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Evaluation of the Regional Entrepreneurship Ecosystem of Handicrafts in East Azerbaijan Using a Functional Approach

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Abstract

Purpose: The main objective of this study is to provide an accurate and systematic picture of the current state of the handicrafts entrepreneurship ecosystem in East Azerbaijan Province and to identify the key factors influencing its functionality. By analyzing the existing structures, capacities, and challenges, this research seeks to establish a scientific foundation for designing effective policies and operational programs that can accelerate the development of the handicrafts sector and promote sustainable employment in the region.

Methodology: This research was conducted using a mixed method approach and is applied in nature. In the qualitative phase, data were collected through expert interviews and analyzed using thematic analysis, which resulted in identifying six main factors: cultural factors, laws and regulations, infrastructure, human capital, financing, and markets. In the quantitative phase, to assess the current status of these factors, a researcher made questionnaire was distributed among 187 managers and employees in the handicrafts sector (selected using Cochran's formula from a population of 246 individuals). The quantitative data were interpreted using statistical methods and structural modeling analyses.

Findings: The findings indicate that all identified factors have a positive and significant impact on the province's handicrafts entrepreneurship ecosystem. Among these, infrastructure factors play the most influential role with a path coefficient of 0.214, followed by cultural factors (0.20), laws and regulations (0.193), human capital (0.188), financing (0.166), and markets (0.158). The results highlight that weaknesses in infrastructure, along with the need to strengthen cultural and regulatory components, represent major bottlenecks for ecosystem development. This analysis provides a foundation for prioritizing policy actions and resource allocation.

Originality/value: The added value of this research lies in presenting a localized and precise model of the handicrafts entrepreneurship ecosystem in East Azerbaijan, derived from the simultaneous analysis of qualitative and quantitative data. This model clarifies the gap between the current and the desired states and offers actionable insights for policymakers, managers, and stakeholders in the handicrafts sector. The findings can serve as a scientific basis for designing operational programs, development projects, and effective strategies to enhance ecosystem performance and accelerate the region's economic growth.

Keywords: Entrepreneurship ecosystem, handicrafts, thematic analysis

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1. Introduction

In recent decades, the global economic structure has undergone a significant transformation-from a resource-based economy toward a knowledge-based and innovation-driven one. In this new paradigm, innovation, creativity, and entrepreneurship are recognized as the main drivers of growth and competitiveness. Accordingly, the competitive advantage of nations is no longer determined solely by natural resources or material wealth, but by their ability to create knowledge, convert ideas into businesses, and expand entrepreneurial activities that define their economic standing in the global arena [1]. Consequently, policymakers and researchers have increasingly focused on entrepreneurship as an effective instrument for achieving sustainable economic growth, generating employment opportunities, enhancing productivity, and improving social welfare. Numerous studies have demonstrated positive and significant correlations between the development of entrepreneurial activities and indicators such as GDP growth, job creation, and long-term productivity improvement [2, 3].

However, recent research emphasizes that entrepreneurship is not an isolated individual phenomenon; rather, it emerges within a web of institutional, economic, social, and cultural factors. In this context, the concept of the entrepreneurial ecosystem has gained prominence as a contemporary approach in entrepreneurship literature. This concept refers to a set of actors, institutions, resources, and interactions that coexist dynamically within a specific geographic area, collectively fostering the conditions necessary for the emergence, growth, and sustainability of entrepreneurial ventures [4]. Scholars have categorized the elements of entrepreneurial ecosystems into components such as entrepreneurial culture, supportive policies and leadership, access to finance, skilled human capital, active markets, and institutional or infrastructural support [5]. Effective interaction among these elements is what enables the creation and expansion of innovative businesses.

An entrepreneurial ecosystem can thus be viewed as a dynamic, multidimensional environment in which a network of players-including entrepreneurs, firms, universities, research centers, investors, government agencies, consultants, and both formal and informal networks-interact with one another. These interactions, occurring within a specific regional context, give rise to flows of knowledge, capital, skills, and business opportunities [6]. Nevertheless, experiences from different regions around the world suggest that no universal formula exists for developing a successful entrepreneurial ecosystem. Diverse configurations of elements and interactions can produce unique ecosystems with distinct characteristics. Therefore, understanding the specific features of each region and analyzing its actors and relationships is essential for designing effective entrepreneurship policies and development programs [7].

Within this framework, the handicrafts industry-as a vital segment of the creative economy-plays a significant role in the economic, social, and cultural development of regions. Rooted in traditional skills, individual creativity, and the use of local raw materials, handicrafts not only preserve cultural and historical identity but also contribute to job creation, income generation, and tourism development [8]. In many countries, handicrafts are considered part of local economic development strategies and economic diversification efforts, as this sector, with relatively low investment requirements, can generate extensive employment opportunities and substantial value added to regional economies [9].

East Azerbaijan Province, benefiting from its rich cultural heritage, diverse handicraft traditions, and skilled artisans, is recognized as one of Iran’s major centers of handicrafts. Alongside provinces such as Isfahan and Fars, East Azerbaijan occupies a prominent position in terms of craft diversity, production volume, and the attainment of national and international quality awards. Despite these potentials, sustainable development of handicrafts in the region requires a systematic and interactive

approach among various stakeholders. In reality, the growth of this sector cannot be achieved merely by strengthening one or two elements; rather, it depends on the formation and enhancement of a regional entrepreneurial ecosystem in which governmental bodies, artisans, producers, designers, investors, distributors, marketers, universities, and supportive institutions interact synergistically within a coherent framework.

Despite the significance of this subject, evidence suggests that systematic and comprehensive studies evaluating regional handicraft entrepreneurship ecosystems in Iran-particularly in East Azerbaijan Province-are still lacking. Meanwhile, the experiences of successful global ecosystems such as Silicon Valley, London, New York, and Tel Aviv underscore that success in fostering entrepreneurial activities depends heavily on the quality of interactions among actors, access to financial resources, specialized human capital, and effective market linkages. Therefore, gaining a precise understanding of the components, actors, and functions of the regional handicraft entrepreneurship ecosystem constitutes a pivotal step toward designing effective policies and development programs for this sector.

