

Presenting an Empirical Model for Identifying and Exploiting Entrepreneurial Opportunities in Sericulture in Northern Iran

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Abstract

Given the importance of the sericulture in income diversification for villagers and the fluctuations in the number of sericulturists, the issue of sustainability of this agricultural activity should be seriously considered. This research seeks to design a model for identifying and exploiting entrepreneurial opportunities of sericulture activity in Iran. The present study was conducted with a quantitative approach and the structural equation modeling (SEM) technique was used to analyze the research variables. Considering the number of sericulturists in Mazandaran province (2196 people), 327 sericulturists were surveyed using a random stratified sampling method. The validity of the questionnaire was confirmed by asking experts for their opinions, and the reliability was confirmed with the help of Cronbach's alpha. Identified factors (including individual, social, organizational, economic, and environmental factors) explain about 73% of the changes in the recognition of entrepreneurial opportunities in sericulture. Individual were the most effective factor and environmental factors were the last effective factor in identifying the entrepreneurial opportunity of sericulturists. Also, social and economic factors with a negative path coefficient had an inverse relationship with the recognition of entrepreneurial opportunities. Therefore, since individual and organizational factors play an important role in fostering entrepreneurial opportunities, while strong social ties and a false sense of security resulting from maintaining economic conditions have limited risk-taking and the expansion of entrepreneurship, issues such as reducing social barriers through digital integration, strengthening social networks, institutionalizing economic support and policy coordination, increasing market competitiveness and digital presence, and advancing longitudinal environmental research are suggested.

Keywords: Entrepreneurial opportunity, Rural entrepreneurship, Rural women's employment, Sericulture activity.

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Introduction

The concept of entrepreneurship in the agricultural field is not only a supportive element but also an approach that helps address the problem of stagnation and challenge in agriculture. Agricultural entrepreneur refers to the individual who, through strategic foresight, consideration of the environment, lessons learned through previous experience, indigenous knowledge, knowledge of science, risk taking, innovation, creativity, and productivity seek to evaluate and identify the best economic opportunities that are exploitable in the agricultural sector. Till today, due to the lack of entrepreneurship orientation in development strategies, the potentials of the agricultural field have not been optimally tapped and the development strategies of agriculture have been subsistence and vulnerability oriented (Shirmohammadi and Choobdar, 2023). Connecting the agricultural sector with the economic development of the country calls for special types of individuals characterized by particular features that help them engage in networking. Such individuals are called agricultural entrepreneurs. Schumpeter saw the entrepreneurial process as a form of “creative destruction” (Ghezzi and Cavallo, 2018). Opportunity recognition forms the initial stage of entrepreneurship development. Entrepreneurs then assess those opportunities and make decisions whether or not to capitalize on the opportunities recognized through starting up a new business (Shane and Nicolaou, 2015). However, what makes this topic interesting is that examining the factors influencing the recognition of entrepreneurial opportunities provides us with valuable information for designing entrepreneurship education programs.

One of the subsectors of agriculture where the identification and recognition of entrepreneurial opportunities is necessary is sericulture. Sericulturists need to embrace entrepreneurship and its sustainability to ensure their sustainability and improvement. Sericulture entails relatively smaller investments in comparison with numerous other productive processes, while returns on investment are realized much faster. As a result, despite limitations in terms of land area and increasing cost of labor, sericulture represents a great opportunity for development of developing countries with respect to an increase in silk production due to modernization of the sericulture industry (Sorati Zanjani and Rokni, 2017). Currently, China, India, Uzbekistan, Vietnam, Thailand, and Brazil are the largest producers of silk in the world; their total production accounts for 99.2% of global silk production. In 2022, the value of the global silk market reached USD 24.83 billion, and this number is expected to increase up to USD 39.12 billion by 2028 (Popescu *et al.*, 2024). As a complementary agricultural activity, sericulture plays an extremely important role in effective

use of natural resources and, by providing employment and income sources, helps to enhance the socio-economic position of rural communities. In this regard, rural families consider sericulture to be a quite profitable activity (Ghorashi Fallah Roudbaneh *et al.*, 2024; Girish *et al.*, 2020; Bhattacharjya *et al.*, 2019). Mazandaran Province is one of the leading sericulture-producing regions in the country, with a total of 2,196 active sericulturists engaged in silk production. However, the number of sericulturists in the province has experienced significant fluctuations in recent years, with some practitioners discontinuing their activities altogether. For instance, the number of sericulturists decreased from approximately 1,280 in 2016 to 1,200 in 2017 (Mazandaran Province Jihad-e-Agriculture Organization, 2025).

A review of the literature shows that despite the existence of different global models for identifying entrepreneurial opportunities, each researcher has designed and identified the dimensions of his or her own model, taking into account the specific conditions of his or her region. Therefore, considering the unique climatic (appropriate humidity and the possibility of growing mulberry orchards), social (abundance of labor and density of silkworm breeders, especially rural women), economic (domestic and foreign market needs and the existence of related industries such as carpet weaving, handicrafts, etc.) and cultural (local cultural dynamics) characteristics of northern Iran, the globally designed models in the past do not have the necessary efficiency and the need for a localized experimental model seems very necessary. Considering the importance and added value that silkworm farming creates as a production process (diversification of incomes, increase in silk prices and increased demand for pure silk in various military industries, handicrafts, etc.) as well as changes in the number of sericulturists, the correct use of entrepreneurial opportunities in this industry can contribute to the sustainability and longevity of silkworm farming as an agricultural and industrial activity in the future. Therefore, the aim of this study is to develop an empirical model for identifying and exploiting entrepreneurial opportunities in sericulture in Mazandaran province. To achieve this goal, it is necessary to achieve the following specific objectives: 1) Identifying effective factors, including individual, social, economic, etc., affect the recognition and exploitation of entrepreneurial opportunities in sericulture; 2) Examining the relationships between the identified factors affect the recognition and exploitation of entrepreneurial opportunities in sericulture; 3) Examining the fit of the empirical model for the recognition and exploitation of entrepreneurial opportunities in sericulture

