

Integrated Economic–Sociological Modeling of the Startup Ecosystem in Algeria: A Hybrid Approach Between Exploratory Analysis of the Cultural System and Predictive Measurement of Empowerment Mechanisms

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Abstract

This study emerges within the context of the rapid transformations experienced by the Algerian economy, alongside the rise of the startup ecosystem as a central pillar of the knowledge economy. Since 2020, Algeria's startup ecosystem has recorded notable growth, reflected in the expansion of the number of startups, incubators, and public funding programs directed toward digital innovation. The research problem stems from the limitations of prevailing approaches in capturing the comprehensive dynamics governing the startup environment. Most studies are confined to describing the legal framework and financial instruments or to measuring isolated economic performance indicators, without proposing an integrated model that links the entrepreneurial cultural system with economic and sociological empowerment mechanisms within a predictive framework capable of explaining variations in success and failure. Accordingly, this article aims to construct an integrated economic–sociological model of the startup ecosystem in Algeria, based on a hybrid approach that combines exploratory analysis of the cultural and value system framing entrepreneurial action with quantitative predictive measurement of the effectiveness of empowerment mechanisms in terms of financing, institutional support, and social and knowledge networks. The research gap addressed by this work lies in the absence of composite models that integrate econometrics and cultural sociology in the study of entrepreneurship within the Algerian context, as well as in the scarcity of studies that move beyond the “opportunities/constraints” dichotomy toward a deeper examination of symbolic structures and social representations of risk, innovation, and institutional trust. The theoretical significance of the study resides in its contribution to bridging the gap between innovation economics models and approaches in economic sociology through the proposal of a conceptual framework that precisely defines the terms “startup,” as specified by Algerian legal regulation, “entrepreneurial cultural system,” and “empowerment mechanisms” as an interconnected bundle of material and symbolic resources. Practically, it provides an analytical foundation that policymakers can rely upon in designing policies more responsive to the cultural and social realities of young entrepreneurs. The study adopts a hybrid methodology combining qualitative exploratory analysis (semi-structured interviews and focus groups with startup founders and incubator managers, along with content analysis of official discourse on entrepreneurship) and quantitative analysis using econometric modeling and predictive measurement tools (regression models, path analysis, and structural equation modeling) applied to a sample of certified startups across various sectors. The main findings indicate that the effectiveness of empowerment mechanisms (particularly innovative financing, incubation programs, and the facilitation of legal procedures) is strongly mediated by patterns of risk and success perception, levels of institutional trust, and the density of social and knowledge networks. Furthermore, support policies based solely on financial incentives remain limited in impact unless accompanied by a transformation in the cultural system toward normalizing failure, encouraging experimentation, and consolidating values of cooperation and open knowledge. The model also reveals distinctions between types of startups characterized by strong economic empowerment but weak sociological empowerment, and vice versa, and proposes a classification of empowerment patterns that can be utilized in redesigning support programs according to different cultural–economic profiles. In this way, the article offers a critical and in-depth perspective that moves beyond celebratory views of the startup ecosystem toward a complex diagnosis of its strengths and structural imbalances, while proposing intervention mechanisms grounded in precise predictive modeling of the relationships between culture, institutions, and the economy within the Algerian startup context.

Keywords: Economic, Sociological Modeling, Startups, Entrepreneurial Cultural System, Empowerment Mechanisms, Knowledge Economy, Entrepreneurship In Algeria, Startup Ecosystem.

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First: Study Introduction

In recent decades, national economies have undergone profound transformations that transcend traditional structures based on natural resource dependence, moving instead toward a knowledge- and innovation-driven economy. In this context, startups are considered one of the most important pillars enabling

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countries to transition from models of near-total reliance on hydrocarbons to more dynamic models grounded in innovation, digitalization, and entrepreneurship. In Algeria, this shift has taken place within a long-term strategy aimed at diversifying the national economy and reducing dependence on oil rents, which have dominated public budgets for decades (Bouras, 2024, p. 7). Within this framework, the Algerian state has begun adopting a new approach based on supporting startups as drivers of innovation, technological development, and job creation for youth, particularly in light of declining hydrocarbon revenues and increasing global economic challenges (Bouras, 2024, p. 10).