Accordingly, the present article adopts a functional approach to the regional entrepreneurship ecosystem, aiming to identify key actors and their interactions, extract evaluation indicators for the handicraft entrepreneurship ecosystem in East Azerbaijan Province, and assess its current state. Ultimately, based on the findings of this evaluation, operational programs and strategies will be proposed to strengthen and develop the handicraft entrepreneurship ecosystem in the province, thereby facilitating a more effective utilization of the region's economic, cultural, and tourism capacities.

The remainder of this article is organized into five sections. Following this introduction and the description of the study's objectives in Section 1, Section 2 provides a comprehensive literature review and develops the conceptual model. Section 3 details the research methodology. Section 4 presents the results derived from the conceptual model and various data analyses. Finally, Section 5 offers conclusions and provides recommendations for future research.

2. Literature Review

With the expansion of entrepreneurship literature in recent decades, research has increasingly shifted from a narrow focus on the individual characteristics of entrepreneurs or environmental conditions toward a more integrated and systemic perspective-one that views entrepreneurship as the outcome of dynamic interactions among individuals, institutional environments, resources, and social mechanisms. The concept of the entrepreneurial ecosystem emerged and evolved precisely within this theoretical context. Unlike linear or single factor approaches, the ecosystem perspective emphasizes that the emergence and sustainability of entrepreneurial activities result from the synergy among multiple elements operating within a specific geographical setting, whether urban, regional, or national. This perspective has encouraged researchers to identify and classify a wide range of dimensions-including human capital, culture, networks, policies, infrastructure, leadership, markets, and financial capital-within coherent analytical frameworks.

Although the entrepreneurial ecosystem literature is still evolving and no complete consensus exists on its boundaries or components, a review of the models proposed by various scholars offers valuable insights into system dynamics, key factors, and the mechanisms that shape entrepreneurial success. These models range from early frameworks rooted in economic factors (such as the Waldz model), institutional approaches (such as those of Gianelli and Vogel), network based perspectives (such as

Cohen's model), policy and region oriented frameworks (such as the Isenberg and Feld models), and more holistic or ontology based models (such as those developed by Stam, Spigel, and recent frameworks grounded in dynamic capabilities). Reviewing these models is particularly important for analyzing regional and localized ecosystems-such as the handicrafts entrepreneurship ecosystem of East Azerbaijan-because it helps identify which components play a critical role at the local scale and how interactions among elements can contribute to regional competitive advantage.

Accordingly, Table 1 provides an analytical comparison of the most influential entrepreneurial ecosystem models discussed in the literature.

Table 1. Comparative overview of major entrepreneurial ecosystem models

Model	Main Focus	Key Components	Distinctive Feature
Valdez Institutional Model	Institutional and economic environment	Laws, economic policies, infrastructure, access to financial resources	Emphasizes the role of institutional structures in shaping entrepreneurial activities
Vogel Institutional Model	Institutional drivers of entrepreneurship	Property rights, regulatory stability, government support, institutional transparency	Demonstrates that institutional quality is a prerequisite for entrepreneurial development
Cohen Network-Based Model	Networks and innovation environment	Entrepreneurial networks, universities, incubators, accelerators, collaborative culture	Highlights the role of social interactions and knowledge networks
Isenberg Policy-Driven Model	Policy framework of the ecosystem	Policies, culture, markets, human capital, financial capital, infrastructure	One of the most comprehensive and widely used policy-oriented ecosystem models
Feld Model	Local entrepreneurial community	Entrepreneurial leaders, informal networks, supportive culture, local interactions	Focuses on social dynamics and the role of the entrepreneurial community
Stam Model	Value creation system	Framework conditions (institutions, infrastructure, culture) and systemic conditions (networks, leadership, capital)	Distinguishes between contextual and functional elements of the ecosystem
Spigel Model	Cultural and social characteristics of the ecosystem	Entrepreneurial culture, social capital, role models, material resources	Emphasizes the cultural and regional context of the ecosystem
Dynamic Capabilities-Based Models	Ecosystem dynamism and adaptability	Collective learning, resource reconfiguration, network flexibility	Presents an evolutionary view of the ecosystem as an adaptive system

A review of various entrepreneurial ecosystem models reveals that although these frameworks differ in their focal points, they generally emphasize a shared set of elements, including institutions, networks, financial resources, human capital, entrepreneurial culture, and supportive infrastructures [10].

In recent years, at the global scale, governments, development organizations, and educational institutions have introduced a variety of tools and frameworks to monitor the level of development and improvement of entrepreneurial ecosystems. These frameworks differ in the dimensions they examine, as illustrated in Table 2, which compares several major frameworks based on their focal dimensions. The most prominent of these include:

- Entrepreneurship and Regional Development Measurement Framework (Europe),
- Assets Roadmap Framework,
- U.S. Council on Competitiveness Framework,
- World Economic Forum Entrepreneurship Ecosystem Report,
- World Bank Doing Business Project,
- OECD Entrepreneurship Measurement Framework,
- Startup Genome Framework,
- Babson College Entrepreneurial Ecosystem Assessment Framework, and
- George Mason University Global Entrepreneurship and Development Index (GEDI).

Table 2. Comparison of Assessment Components in Selected Entrepreneurial Ecosystem Frameworks

	Babson	OECD	World Bank	World Economic Forum	U.S. Council on Competitiveness	GEDI	Innovation Rainfall	6+6 Model	GSMA
Policy	*	*	*	*	*	*		*	*
Finance	*	*		*	*	*	*		*
Infrastructure	*	*	*	*	*				*
Market	*	*				*			*
Human Capital	*	*		*	*	*	*	*	*
Support Services	*	*		*	*	*		*	*
Culture	*	*		*	*	*	*	*	*
Research and Development / Innovation	*	*			*	*	*		*
Quality of Life					*				
Macroeconomic Conditions		*							

These approaches are highly diverse and can be categorized along several dimensions, such as their geographical unit of analysis, the level of detail they provide, and the extent to which they focus on specific ecosystem components. The Aspen Network of Development Entrepreneurs (ANDE) has examined these approaches based on two criteria: the geographical unit of analysis and their level of complexity (measured by the number and type of indicators included). Accordingly, the greater the number of indicators used in a given approach, the higher its level of complexity. Approaches such as those of the OECD, the World Bank, and George Mason University provide national-level frameworks that can be used for cross-country comparisons. In contrast, the U.S. Council on Competitiveness Asset Map and the Innovation Rainfall Model are specifically tailored to regional ecosystems. Some frameworks, such as those of Babson and Koltai, are applicable at both national and regional level [11].