Theoretical foundations

Regarding the identification of entrepreneurial opportunities, two main perspectives can be traced: the first perspective emphasizes the identification of opportunities that exist in the environment, and the second perspective goes beyond existing opportunities and describes the change of phenomena with the aim of creating entrepreneurial opportunities. In general, the first perspective and the discovery of environmental opportunities can be referred to Meoli's studies, and the creation of entrepreneurial opportunities to Schumpeter's opinions and opinions (Meoli *et al.*, 2019). A brief review of the literature on entrepreneurial opportunities shows that various researchers have examined its theoretical concepts. Detienne and Chandler (2004) reviewed the literature on opportunity recognition and proposed four perspectives: active search, passive search, serendipitous discovery, and opportunity creation for identifying opportunities. In the active search, passive search, and serendipitous discovery perspectives, opportunities exist in the environment around the individual and the entrepreneur discovers them. However, the opportunity creation perspective is based on the premise that opportunities are the product of the entrepreneur's mind. Berglund (2007) reviewed the literature on opportunity recognition and concluded that opportunity discovery is a unique activity during which the entrepreneur discovers the opportunity alone. However, in opportunity creation, the entrepreneur usually creates this opportunity with others, such as close friends, relatives, etc. In the opportunity discovery perspective, the initial idea usually does not change much over time, but in the opportunity creation perspective, the idea is formed and changes gradually and in interaction with the environment. Another model that has tried to look at the concept of entrepreneurship from a comprehensive perspective is the model of Ardichvili *et al.* (2003). According to this model, the factors influencing the opportunity recognition process include: entrepreneurial alertness, prior knowledge, discovery versus purposeful search, social networks, personality traits including risk-taking, optimism, self-efficacy, and creativity. Shook *et al.* (2003) also developed a model for discovering opportunities and starting entrepreneurial businesses after reviewing the entrepreneurship literature on how to start entrepreneurial businesses. The aforementioned researchers believe that individual differences such as attitudes, inclinations, skills, psychological traits, and cognitive differences affect the promotion of entrepreneurial intention, search, discovery, and exploitation of opportunities.

Bird (1988) believes that although behavior can have unconscious or unintentional origins, founding a new company is a conscious and intentional behavior. Intention is the entrepreneur's mental state that directs the entrepreneur's attention, experience, and action towards a business

and is considered an important basis for the development of a new company. The Theory of Planned Behavior is also a valid framework for predicting behavioral intention that considers both individual and social factors. This theory states that three components including attitude toward the behavior (the extent to which a person perceives the desirability and attractiveness of the intended behavior), perceived social norms (the pressure that a person perceives from influential reference groups such as family, friends, and role models to perform the intended behavior), and perceived behavioral control (a person's self-evaluation and perception of their competence and ability to perform an action or task) affect the formation of entrepreneurial intention (Ajzen, 1991). Krueger (2017) also proposed a model by combining the two planned behavior models and the entrepreneurial event model (Shapero & Sokol, 1982) that included pragmatism, desirability, and perceived feasibility from the entrepreneurial event model as well as social norms and perceived self-efficacy from the planned behavior model.

Literature review

A number of researchers across various disciplines have focused on the significance of opportunity recognition among entrepreneurs. Some of the major areas of research and experimental background focus are provided below. Aldrichvili *et al.* (2003) observed that prior knowledge management was one of the most significant factors in opportunity recognition according to them and especially knowledge regarding markets, serving the markets, and customer problems. Andreas *et al.* (2017), from their research, found that prior knowledge and risk-taking were the most influential determinants of opportunity recognition. Li-min *et al.* (2019) studied entrepreneurial opportunities and culture in their research. Individualism, uncertainty avoidance, and long-term orientation, which are dimensions of culture, influence entrepreneurial opportunity recognition as per their findings. Factors influencing entrepreneurial opportunity recognition according to Filser *et al* (2023) included personal factors (prior knowledge, experience), organizational dimensions (financial potential of the organization, entrepreneurial culture), and environmental factors (networks, technologies, demographic changes). The study done by Arafat *et al.* (2020) investigated the determinants of agricultural entrepreneurship, and it was found that people who can recognize opportunities, have confidence in themselves, have social connections with current entrepreneurs, and work as business angels in other firms have higher chances of becoming entrepreneurs than others.

Masoomi and Rezaei-Moghaddam (2021) found that in studying the variables that affect the identification and utilization of the agricultural entrepreneurial opportunities, the effects of social networks of social media, the effects of previous failures in the business sector, and the level of uncertainty had a considerable effect on the dependent variable. The effects of social factors, uncertainty, and previous business failure were said to have a positive effect on the opportunity recognition process. Also, in evaluating the rural entrepreneurship process, Masoomi and Rezaei-Moghaddam (2023) found that prior knowledge, expertise and financial resources were the main factors that determine the utilization of entrepreneurial opportunities. Both individual and environmental factors have a strong influence on the processes of opportunity recognition and exploitation. Dasmon *et al.* (2023) found that opportunity exploration and exploitation are theoretically linked, and combined to form entrepreneurial capability. However, SMEs in emerging markets explore more than they exploit, leading to over-exploitation of existing opportunities and under-exploration of new viable opportunities. Motamed *et al.* (2023) found in the assessment of social participation and social trust networks among sericulture stakeholders in Guilan province that the level of cohesiveness and sustainability of these networks was relatively moderate. Through an advanced examination of the sericulture network in Guilan Province, Ghorashi Fallah Roudbaneh *et al.* (2024) highlighted suitable individual characteristics such as personal interest, positive attitude, and experience in sericulture along with access to appropriate resources, which included the presence of complementary industries, sufficient equipment, availability of silkworm eggs and encouragement by respected local elders, as influential in the satisfaction of sericulturists regarding the silkworm eggs distribution in Guilan Province of northern Iran.

