether through fair-trade markets, digital platforms, or environmental collaborations. This global-local integration ensures that villages can

benefit from international resources while contributing their unique innovations to global discourses on sustainability. At the same time, knowledge equips them with critical skills to navigate the risks of globalization, such as cultural homogenization or dependency on volatile external markets.

Despite these numerous benefits, challenges remain in fully harnessing the function of social entrepreneurship knowledge for sustainable development in northern Iranian villages. Structural barriers such as limited access to capital, inadequate infrastructure, and restrictive policies can inhibit the translation of knowledge into practice. Moreover, resistance from entrenched social norms or power structures may obstruct the empowerment of women and youth. To overcome these obstacles, it is essential to create enabling ecosystems that combine capacity-building with supportive legal frameworks, financial mechanisms, and infrastructural investments. Social entrepreneurship knowledge, while powerful, requires complementary systemic support to flourish.

In conclusion, the function of social entrepreneurship knowledge in realizing sustainable development in northern Iranian villages is both profound and multifaceted. It equips communities with the tools to integrate economic vitality, social justice, cultural preservation, and environmental stewardship into coherent strategies of progress. It empowers marginalized groups, fosters resilience, and nurtures adaptive learning cultures that can respond to emerging challenges. It redefines governance by enabling participatory models and reframes development narratives by emphasizing local agency and creativity. Although challenges exist, the evidence demonstrates that when adequately supported, social entrepreneurship knowledge can transform northern Iranian villages into hubs of sustainable innovation, serving as models for rural development not only within Iran but across other developing regions.

Ultimately, the true power of social entrepreneurship knowledge lies in its ability

to cultivate hope, agency, and shared responsibility for the future. In the context of northern Iranian villages, this knowledge provides a pathway out of dependency and marginalization toward a more sustainable and dignified existence. By embedding sustainability into the very fabric of entrepreneurial practice, it ensures that development is not merely about material prosperity but about the flourishing of communities in harmony with their environment and heritage. As such, investing in the dissemination, adaptation, and institutionalization of social entrepreneurship knowledge emerges as one of the most promising strategies for realizing the vision of sustainable development in these villages and beyond.

#### **Recommendations**

The recommendations made by the research are:

1. To strengthen the economic dimension of sustainable development, it is recommended to design programs that optimize local production, increase the added value of products, and create diverse job opportunities. Supporting local entrepreneurship, training in household financial management, and providing financial facilities to farmers and producers can stabilize family incomes and strengthen the rural economy.

2. To promote the social dimension, it is necessary to develop local cooperation networks and social groups. Creating associations and opportunities for active participation for rural people, especially women and youth, can increase mutual trust and social capital. Also, training in social skills and participation in local decision-making promotes solidarity and effective interaction in society.

3. It is important to preserve and strengthen local culture through educational programs, promote handicrafts, and support indigenous traditions and values. Providing cultural workshops, local festivals, and educational activities related to cultural identity can increase belonging and pride in local culture and familiarize new generations with the values of their community.

4. To protect the environment, it is recommended to use sustainable agricultural methods, manage natural resources, and promote green tourism. Educational programs in the field of ecosystem preservation, pollution reduction, and intelligent use of water and soil resources can contribute to sustainable rural development and reduce environmental damage.

5. It is important to improve local governance and strengthen rural institutions. Designing supportive policies and laws, increasing transparency in decision-making, and encouraging people's participation in local management can increase the effectiveness of programs and strengthen coordination between people, the government, and the private sector.

6. It is essential to use new technologies and encourage innovation in agricultural activities, handicrafts, and local services. Providing technology training, access to new tools, and supporting creative ideas can increase productivity, product quality, and income opportunities, and lead villages toward sustainable and competitive development.

#### **Declaration of Competing Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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