A variety of studies have been conducted in the field of entrepreneurial ecosystems, and some of the most noteworthy contributions are reviewed below. Nadaf et al. demonstrated that entrepreneurial ecosystems influence entrepreneurial behavior through mediating variables such as self-efficacy, passion, and alertness [12]. Jame-Bozorgi and Migun-Pouri emphasized that university entrepreneurial ecosystems are most effective when individual, educational, and research dimensions interact to create

social value [13]. Jalilian et al. linked the development of knowledge-based firms' ecosystems to enhanced employability and innovation capabilities [14]. Lalehzarimosalla et al. found that social capacity, legal and financial support, and networking are key elements in shaping the ecosystem of the stone industry [15]. Rahmaty et al., in a study of the Mazandaran tourism sector, identified culture as the strongest and human capital as the weakest component of the ecosystem [16]. Bejjani et al. proposed a framework for digital entrepreneurial ecosystems [17]. Buratti et al. highlighted the evolutionary dynamics of ecosystems, explaining the inverse relationship between entrepreneurial and organizational activities over time [18]. Qian and Acs examined the policy implications of the ecosystem approach for economic development [19]. Zhao et al., using the fsQCA method, showed that no single ecosystem element constitutes a necessary condition for entrepreneurship; rather, it is the configuration of factors that plays a decisive role [20]. Germain et al. analyzed the role of science parks in shaping entrepreneurial ecosystems [21]. Ferreira et al. found that technology transfer can weaken the relationship between ecosystems and the digital performance of SMEs [22]. Rawhouser et al. highlighted the impact of blockchain technologies on empowering vulnerable ecosystems [23]. Andersson et al. demonstrated that the dynamics of innovation ecosystems depend on the simultaneous combination of social capital and institutional support. They emphasized that in regions with low social cohesion, even supportive policies cannot ensure ecosystem sustainability [24].

Carayannis and Campbell, in their Quadruple Helix innovation model, demonstrated that public participation and culture play an active role in shaping ecosystems. Their findings suggest that neglecting the cultural dimension diminishes the efficacy of university-centered policymaking [25]. Lee and Wong identified knowledge absorptive capacity as a vital link between the regional ecosystem and product innovation. Their results indicated that SMEs with high learning capacities are better positioned to entrepreneurially exploit environmental opportunities [26]. Fernández et al. found that in tourism ecosystems, cultural capital serves as the primary driver of differentiation and competitive advantage. They emphasized that creativity-oriented ecosystems exhibit significantly more sustainable performance compared to purely commercial ones [27]. Al-Mansoori showed that cultural diversity in immigrant-hosting cities expands the range of entrepreneurial opportunities and accelerates startup formation. The analysis suggests that cultural mixing improves the quality of networking and market entry [28]. Shin and Park identified digital infrastructure as a core factor in the rapid growth of startups within creative industries. Their study posits that infrastructure improvements drastically reduce business startup costs and accelerate innovation [29]. Mariano et al. demonstrated that entrepreneurial leadership style within the ecosystem is the most vital factor for the survival and growth of technology startups. They explained that effective leadership compensates for institutional gaps and resource scarcities in emerging ecosystems [30].

Kapur and Singh found that the quality of e-government services significantly boosts entrepreneurs' trust in public institutions. According to their results, digital transparency is a major driver in reducing institutional uncertainty within the ecosystem [31]. Habibi et al. identified three key factors in Middle Eastern knowledge-based ecosystems: venture capital, entrepreneurial universities, and international networks. They stated that the lack of cross-border networking remains the most significant barrier to ecosystem growth in the region [32]. Zhao and Liu demonstrated that market demand power has a greater impact on new business creation than physical infrastructure. Their findings emphasize that a "dynamic market" is a fundamental condition for the formation of productive ecosystems [33]. Williams and Parker explored the concept of "ecosystem resilience" under crisis conditions, highlighting the critical role of intermediary actors. Their study shows that informal support networks play the most

significant role in sustaining entrepreneurial activities during times of crisis [34]. Giannetti et al. found that smart regional policies are successful only when integrated with informal entrepreneurial networks. Their analysis revealed that a lack of coordination between policymakers and local actors reduces the effectiveness of development interventions [35]. Finally, Patel and Roy emphasized that for promoting female entrepreneurship, network and social support are more effective than financial support. Their study indicated that ecosystems based on social solidarity lead to higher retention rates for women-owned businesses [36].

Almeida et al. showed that creative-industry ecosystems grounded in local cultural heritage are more sustainable than purely economic ecosystems. They emphasized that local culture functions as an "institutional glue" that holds the ecosystem together [37]. Nouri et al. demonstrated that the internationalization of small and medium-sized enterprises is shaped by a set of critical factors. Their findings indicate that networking and forming strategic alliances, developing flexible strategies for entering foreign markets, strengthening technology and innovation ecosystems, enhancing talent acquisition and retention systems, and improving product and process quality are among the most influential determinants of success in international markets. These factors collectively contribute to expanding exports and international trade opportunities [38]. Horváth and Kovács found that in rural ecosystems, indigenous cultural capital is more influential than financial capital. Their study shows that local identity and traditional skills constitute the essential foundation for the emergence of new businesses [39]. Dutta et al. stressed that the international networking of SMEs significantly enhances regional ecosystem dynamism. Their results indicate that global connectedness strengthens access to knowledge resources and markets [40]. Sousa and Martins identified the quality of digital education as the most critical factor shaping Generation Z entrepreneurship. Their study argues that digital skills serve as the primary drivers of initiative and innovation among the new generation [41]. Kramer and Jensen found that constructive university–government–industry interaction is the main driver of technological entrepreneurship in small cities. Their analysis revealed that through smart institutional collaboration, small cities can achieve performance levels comparable to major metropolitan areas [42]. Rahman and Chowdhury demonstrated that ecosystem flourishing in developing countries depends on the simultaneous presence of "institutional stability" and "network support." They concluded that the absence of either factor disrupts the entire ecosystem [43].