Conceptual research model

A review of the theoretical foundations suggests that there are two general paradigms in conceptualizing entrepreneurial opportunities: the Discovery Perspective of opportunity and the Creation Perspective of opportunity. The Discovery Perspective of opportunity and the Creation Perspective of opportunity. Proponents of the discovery view argue that opportunities exist independently of the entrepreneur, waiting to be identified through rigorous search processes and individual cognitive capabilities. In contrast, the creation perspective of opportunity posits that opportunities are not merely "found" but are actively "constructed" through dynamic social interactions and the leveraging of social capital (e.g., Detienne & Chandler, 2004; Berglund, 2007). This theoretical dichotomy suggests that while individual

agency is paramount in discovery of opportunity, social embeddedness is the primary driver in opportunity creation. Furthermore, a significant inconsistency persists in the literature regarding the primary determinants of opportunity recognition. While a substantial body of research emphasizes intra-psychic factors—such as risk propensity, creativity, and prior knowledge—as the core drivers, an emerging school of thought argues that these individual traits are insufficient if they are not situated within a robust socio-normative framework. Critics of purely individualistic models suggest that social norms, trust, and institutional structures act as critical moderators that can either catalyze or stifle entrepreneurial intent. Consequently, the literature oscillates between "person-centric" models and "context-centric" models, often they were poorly to provide a synthesized framework that accounts for the reciprocal interplay between the individual and their socio-economic environment.

Empirical studies have further complicated this landscape by highlighting a fragmented array of variables, ranging from market and customer constraints to cultural dimensions and social capital. However, most existing models suffer from a reductionist approach, often isolating single variables and overlooking the synergistic effects of combined dimensions. There is a notable lack of integrated frameworks that simultaneously address individual, organizational, and environmental complexities, particularly within specialized, context-dependent industries. This study addresses these theoretical gaps by moving beyond a reductionist view and proposing a context-specific, integrated model tailored to the sericulture industry in Northern Iran. Unlike generalized global models that often overlook the nuances of traditional and ecologically sensitive sectors, this research employs a bottom-up approach—incorporating the lived experiences of sericulturists and industry experts to develop a localized conceptual framework (Figure 1). A key contribution of this study lies in its critical integration of environmental dimensions and the granular differentiation between the recognition, evaluation, and exploitation of opportunities. By synthesizing these diverse elements into a cohesive model, this research aims to bridge the gap between abstract entrepreneurial theory and the practical, socio-ecological realities of regional sericulture.

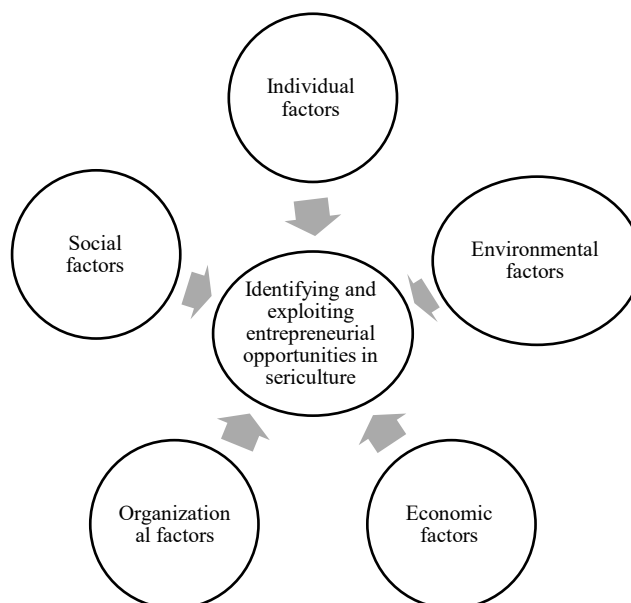


Figure 1. Conceptual research model extracted from literature and research background.

Methodology

As regards the overall paradigm, the current research has been designed based on the quantitative approach. The statistical population includes all sericulturists in Mazandaran Province, numbering 2,196 people (Agricultural Jihad Organization of Mazandaran Province, 2025). Using the Cochran formula (Equation 1), the sample size was estimated as 327 respondents, who were randomly chosen with proportionate stratified sampling method. The sample allocation was done proportionally based on the number of producers in each county. Accordingly, individuals from the counties of Babol (286 people), North Savadkuh (31 people), Ramsar (4 people), Qaemshahr (3 people), and other parts of Mazandaran Province such as Tonekabon, Sari, Neka, Amol, Fereydunkenar, Noor (3 people) were studied.

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left[\frac{z^2 pq}{d^2} - 1 \right]} = 327 \quad (1)$$

Necessary information was collected through a questionnaire developed by the researcher. The constructs, indicators, and their extraction source are presented in Table 1. All variables were examined with five-point Likert scale. In examining the dependent variable of the study, six identified entrepreneurial activities (see Figure 2) were included in the design of three indicators of opportunity identification, evaluation, and exploitation. For example, agrotourism was examined in the form of the following items: Item 1) Agrotourism based on sericulture is effective as an innovative opportunity in expanding and extension of sericulture (opportunity identification). Item 2) Tourist visits to silkworm breeding sites and mulberry garden will

introduce the region and promote and revive sericulture industry, ultimately improving rural livelihoods (opportunity assessment). Item 3) I have tried to achieve more income by developing agrotourism based on sericulture, in addition to extension and revitalizing sericulture, by creating a new market for produced products (opportunity exploitation and creation).

Table 1. Structures, indicators and their extraction source.

Research Structures/variables	Definition of sub variables/indicators	Their extraction source
Entrepreneurial opportunities	Opportunity identification (understanding and discovery)	- Dasmon <i>et al.</i> (2023)
	Evaluation opportunity	- Detienne and Chandler (2004)
	Exploitation of opportunity (creation)	- Berglund (2007)
		- Conducting interviews with provincial sericulture activists
Individual factors	indigenous knowledge	- Aldrichvili <i>et al.</i> (2003)
	Attitude	- Filser <i>et al.</i> (2023)
	Technical skill	- Andreas <i>et al.</i> (2017)
	Risk tolerance	- Masoomi and Rezaei-Moghaddam (2021)
Social factors		- Shook <i>et al.</i> (2003)
		- Bird (1998)
		- Ajzen (1991)
		- Conducting interviews with provincial sericulture activists
Social factors	Social capital	- Aldrichvili <i>et al.</i> (2003)
	The existence of an entrepreneurial culture in sericulture	- Li-min <i>et al.</i> (2019)
		- Filser <i>et al.</i> (2023)
		- Arafat <i>et al.</i> (2020)
Organizational factors		- Ajzen (1991)
		- Krueger (2017)
		- Conducting interviews with provincial sericulture activists
	Government support	- Filser <i>et al.</i> (2023)
Economic factors		- Arafat <i>et al.</i> (2020)
	Attitudes towards the effectiveness of activists' communication	- Masoomi and Rezaei-Moghaddam (2021)
		- Conducting interviews with provincial sericulture activists
	Guaranteed purchase	- Aldrichvili <i>et al.</i> (2003)
Environmental factors		- Masoomi and Rezaei-Moghaddam (2021)
		- Conducting interviews with provincial sericulture activists
	Comparative financial advantage	
	Protecting the vegetation cover in sericulture	
Environmental factors	Controlling soil erosion in sericulture	- Conducting interviews with provincial sericulture activists
	Prevention of runoff in sericulture	
	Development of agricultural tourism in sericulture	
	Restoration activities and maintaining genetic diversity of the region in sericulture	

To ensure the **face validity** of the questionnaire, the opinion of experts from the Agricultural Jahad Organization of the province, who had knowledge of sericulture activities in areas prone to sericulture in Mazandaran Province, and some university lecturers of the Sari Agricultural Sciences and Natural Resources University was obtained (expert panel). **The content validity of the questionnaire was examined using the content validity index and content validity ratio. For the 15 experts studied, the content validity index for each item was more than 0.79 and the content validity ratio was equal to 0.6, which indicates the confirmation of the content validity of the researcher-made questionnaire.**

Cronbach's alpha coefficient is one of the most widely used techniques in evaluating the reliability of questionnaires. To obtain the value of the Cronbach's alpha coefficient in the current study, 30 questionnaires were given to some people from the statistical community but were not included in the main sample. The results were then analyzed using the SPSS 26 Statistics software package. **Cronbach's alphas for various sections of the questionnaire range from 0.74 to 0.96, all higher than the acceptable cut-off point of 0.70, showing adequate reliability of the items used in the questionnaire.** The fitness of the model proposed was examined based on both the measurement and structural models. In this study, the structural equation modeling method based on partial least squares variance was used using Smart PLS3 software. Since Smart PLS software is designed graphically, it gives users the opportunity not to get involved in writing codes and texts for data analysis. On the other hand, the analysis output can be more understandable for readers because in addition to reporting numerical results, it can also be presented graphically, and working with this software was easy for users. In this study, the measurement part was studied with indicators such as factor loadings, Cronbach's alpha, composite reliability (CR), convergent validity or AVE index (average variance extracted) and divergent validity with the help of Fornell-Larcker Criterion test. The structural part was also studied with indicators such as R^2 coefficient of determination, t-coefficients and path coefficients (Beta).

Findings

Surveying Personal and Professional Qualifications of Sericulturists

In the initial section of the survey, some of the sericulturists' personal and professional qualifications have been analyzed, most of the participants were rural women (82%). It means that sericulture usually is done as a supplementary activity by the rural women. Regarding their education, most sericulturists had received schooling at less than the high school level (89.3

293 %). On average, sericulturists had 22.58 years of experience in sericulture (standard deviation
294 13.23) and 38.53 years (standard deviation 17.7) of residence in their village.

295 Through reviewing the history of the region under investigation and conducting specialized
296 interviews with experts and experienced sericulturists in those regions entrepreneurial activities
297 related to sericulture were extracted. The average interview time was about 45 minutes and
298 most interviews were conducted in the village and workplace of sericulturists. In some cases,
299 after making the necessary arrangements, the interview continued by telephone. Six different
300 types of entrepreneurial activities regarding sericulture, can be stated as follows:

301 1) Agricultural tourism based on sericulture, 2) Intercropping cultivation (cultivation of
302 mulberry trees along with other agricultural crops), 3) Drying of fresh cocoons, 4) Spinning
303 and production of silk yarn, 5) Silk fabrics and garment manufacturing, 6) Manufacturing
304 handicraft items made from sericultural products (cocoons, silk yarn, etc.). None of the
305 surveyed sericulturists were involved in cocoon drying operations. However, most of them had
306 been engaged in intercropping in their berry orchards in the past (89.9%), which indicates that
307 this is the dominant entrepreneurial activity pursued by the participants. However, according
308 to field interviews with farmers, it seems that they are engaged in this activity out of habit and
309 do not understand its entrepreneurial importance. Other activities are far from intercropping. It
310 seems that despite the importance of innovative and income-generating activities, carrying out
311 these activities has been largely forgotten. It can be noted that the phenomenon of "disruption
312 in the value chain" and the lack of attention of sericulturists to the importance of transformation
313 and complementary industries in sericulture have become a major obstacle to the full
314 exploitation of entrepreneurial opportunities in sericulture by sericulturists. Failure to
315 recognize and exploit such opportunities will affect the development process of sericulture and
316 the future of this agricultural activity.