A systematic review of the literature, along with an analysis of domestic and international studies, indicates that no integrated and localized model has yet been developed to explain the regional entrepreneurial ecosystem of the handicraft sector-particularly in East Azerbaijan Province. A comprehensive model is needed in which cultural factors, institutional and regulatory structures, infrastructural components, human capital, financial mechanisms, and market structures are examined simultaneously and through their internal interrelationships. Although several international frameworks-such as those of Isenberg, Stam, and Cohen-highlight the roles of institutions, culture, human capital, and markets, these models, despite their relative comprehensiveness, lack sufficient conceptual adequacy for handicraft ecosystems. This is because handicraft ecosystems possess a hybrid nature that is culture-driven, skill-intensive, and dispersed across niche markets. Moreover, recent literature suggests that cultural-industry and handicraft ecosystems, especially those characterized by weak institutional structures, limited networks, and high sensitivity to cultural elements and small-scale markets, require localized and adaptive frameworks.

Accordingly, the present study seeks to fill this theoretical gap by proposing an integrative and localized model that explains the influence of six key dimensions-cultural factors, laws and regulations, basic infrastructure, human capital, financial mechanisms, and market structures-within a coherent framework tailored to the characteristics of the regional handicraft ecosystem of East Azerbaijan. Thus, the conceptual model of the study, presented in Figure (1), aligns conceptually with reputable global frameworks while being contextually enriched to capture the unique dynamics of this local ecosystem.

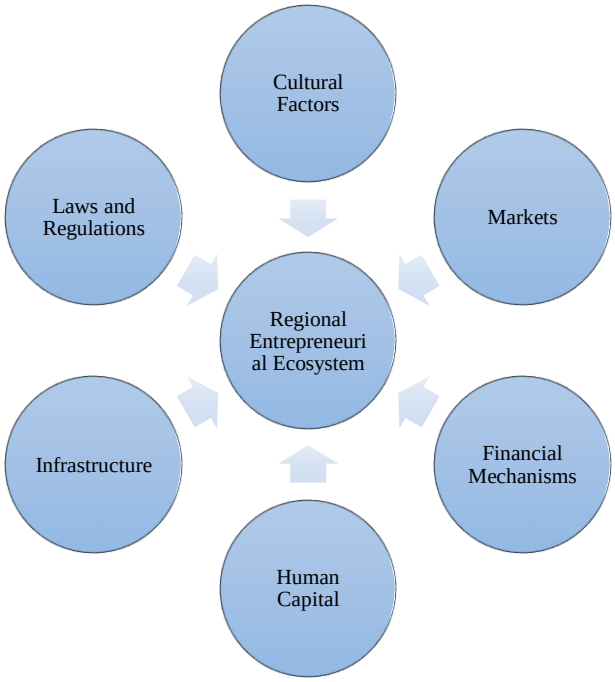


Fig. 1. Theoretical Research Model

3. Research Methodology

This article aims to identify and evaluate the influential indicators on the regional entrepreneurship ecosystem of handicrafts in East Azarbaijan Province. From an objective perspective, it falls under the category of applied and developmental studies. Given the complex nature of the subject and the necessity of extracting real data from the environment, the article is designed based on an exploratory mixed-methods approach. This approach initially utilizes qualitative data to generate patterns and indicators, and then evaluates and validates these findings through quantitative tools. This inductive logic ensures that the final model of the article is developed indigenously, empirically, and based on real-world data.

In the qualitative phase, data were collected through document analysis and semi-structured interviews with managers, experts, and artisans in the handicraft sector of the province. Participants were selected using a purposeful sampling method, striving for the highest level of diversity to cover various perspectives on the functioning of the entrepreneurship ecosystem. Interviews continued until theoretical saturation was achieved, meaning no new concepts emerged in the final interviews compared to previous discussions. The collected data were analyzed using Clarke and Braun's thematic analysis method. In this process, the researcher first familiarized themselves with the data, then extracted initial codes and organized them into potential themes. Subsequently, the themes were reviewed and refined,

and finally, the definitive themes were formulated with precise definitions and clear boundaries. The outcome of this phase was the development of an initial conceptual model and the identification of key indicators for the regional entrepreneurship ecosystem of handicrafts.

In the quantitative phase, a researcher-made questionnaire was designed based on the findings of the qualitative phase to assess the actual state of the ecosystem. The statistical population for this section included 246 managers and active personnel in the provincial handicraft industries. Simple random sampling was employed. The sample size was determined using Cochran's formula with a 95% confidence level and a 5% margin of error:

$$n = \frac{Nz^2p(1-p)}{d^2(N-1) + z^2p(1-p)}$$

where $N = 246$, $z = 1.96$, $p = 0.5$, and $d = 0.05$were applied, resulting in a calculated sample size of 187 participants. To ensure the quality of the measurement instrument, the face and content validity of the questionnaire were first assessed during the qualitative phase. Subsequently, in the quantitative phase, validity was measured using the Content Validity Ratio (CVR) based on Lawshe's table for a panel of 9 experts. Items with a CVR value below the acceptable threshold of 0.78 were either removed or modified. Furthermore, the reliability of the questionnaire was evaluated using Cronbach's alpha coefficient; all model constructs demonstrated acceptable reliability, with values exceeding 0.70.

Quantitative data analysis was conducted at both descriptive and inferential levels. At the descriptive level, indices such as mean, standard deviation, and frequency were utilized to describe the characteristics of the respondents and the research variables. At the inferential level, one-sample t-tests and one-way analysis of variance (ANOVA) were employed to assess the status of the identified indicators and to perform group comparisons. To evaluate the conceptual model and examine construct validity, Confirmatory Factor Analysis (CFA) was conducted within the framework of variance-based Structural Equation Modeling (SEM) using Smart PLS software. In the first-order model, factor loadings, convergent validity, and discriminant validity were assessed. In the second-order model, higher-order constructs and the overall structure of the ecosystem were analyzed to determine the goodness-of-fit between the empirical data and the theoretical model.

Based on the aforementioned points, previous studies, and the identification of independent and dependent variables derived from thematic analysis and the literature review, the conceptual model of the research is illustrated in Figure 2. In this study, the identified variables are classified under sub-themes into six categories: "Cultural Factors," "Laws and Regulations," "Infrastructure (Foundational Components)," "Human Capital," "Financing," and "Markets." Furthermore, Table 3 presents a detailed breakdown of the sub-themes, main themes, and overarching (global) themes of the regional handicraft entrepreneurship ecosystem in East Azerbaijan.

Table 3. Sub-Themes, Main Themes, and Overarching Theme (Regional Handicraft Entrepreneurship Ecosystem of East Azerbaijan Province)

Overarching Theme	Main Themes	Sub-Themes	Symbol
Overarching Theme: Regional Handicraft Entrepreneurship Ecosystem of East Azerbaijan Province	Cultural Factors	Social status of business owners in the region	F1
		Degree of attention to creativity, innovation, and experience in the culture of the society	F2
		Belief in the usefulness and effectiveness of business owners in various social and economic dimensions	F3
		Visibility and recognition of successful business owners in the region	F4
		Level of risk tolerance, acceptance of mistakes, and failure among business owners	F5
		Degree of entrepreneurs' tendency and willingness to enter global markets	F6
		Holding idea competitions and business creation and development contests at the regional level	F7
		Degree of individuals' tendency and willingness to start entrepreneurial ventures	F8
	Laws and Regulations	Existence of entrepreneurship development strategies in government programs	G1
		Entrepreneurship incentive regulations	G2
		Government willingness to address potential entrepreneurial challenges	G3
		Existence of anti-monopoly and intellectual property laws	G4
		Existence of transparent and fair labor laws for employees	G5
		Transparency of laws and regulations governing market entry (licenses, etc.)	G6
		Existence of clear and flexible tax regulations (tax exemptions) in the field of entrepreneurship	G7
	Infrastructure	Facilitating venture capital investment in early stages of business creation and development	Z1
		Access to physical communication infrastructures in the region	Z2
		Provision of technical and support services by industry associations	Z3
		Easy access to information, knowledge, and required technologies in the handicraft sector	Z4
		Access to energy infrastructures (water, electricity, gas, etc.)	Z5
		Entrepreneurs' access to financial and accounting consultations	Z6
		Entrepreneurs' access to legal consultations	Z7
		Access to ICT infrastructures	Z8
		Access to virtual communication infrastructures (telephone, internet, etc.) in the region	Z9
		Holding conferences and seminars on business creation and development at the regional level	Z10
	Human Capital	Existence of R&D centers in the field of handicraft entrepreneurship in the province	S1
		Availability of abundant managerial talent in the province's handicraft sector	S2
		Development of entrepreneurial motivation and spirit by educational and research centers	S3
		Emotional and social support from family and friends for entrepreneurship	S4
		Emphasis on innovation and existence of innovation-support programs in organizations across the province	S5
		Level of access to skilled and semi-skilled labor	S6
		Existence of general, cultural, and promotional training for entrepreneurship and self-employment in the province	S7
		Willingness and intention of human capital to engage in entrepreneurial activities	S8
		Ability of human resources to move freely within the labor market	S9

Financing	Existence of risk-tolerant investors in the province and their willingness to allocate resources to businesses	T1
	Existence of multiple financing solutions and access to them depending on business needs	T2
	Extent of private-sector participation in entrepreneurial financing	T3
	Provision of low-interest loans and facilities for handicraft entrepreneurs in the province	T4
	Participation of investors, friends, and family in launching entrepreneurial ventures	T5
Markets	Existence of appropriate macro-level policies and goals supporting entrepreneurship in the provincial handicraft sector	B1
	Existence of suitable channels for product distribution (access and ease of reaching distribution channels and retailers)	B2
	Access to networks of Iranian investors and entrepreneurs abroad	B3
	Existence of general domestic customers for handicraft products and their abundance	B4
	Breadth and access to international networks enabling entrepreneurs to connect with foreign companies and individuals	B5
	Existence and interaction of handicraft business mentors with technology-based enterprises	B6
	Access to wholesale and retail buyers for selling offered products or services	B7

4. Results

In this section, the collected research data are presented and analyzed. In the next step, the data obtained from the designed questionnaire were evaluated using descriptive and inferential statistical analyses. Finally, through confirmatory factor analysis, the current status of the regional handicraft entrepreneurship ecosystem in East Azerbaijan Province was examined based on the functional approach to regional entrepreneurial ecosystems, and operational programs effective in developing this ecosystem were proposed.

Descriptive data show that among the 187 respondents, the age distribution includes 28 individuals aged 20–29, 74 individuals aged 30–39, 59 individuals aged 40–49, and 26 individuals over 50 years old. In terms of educational level, 25 participants hold a high school diploma, 32 have an associate degree, 64 have a bachelor's degree, 58 hold a master's degree, and 8 have a doctorate. The gender composition consists of 38 women and 149 men.

Analysis of the entrepreneurship ecosystem indicators shows that although the mean values of the components are above the mid-point of 2.5, none of them reach the desirable level of 3 or higher. This pattern indicates an unfavorable and suboptimal state of the province's handicraft entrepreneurship ecosystem, highlighting the necessity of deeper examination of institutional barriers and structural gaps in subsequent sections. Table 4 presents the descriptive statistics of the regional handicraft entrepreneurship ecosystem based on the questionnaire results.