317 318 **Presentation of the Empirical Model**

319 To determine the variables that influence the creation of a model for recognizing and
320 exploiting entrepreneurial opportunities in sericulture in Mazandaran Province, a confirmatory
321 factor analysis (CFA) was carried out, where all identified constructs were consolidated into
322 one overall model. Before evaluating the results of the proposed model, its goodness of fit
323 indices were evaluated. Before that, the collinearity between the predictor constructs was also
324 examined due to the presence of multiple correlated dimensions (individual, social,
325 organizational, economic and environmental factors). Collinearity was studied with the

variance inflation factor criterion (VIF). This measure indicates the increase in the variance of the coefficient estimates due to collinearity. A variance inflation index above 10 indicates a critical collinearity situation and a value close to 1 indicates a favorable situation. The acceptable limit of the VIF index is below 5. If the VIF test statistic is close to one, it indicates the absence of collinearity. As an empirical rule, a VIF value greater than 5 indicates high multiple collinearity (James et al., 2017). According to the results of the research, the amount of collinearity between the structures for the economic, environmental, organizational, individual and social structures is 1.94, 1.10, 3.72, 3.86 and 2.46 respectively, which indicates that the amount of collinearity for all structures is less than 5 and is an acceptable value.

The examination of the fit indices was conducted in two phases, including the measurement model and structural model. The findings pertaining to the assessment of the measurement model are provided in Table 2.

Table 2. Studying the model of identifying and exploiting entrepreneurial opportunities in sericulture in Mazandaran province (n= 327).

Research variables	Definition of sub variables/indicators	Marker symbol in model	Factor loadings	Cronbach's alpha	Composite reliability (CR)	Average Variance Extracted (AVE)
Identifying entrepreneurial opportunities	Opportunity identification (understanding and discovery)	o1	0.954	0.786	0.875	0.712
	Evaluation opportunity	o2	0.969			
	Exploitation of opportunity (creation)	o3	0.536			
Individual factors	indigenous knowledge	p1	0.901	0.944	0.959	0.853
	Attitude	p2	0.945			
	Technical skill	p3	0.905			
Social factors	Risk tolerance	p4	0.941	0.885	0.945	0.896
	Social capital	s1	0.958			
	The existence of an entrepreneurial culture in sericulture	s2	0.934			
Organizational factors	Government support	c1	0.950	0.843	0.925	0.861
	Attitudes towards the effectiveness of activists' communication	c2	0.905			
Economic factors	Guaranteed purchase	e1	0.973	0.934	0.968	0.937
	Comparative financial advantage	e2	0.964			
Environmental factors	Protecting the vegetation cover in sericulture	a1	0.731	0.837	0.884	0.604
	Controlling soil erosion in sericulture	a2	0.788			
	Prevention of runoff in sericulture	a3	0.836			
	Development of agricultural tourism in sericulture	a4	0.830			
	Restoration activities and maintaining genetic diversity of the region in sericulture	a5	0.691			

The adequacy of the measurement model based on indices was determined by the fact that the factor loadings of all indicators were above 0.5. It was concluded that the reliability of the questionnaire could be confirmed by Cronbach's alpha for each of the main scales, where their reliability was higher than 0.70. Additionally, it can be noted that along with Cronbach's alpha, the Composite Reliability (CR) index was greater than 0.7, which means acceptable reliability of the questionnaire (Hair *et al.*, 2019). The AVE index was greater than 0.5, therefore, convergent validity of the questionnaire was proved (Davari and Rezazadeh, 2018). One of the methods for discriminant validity testing is the Fornell–Larcker criterion, where AVE square root for latent variables will appear along the main diagonal being larger than the correlations between constructs found in the bottom-left part of the matrix. Thus, it can be stated that the constructs (latent variables) had better links with their own measures than other constructs, demonstrating satisfactory discriminant validity (Table 3).

Table 3. discriminant validity testing matrix (Fornell – Larcker technique).

Structures	Economic factors	Environmental factors	Identifying entrepreneurial opportunities	Organizational factors	Individual factors	Social factors
Economic factors	0.968					
Environmental factors	0.227	0.777				
Identifying entrepreneurial opportunities	0.544	0.322	0.844			
Organizational factors	0.691	0.291	0.775	0.928		
Individual factors	0.661	0.292	0.797	0.826	0.923	
Social factors	-0.602	-0.241	-0.758	-0.709	-0.749	0.946

According to Table 3, negative values of social factors in relation to other constructs indicate an inverse relationship between these factors. In other words, the social capital and entrepreneurial culture existing in sericulture has acted as a deterrent to the recognition and exploitation of entrepreneurial opportunities in sericulture. In a way, social factors, instead of supporting the entrepreneurial opportunity in sericulture, have become an obstacle to it and have prevented the recognition of entrepreneurial opportunities in sericulture.

After examining the fitness of the measurement part of the model, it is necessary to also study the structural part of the model. The results related to structural indices such as the coefficient of determination (R^2) and beta path coefficients are presented in Figure 2.