Table 4. Descriptive Statistics of the Regional Handicraft Entrepreneurship Ecosystem

Symbol	Minimum	Maximum	Mean	Standard Deviation	Symbol	Minimum	Maximum	Mean	Standard Deviation
T1	1	4	2.58	0.753	S1	1	4	2.80	0.705
T2	1	4	2.61	0.632	S2	1	4	2.42	0.813
T3	1	4	2.64	0.744	S3	1	4	2.61	0.693
T4	1	4	2.50	0.740	S4	1	4	2.65	0.687
T5	1	4	2.62	0.766	S5	1	4	2.63	0.916
Z1	1	4	2.63	0.839	S6	1	4	2.71	0.640
Z2	1	4	2.65	0.837	S7	1	4	2.63	0.689
Z3	1	4	2.65	0.905	S8	1	4	2.75	0.761
Z4	2	4	2.65	0.591	S9	1	4	2.69	0.802
Z5	1	4	2.53	0.672	G1	1	4	2.53	0.902
Z6	1	4	2.70	0.621	G2	1	5	2.61	0.896
Z7	2	4	2.57	0.595	G3	1	4	2.62	0.857
Z8	1	4	2.66	0.749	G4	1	4	2.80	0.751
Z9	1	4	2.69	0.852	G5	1	4	2.55	0.824
Z10	1	4	2.59	0.667	G6	1	5	2.48	0.953
F1	1	5	2.79	0.745	G7	1	4	2.51	0.939
F2	1	4	2.59	0.803	B1	1	4	2.62	0.682
F3	1	5	2.64	0.797	B2	1	4	2.73	0.623
F4	1	5	2.69	0.828	B3	1	4	2.55	0.710
F5	1	4	2.57	0.822	B4	1	4	2.51	0.673
F6	1	5	2.75	0.971	B5	1	4	2.61	0.731
F7	1	5	2.56	0.908	B6	1	4	2.71	0.619
F8	1	4	2.50	0.766	B7	2	5	2.91	0.870

According to Table 5, the results of the one-sample t-test for the basic themes indicate that the significance value for all indicators equals 0.000, which is less than 0.05. Given that the mean of each indicator is approximately 3, it can be concluded that the mean scores of the basic themes of the regional handicraft entrepreneurship ecosystem in East Azerbaijan Province are significantly higher than the average value. Furthermore, all obtained t-values for the basic themes are greater than 1.96, indicating that all basic themes are significantly influential at the 95 percent confidence level.

Table 5. Student's t-Test for the Regional Handicraft Entrepreneurship Ecosystem in the Province

Symbol	T-Value	Significance	Mean Difference	95% Confidence Interval		Symbol	T-Value	Significance	Mean Difference	95% Confidence Interval	
				Lower	Upper					Lower	حداکثر
T1	41.95	0.000	2.58	2.46	2.70	S1	48.66	0.000	2.80	2.69	2.91
T2	50.61	0.000	2.61	2.51	2.72	S2	36.44	0.000	2.42	2.29	2.55
T3	43.43	0.000	2.64	2.52	2.76	S3	46.18	0.000	2.61	2.50	2.73
T4	41.40	0.000	2.50	2.38	2.62	S4	47.20	0.000	2.65	2.54	2.76
T5	43.91	0.000	2.62	2.50	2.74	S5	35.11	0.000	2.63	2.48	2.77
Z1	38.45	0.000	2.63	2.50	2.77	S6	51.77	0.000	2.71	2.60	2.81
Z2	38.74	0.000	2.65	2.51	2.78	S7	46.77	0.000	2.63	2.52	2.74
Z3	35.91	0.000	2.65	2.51	2.80	S8	44.18	0.000	2.75	2.62	2.87
Z4	55.02	0.000	2.65	2.56	2.75	S9	41.11	0.000	2.69	2.56	2.82
Z5	46.15	0.000	2.53	2.42	2.64	G1	34.38	0.000	2.53	2.39	2.68
Z6	53.23	0.000	2.70	2.60	2.80	G2	35.72	0.000	2.61	2.47	2.76
Z7	52.79	0.000	2.57	2.47	2.66	G3	37.45	0.000	2.62	2.48	2.76
Z8	43.47	0.000	2.66	2.54	2.78	G4	45.67	0.000	2.80	2.68	2.92
Z9	38.60	0.000	2.69	2.55	2.82	G5	37.96	0.000	2.55	2.42	2.69
Z10	47.65	0.000	2.59	2.49	2.70	G6	31.85	0.000	2.48	2.33	2.63
F1	45.95	0.000	2.79	2.67	2.91	G7	32.77	0.000	2.51	2.36	2.66
F2	39.53	0.000	2.59	2.46	2.72	B1	47.03	0.000	2.62	2.51	2.73
F3	40.58	0.000	2.64	2.51	2.77	B2	53.62	0.000	2.73	2.63	2.83

F4	39.71	0.000	2.69	2.55	2.82	B3	43.91	0.000	2.55	2.43	2.66
F5	38.38	0.000	2.57	2.44	2.71	B4	45.61	0.000	2.51	2.40	2.62
F6	34.65	0.000	2.75	2.59	2.90	B5	43.79	0.000	2.61	2.50	2.73
F7	34.51	0.000	2.56	2.41	2.71	B6	53.55	0.000	2.71	2.61	2.81
F8	39.95	0.000	2.50	2.38	2.62	B7	40.93	0.000	2.91	2.77	3.05

Subsequently, confirmatory factor analysis was conducted for each category related to the status of the regional entrepreneurship ecosystem in East Azerbaijan Province. Figures 2 and 3 present the results of the confirmatory factor analysis for the organizing indicators of the regional entrepreneurship ecosystem in the province's handicraft sector. The findings indicate that infrastructure, with a standardized coefficient of 0.214, has the highest contribution, while financing, with a standardized coefficient of 0.116, has the lowest coefficient among the core indicators.