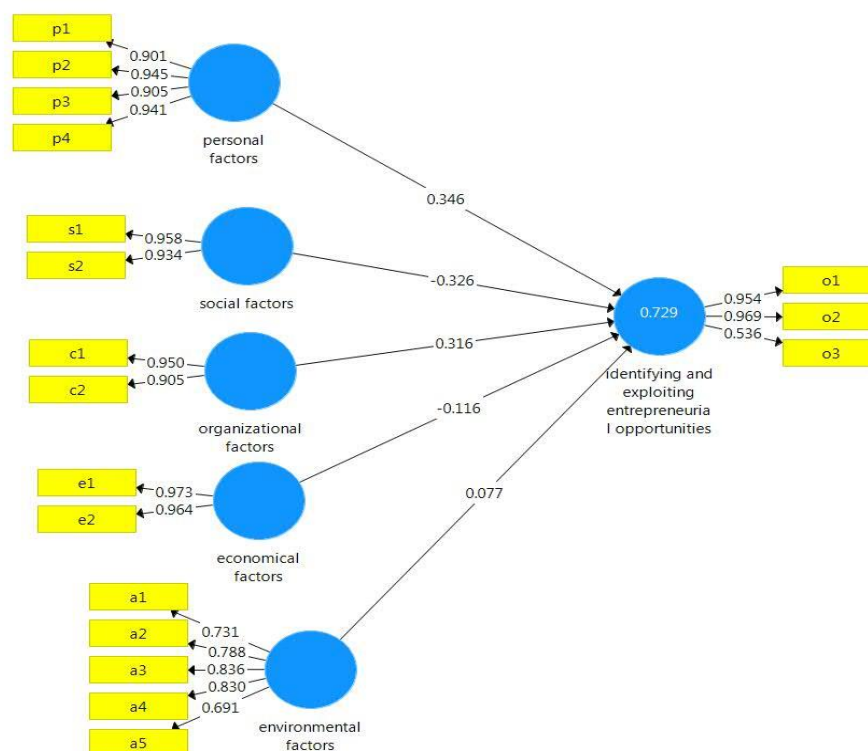


Figure 2. Factor loading values and path coefficients of model of identifying and exploiting entrepreneurial opportunities in sericulture in Mazandaran province.

In the present study, the R^2 value equaled 0.729, since the researchers reported three values of 0.19, 0.33, and 0.67 as the criterion values for weak, medium, and strong values of the R^2 coefficient of determination, respectively, the coefficient of determination of the current model was reported to be strong. Accordingly, individual, social, organizational, economic, and environmental factors account for approximately 73% of the variance in identifying entrepreneurial opportunities in sericulture and were identified as the most important factors affecting the identification and exploitation of entrepreneurial opportunities in sericulture in Mazandaran province (see Figure 2). Also, the individual factors as those having the highest path coefficient ($\beta = 0.346$) had been discovered to be the most influential determinants. Following the individual factors, the social factors having the path coefficient of -0.326 were ranked second. Factors associated with organizations were found to be the third influential determinant of recognition of entrepreneurial opportunities in sericulture with an estimated coefficient of 0.316. Economic factors as the fourth factor revealed a negative relationship with recognition of entrepreneurial opportunities ($\beta = -0.116$). The fourth factor was environmental factors, which had the least influence on the dependent variable of recognition of entrepreneurial opportunities in sericulture ($\beta = 0.077$).

In addition to examining the structural model according to the factor loadings in the final model (Figure 2), the sub variables "attitude", "risk-taking propensity", "technical skills", and "indigenous knowledge" were identified as the most influential individual indicators based on their factor loadings. Attitude with the highest factor loading (0.945) was the most important indicator of individual factors. Out of the social factors, "social capital" was the most important indicator based on its high factor loading which was 0.958 whereas the second indicator that played a vital role for successful sericulture was the "existence of entrepreneurial culture" (0.934). "Governmental support" and "attitude towards effective stakeholder" interaction were considered the main organizational indicators based on their high factor loadings of 0.950 and 0.905 respectively. The two most dominant economic indicators included "guaranteed purchasing" (0.973) and "relative financial advantage" (0.964). In the environmental field, "preventing runoff and flooding by establishing mulberry orchards," "developing agrotourism in sericulture" "controlling soil erosion through sericulture practices," "protecting the vegetation cover due to establishing mulberry orchards and revitalization activities," and "Restoration activities and maintaining genetic diversity of the region in sericulture with the help of sericulture" were identified as the most determining environmental factors. The entrepreneurial opportunity recognition in sericulture as the dependent variable in this research had three primary indicators. These include "opportunity evaluation", "opportunity identification" and "opportunity exploitation" having the factor loadings of 0.969, 0.954, and 0.536, respectively, as the most important indicators of the construct. In addition, the t-values were used as criteria for assessing the structural model. If the t-values are greater than 1.96, then the significance of these criteria is proved at the confidence level of 95%. The t-values for individual, social, organizational, economic, and environmental factors were calculated as 5.212, 6.476, 5.619, 3.517, and 2.758, respectively, which indicates that the research has an appropriate level of significance with the structural model.

The overall fit of the model was also studied using the SRMR, NFI and RMS_theta indices and the results are presented in Table 4. SRMR indicates the difference between the observed correlation and the correlation matrix of the structural model. If the value of this index is less than 0.8, it indicates a good and correct fit of the model. RMS_theta evaluates the degree of correlation of the residuals of the external model. This fit measure is only useful for evaluating reflective models, because the residuals of the external model are not meaningful for developmental measurement models. RMS_theta values below 0.12 indicate a good fit, while

higher values indicate a lack of fit (Henseler et al., 2014). According to the values calculated in Table 4, the overall validity of the model is also confirmed.