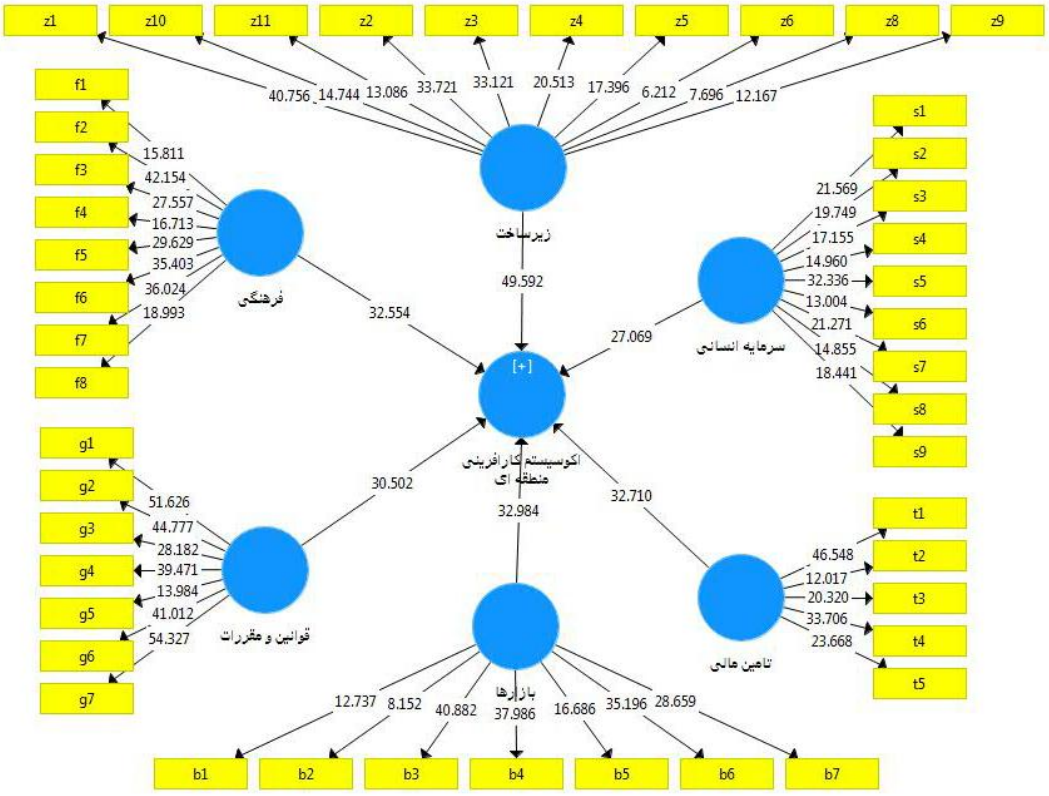


Fig. 2. T-Value Estimates for the Construct Components

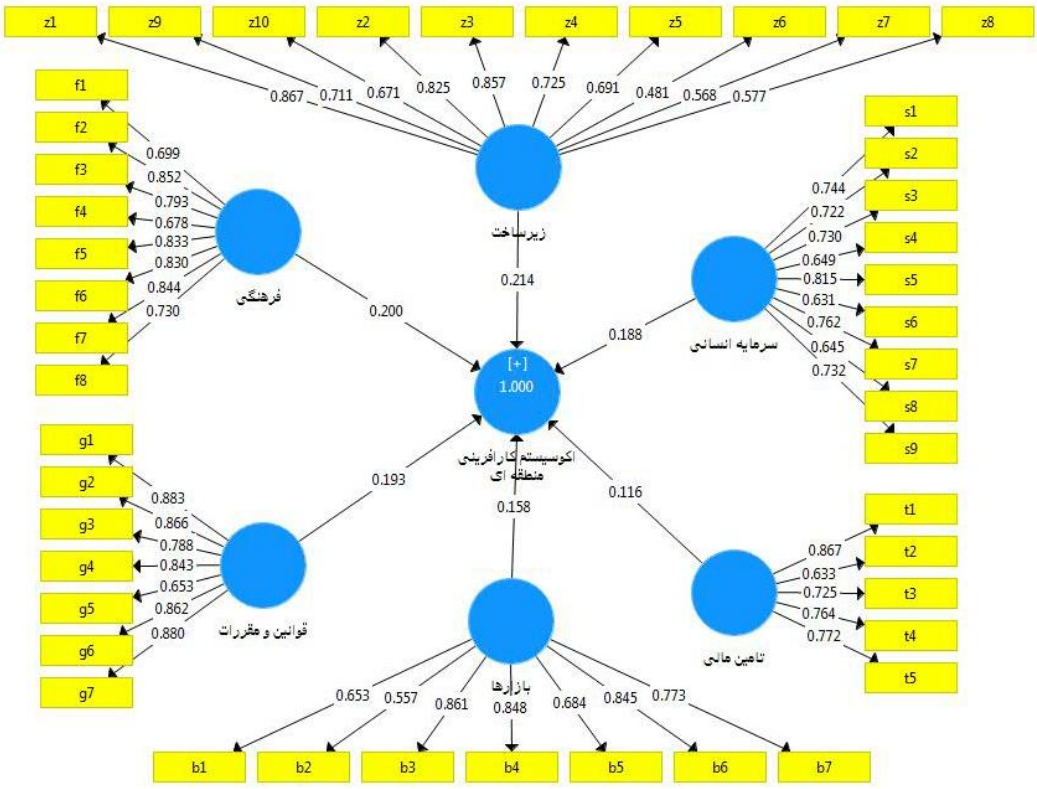


Fig. 3. Factor Loadings of Each Component

As observed, the results of the confirmatory factor analysis (CFA) conducted to examine the status of the regional handicraft entrepreneurship ecosystem in East Azerbaijan indicate that the infrastructure factor, with a standardized coefficient of 0.214, and the financing factor, with a standardized coefficient of 0.116, are statistically significant. Moreover, the critical ratio (C.R.) values for all variables exceed 1.96, confirming their significance.

The findings further show that cultural factors, with a path coefficient of 0.200, have a positive and significant effect on the regional entrepreneurship ecosystem. Likewise, infrastructure (path coefficient = 0.214) and financing (path coefficient = 0.116) exert positive and significant impacts on the regional entrepreneurship ecosystem. Additionally, markets (path coefficient = 0.158), laws and regulations (path coefficient = 0.193), and human capital (path coefficient = 0.188) also have positive and statistically significant effects on the regional entrepreneurship ecosystem. Overall, the results indicate that the highest path coefficient is associated with infrastructure, whereas the lowest coefficient pertains to financing.

The model fit indices also demonstrate that the level of significance is below 0.05, and the estimated values of the relative fit indices, including the Goodness of Fit (GOF) index, are within acceptable ranges. It should be noted that in structural equation modeling, after assessing model fit, the reliability of each dimension, construct, and the overall model must be evaluated. Accordingly, Composite Reliability (CR) was employed to assess construct reliability. Furthermore, Cronbach's alpha was used to examine the internal consistency and coherence of the observed variables.