Table 4. Overall fit of the research model.

Indicator under study	The value of the coefficient obtained	The value of the desired criterion	Result
SRMR	0.198	< 0.1	Fitness verification
NFI	0.91	> 0.9	Fitness verification
RMS_theta	0.11	< 0.12	Fitness verification

Discussion

A notable finding in this study the discrepancy between opportunity recognition and exploitation among sericulturists, suggesting that cognitive awareness does not always translate into practical implementation due to context-specific barriers. Thus, opportunity exploitation had a lower factor loading than other indicators.

The current research findings indicated that individual factors are the most significant determinants of the recognition and utilization of entrepreneurial opportunities in sericulture. These research findings coincide with those of previous researches (According to the findings of Ardichvili et al. (2003), and Andreas et al. (2017)). Other researchers have also emphasized the significance of individual factors like knowledge, experience, motivation, and technical skills on entrepreneurial opportunities' recognition (Li-min et al., 2019; Filser et al., 2023; Arafat et al., 2020; Masoomi & Rezaei-Moghaddam, 2023). Ghorashi Fallah Roudbaneh et al. (2024) pointed out that suitable individual characteristics such as interest, positive attitude, and higher experience in sericulture can play a vital role in the satisfaction of sericulturists in Guilan Province of northern Iran. As far as organizational factors go, there were two dimensions that were analyzed: governmental support and effectiveness of stakeholder interaction. Governmental support has proven to be the most influential variable. In this respect, Filser et al (2023) pointed out the significance of both governmental and organizational support together with training programs creation. Furthermore, the importance of governmental and stakeholder cooperation was stressed by Motamed et al. (2023).

Social and economic factors have also been found to play a significant role in the identification and exploitation of entrepreneurial opportunities. Previous studies have also highlighted the significance of social and economic factors for entrepreneurial opportunity identification (Ardichvili *et al.*, 2003., Filser *et al.*, 2023., Masoomi and Rezaei-Moghaddam, 2021., Filser *et al.*, 2023., Arafat *et al.*, 2020). However, the respondents to this study believed that the guaranteed purchase of cocoons not only did not play a role in developing risk-taking abilities or creating a financial basis for expanding sericulture, but was even a major obstacle

in this regard. In analyzing the inverse relationship between economic factors and the recognition and exploitation of entrepreneurial opportunities, it is important to note that the guaranteed purchase and financial advantage of sericulture that perceived by sericulture farmers in the current circumstances, has created a kind of "false security" in her/him. As a result, instead of exploring new entrepreneurial and risky opportunities, the sericulture farmer is attached to the same traditional supports and the guaranteed purchase system, and over time, her/his sense of recognizing opportunities, exploiting them, and creating opportunities is eroded. The sericulture farmer remains in a survival logic and does not tend towards the logic of growth and creativity. In a way, the sericulture farmer's being caught in the "dependency trap" ties them to the status quo and stifles innovation. On the other hand, guaranteed purchase is a kind of distortion in the market. Such distortions cause prices to be unrealistic. When prices are unrealistic, the farmer cannot properly recognize the added value. Therefore, her/his motivation to enter into new risks and to identify and create entrepreneurial opportunities is effectively reduced due to market distortions, dependence on subsidies and traditional supports, and the expectation of low profits.

In analyzing the inverse relationship between social factors such as social capital and the entrepreneurial culture among sericulture farmers, the important point is the "dependency trap on social ties." Accordingly, in traditional societies such as sericulture, social capital is very strong to the extent that social ties and social trust with family, neighbors, and acquaintances cause the farmer to remain in their safe corner. Loyalty to traditions, social and group pressure prevent an individual from engaging in risky and unconventional behaviors (which are necessary to recognize opportunities and engage in entrepreneurial and innovative activities). Instead of being a "bridge" and a factor in the expansion of entrepreneurship, social capital can play the role of a major obstacle in such circumstances. Over-reliance on traditions is also justified by the theoretical perspective of "herd behavior." This behavior occurs when a person has incomplete information on a specific issue and is forced to make a decision about it. In such a case, she/he observes the behavior of others and behaves similarly to them (Feng and Ying, 2021). Herding behavior among sericulture farmers, which is formed due to their poor and incomplete information, prevents them from taking risks and identifying new entrepreneurial opportunities. According to researchers and experienced sericulturists, sericulture is not just an economic activity but also has environmental impacts. In addition, following such impacts, environmental factors can be effective in further encouraging sericulturists and enhancing the ability to recognize and exploit its entrepreneurial

opportunities. In this study, environmental factors have been studied for the first time as an independent dimension as regards their impact on entrepreneurial opportunity recognition. A review of the literature showed that there had been no prior research on how environmental factors affect entrepreneurial opportunity recognition. Thus, this research is one of the very first ones considering the impact of environmental factors on entrepreneurial opportunity recognition in sericulture. The main reason behind the inclusion of environmental factors in this study stems from the intrinsic compatibility and eco-friendliness of sericulture practices. In general, individual, social, organizational, economic, and environmental factors constitute the main components of entrepreneurial opportunity recognition in sericulture.

Conclusion and Recommendations

The necessity of establishing multi-purpose agriculture and diversified income streams underscores the importance of expanding complementary activities that maintain minimal environmental impact while ensuring sustainable income. Sericulture, as a key complementary activity, possesses significant potential for entrepreneurial and innovative development. The findings of this study reveal that while individual and organizational factors play crucial roles in fostering entrepreneurial opportunities, a strong dependency on social ties and a "false sense of security" arising from the maintenance of existing economic conditions have constrained risk-taking and entrepreneurial expansion within this sector. Therefore, enhancing individual, organizational, and environmental conditions, alongside improving the social and economic frameworks of sericulture, is essential to achieving occupational success, operational sustainability, value addition, and increased productivity.