The results show that Cronbach's alpha values for all variables exceed 0.70, and the composite reliability indices for all constructs are also above 0.70, indicating satisfactory reliability. Finally, the

Average Variance Extracted (AVE) criterion was used to assess the degree of correlation between each construct and its indicators. In simple terms, AVE represents the average shared variance, and higher values indicate better model fit. Convergent validity is established when AVE exceeds 0.50. Accordingly, the proposed model of the regional handicraft entrepreneurship ecosystem in East Azerbaijan demonstrates an adequate and desirable level of fit (Tables 6 and 7).

Table 6. Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE)

Indicator Type	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Regional Entrepreneurship Ecosystem	0.977	0.978	0.977
Markets	0.868	0.900	0.568
Financing	0.808	0.869	0.572
Infrastructure	0.884	0.907	0.501
Human Capital	0.881	0.904	0.514
Cultural Factors	0.910	0.927	0.616
Laws and Regulations	0.922	0.938	0.687

Table 7. Model Fit Indices

Indicator Type	Model Fit Criterion	Acceptable Threshold	Estimated Value
Goodness of Fit Index (GOF)	GOF	0.19-0.67	0.563
Coefficient of Determination	R2	Above 0.60	0.9
Root Mean Square Error of Approximation	RAMSEA	Weak fit: > 0.10 Moderate fit: 0.08–0.10 Good fit: 0.05–0.08 Excellent fit: < 0.05	<0.05

5. Conclusion

The present study was conducted with the aim of examining and contextualizing the dimensions of the regional entrepreneurial ecosystem in the handicrafts sector of East Azerbaijan Province. The findings indicate that transitioning from traditional development models toward a holistic and systemic approach is an undeniable necessity for enhancing entrepreneurship rates. The results confirm that entrepreneurial ecosystems are profoundly context-dependent phenomena; that is, despite similarities in their fundamental components, their configuration and dynamics are directly shaped by local needs, cultural norms, and regional institutions. Consequently, any uncritical imitation of successful global models without considering the indigenous capacities of East Azerbaijan Province entails a high risk of misalignment.

Based on data analysis, six core pillars were identified as essential for the formation and development of this ecosystem, which are summarized as follows. First, cultural factors function as the foundation of the ecosystem. Shifting societal attitudes toward risk-taking, valuing innovation, and showcasing successful role models in the handicrafts sector serve as key drivers for individuals' entry into global markets and the creation of new ventures. Second, in the domain of markets, the findings reveal that demand orientation and access to international distribution networks constitute the beating heart of the ecosystem. In the absence of modern sales channels and interaction with foreign investors, the productive potential of handicrafts cannot be transformed into economic value added.

Third, financial provision remains a critical challenge. The results suggest that diversifying financial instruments-ranging from venture capital to low-interest governmental support-along with the active participation of the private sector and families, is a prerequisite for overcoming liquidity constraints in this sector. At another level, laws and regulations operate as governmental leverage mechanisms. Transparency in tax regulations, protection of intellectual property rights, and the elimination of excessive bureaucratic procedures in licensing processes provide the necessary security for entrepreneurial activities.

Fifth, creative and skilled human capital serves as the driving force of innovation within the ecosystem. Strengthening research and development centers and fostering linkages between educational institutions and the handicrafts labor market can generate the motivation and competencies required for the free mobility of labor at the regional level. Finally, physical and digital infrastructures (ICT) provide the technical and communicative foundations needed to reduce transaction costs and facilitate access to up-to-date knowledge.

Overall, the results of this study recommend that local and national policymakers focus on enhancing interactions among these six pillars, rather than implementing fragmented interventions. Contextualizing the entrepreneurial ecosystem model in East Azerbaijan Province not only accelerates idea exchange and promotes sustainable employment in the handicrafts sector, but also improves the quality of life of local communities through the diversification of the regional economy. By offering a coherent framework, this study paves the way for targeted planning aimed at transforming the province's latent handicrafts capacities into a sustainable competitive advantage.

Despite efforts to design and implement the study rigorously, several limitations-common to empirical research-should be considered when interpreting the findings. First, the data were collected based on respondents' perceptions and self-reported assessments; therefore, some responses may have been influenced by individual interpretations, perceptual bias, or social desirability tendencies. Second, the geographical scope of the study was limited to East Azerbaijan Province, which may restrict the generalizability of the findings to other regions or provinces. This limitation is particularly important given the context-dependent nature of entrepreneurial ecosystems, where institutional, economic, and cultural characteristics of each region can significantly influence their structure and functioning.

Furthermore, this study is based on cross-sectional data; therefore, it was not possible to examine temporal changes or the long-term dynamics of the entrepreneurial ecosystem, despite the inherently dynamic and evolving nature of such ecosystems. Additionally, the main focus of this research was limited to the handicrafts sector, while other domains within the cultural and creative industries were not investigated. Moreover, certain intangible yet influential variables-such as the level of social trust among ecosystem actors, informal interactions, and hidden networks of collaboration-were not incorporated into the model due to difficulties in direct measurement. This omission may influence the extent to which the internal mechanisms of the ecosystem are comprehensively understood.

Based on the study's findings, it is recommended that policymakers and development institutions adopt a systemic and integrated approach toward the entrepreneurial ecosystem when designing support programs for the handicrafts sector. Strengthening the culture of entrepreneurship and promoting positive attitudes toward innovation and risk-taking can lay the groundwork for the emergence of new ventures within the handicrafts industry. Additionally, the establishment and expansion of market networks-particularly through leveraging digital platforms and e-commerce-can facilitate handicraft producers' access to national and international markets. Alongside this, diversifying financial

instruments, developing support funds, and easing entrepreneurs' access to financial resources are among the essential measures that can reinforce entrepreneurial activities in this sector.

From an institutional perspective, it is also suggested that laws and regulations related to entrepreneurial activities in the handicrafts domain be revised, and that administrative procedures and licensing processes be streamlined to create a more enabling environment for entrepreneurs. Furthermore, strengthening human capital through training in entrepreneurial skills, business management, and digital marketing can play a crucial role in enhancing the competitiveness of handicraft producers. Finally, to further advance knowledge in this field, future research is encouraged to employ longitudinal data and advanced analytical methods to examine the temporal dynamics of entrepreneurial ecosystems. Conducting comparative studies across different regions of the country could also provide deeper insights into the factors that shape and promote the development of regional entrepreneurial ecosystems.

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