To address these challenges, the following operational recommendations are proposed:

- Mitigating Social Barriers via Digital Integration : To overcome the adverse effects of social constraints on business opportunity recognition, social media and modern inter-group communication tools should be strategically utilized. It is recommended to conduct psychological studies to identify specific social barriers and develop strategies to leverage local influential figures in Mazandaran Province (within a maximum of six-month period). Furthermore, establishing virtual communication channels with a membership exceeding 80% of the province's active sericulturists is essential. These platforms should facilitate information sharing regarding new entrepreneurial opportunities and enhance interaction between sericulturists, industry pioneers, and experts from the Jihad-e-Agriculture Organization.
- Strengthening Social Networks through Peer-to-Peer Learning: To reinforce social networks

and ensure high-quality information flow, the Jihad-e-Agriculture Organization of Mazandaran Province should implement a structured 24-month "Farmer-to-Farmer Training" program. This program should specifically target the top 20% of high-performing sericulturists to mentor new entrants and interested individuals, thereby ensuring a sustainable transfer of expertise.

- Institutionalizing Economic Support and Policy Coordination : To overcome entrepreneurial barriers, government support must be operationalized through low-interest loans (maximum 4% interest rate), specialized technical supervision and training (specifically during the peak spring and summer sericulture seasons), insurance facilitation, and the provision of free inputs. To organize these economic policies, a specialized "Sericulture Committee" should be established, comprising stakeholders such as the Jihad-e-Agriculture Organization, tourism agencies, Sericulture Development Centers, research institutes, and financial institutions. This committee should hold regular meetings (every two months), with a representative from the Jihad-e-Agriculture Organization serving as the secretary.

- Enhancing Market Competitiveness and Digital Presence : Increasing awareness of the financial competitive advantages of sericulture—coupled with economic measures such as guaranteed purchases at fair prices, opening export markets, promoting ancillary industries, and expanding e-marketing platforms—is vital to motivating sericulturists toward entrepreneurship. The implementation and monitoring of these economic policies should be integrated into the agenda of the Provincial Specialized Sericulture Committee.

- Advancing Longitudinal Environmental Research : Given the critical role of environmental factors in opportunity recognition and the time-lagged nature of environmental impacts, it is strongly recommended that longitudinal environmental studies (spanning 1–2 years) be conducted within the sericulture industry. The findings of these studies should be formally documented and submitted to the Provincial Specialized Sericulture Committee to foster enhanced collaboration between the sericulture industry and relevant regulatory and research organizations.

Research Limitations

While this study provides valuable insights, several limitations must be acknowledged. First, the geographical focus of the research is primarily centered on the Babol county, which accounts for approximately 87% of the statistical sample. Consequently, the generalizability of the findings to other regions or diverse sericultural contexts may be constrained. Second, the study employs a cross-sectional design, capturing a single snapshot in time; therefore, it cannot

account for longitudinal changes or causal trajectories over time. Finally, the reliance on self-reported data may introduce potential response biases, as participants' perceptions might differ from objective behavioral patterns. Future research should consider longitudinal approaches and broader geographic sampling to enhance the robustness and generalizability of the results.

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ارائه مدل تجربی تشخیص و بهره برداری از فرصت های کارآفرینانه نوغانداری در شمال ایران

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چکیده

با توجه به اهمیت نوغانداری در تنوع درآمدی روستائیان و افتوخیزهای پیش آمده در تعداد نوغانداران، مسئله پایداری این فعالیت کشاورزی به طور جدی باید مورد توجه قرار بگیرد. این پژوهش به دنبال طراحی الگوی تشخیص و بهره برداری از فرصت های کارآفرینانه در فعالیت نوغانداری در ایران است. تحقیق حاضر با رویکرد کمی به انجام رسید و برای تحلیل متغیرهای تحقیق از تکنیک مدل سازی معادلات ساختاری (SEM) استفاده شد. با توجه به تعداد بهره برداران نوغاندار در استان مازندران (2196 نفر) تعداد 327 نوغاندار با روش نمونه گیری طبقه بندی شده تصادفی، مورد بررسی قرار گرفتند. روایی پرسشنامه از طریق نظرخواهی از متخصصان و پایایی با کمک آلفای کرونباخ تأیید شد. عوامل شناسایی شده (اعم از عوامل فردی، اجتماعی، سازمانی، اقتصادی و محیطی زیستی) حدود 73 درصد از تغییرات تشخیص فرصت کارآفرینی در نوغانداری را تبیین می کنند. عوامل فردی مؤثرترین عامل و عوامل محیطی زیستی آخرین عامل مؤثر بر تشخیص فرصت کارآفرینی نوغانداری بودند. همچنین عوامل اجتماعی و اقتصادی با ضریب مسیر منفی، رابطه معکوسی را با تشخیص فرصت کارآفرینی داشتند. لذا از آنجایی که عوامل فردی و سازمانی نقش مهمی را در پرورش فرصت های کارآفرینی دارند در حالی که، پیوندهای اجتماعی قوی و احساس امنیت کاذب ناشی از حفظ شرایط اقتصادی، ریسک پذیری و گسترش کارآفرینی را محدود ساخته است، مواردی همچون کاهش موانع اجتماعی از طریق ادغام دیجیتال، تقویت شبکه های اجتماعی، نهادهای سازی حمایت اقتصادی و هماهنگی سیاست ها، افزایش رقابت پذیری بازار و حضور دیجیتال و پیشبرد تحقیقات طولی محیطی زیستی پیشنهاد می گردد.