Official statistics and recent studies show that the number of startups in Algeria has grown significantly since 2019, exceeding 2,000 certified startups by 2026, with geographical concentrations in Algiers, Sétif, and Ouargla, and sectoral distribution covering digital finance, logistics services, digital education, and digital health (Upgrowth, 2026, p. 3). These figures reflect genuine dynamism within the startup ecosystem; however, they also reveal structural fragility related to startup financing, regulatory stability, and the lack of innovation-supporting infrastructure such as applied research centers, academic incubators, and partnerships between universities and enterprises (Bouras & Saidi, 2024, p. 15).

Since 2020, Algeria has enacted the Startup Law, which constitutes a specific legislative framework aimed at clarifying the legal definition of a startup, regulating the “Startup Label” mechanism, establishing conditions for funding and support, and defining investment incentives for innovative projects (Ministère de la Technologie, 2020, p. 4). This law, along with the decree establishing the Innovation Support Fund (ASF), and the launch of support programs through incubators and accelerators such as Upgrowth and Startup.dz, has formed an official support system intended to promote a culture of innovation and encourage youth entrepreneurship as a strategic socio-economic choice (Bouras, 2024, p. 12; Upgrowth, 2026, p. 5). Despite these legislative and financial initiatives, economic, structural, and sociological challenges remain significant, limiting startups’ capacity for long-term growth, sustainability, and the production of replicable success models.

Recent studies indicate that the Algerian entrepreneurial ecosystem is experiencing notable growth in the number of startups, supported by government measures, funding schemes, and incubators and accelerators; however, it continues to suffer from bureaucracy, financing difficulties, and regulatory instability (Bouras & Saidi, 2024, p. 18; Lagh University, 2025, p. 9). In a survey conducted on 129 founders of certified startups in mid-2023, results showed that 72% of startups primarily rely on self-financing (love money), while only 28% resorted to informal financing due to the lack of bank funding and difficulty accessing innovative financing mechanisms (ARMG Publishing, 2024, p. 6). These figures highlight the fragility of the financial structure in the sector and confirm that financial support remains insufficient, unbalanced, and inattentive to sectoral differences, while failing to integrate cultural and systemic variables that influence startup behavior.

On the other hand, most studies focusing on the startup ecosystem in Algeria have concentrated on economic or institutional indicators, such as funding volume, number of incubators, and legal reforms, whereas the cultural system (values, norms, societal perceptions of failure, and patterns of trust) and variables of socio-economic empowerment have received less attention in models explaining startup performance (IJEPO, 2024, p. 4; OCERINT, 2025, p. 7). This limitation in previous research necessitates a shift from a narrow economic approach to a more comprehensive one that integrates economic and sociological structures, in order to understand how cultural and social factors interact with empowerment mechanisms and influence the likelihood of startup success or failure.

In this context, contemporary research highlights that the entrepreneurial cultural system in Algeria is characterized by several features: a preference for traditional job security, the absence of an institutionalized risk-taking culture, weak acceptance of failure as a learning process, and the presence of a socio-cultural hierarchy that prioritizes personal trust and family networks over formal institutions (IJEPO, 2024, p. 6; OCERINT, 2025, p. 10). Although these characteristics do not prevent the emergence of successful startups, they create an environment that is not fully conducive to a structured culture of innovation, limit the diffusion of replicable success models, and affect financing behaviors, expansion potential, and the ability of startups to attract talent and international partnerships.

Moreover, it can be observed that empowerment mechanisms (financing, incubation, legal frameworks, networks) in the Algerian context remain fragmented, structurally unintegrated, and lacking in comprehensive performance evaluation models that link tangible economic indicators (funding, regulations, market performance) with sociological indicators (culture, trust, social networks) (Bouras & Saidi, 2024, p. 20; Lagh University, 2025, p. 12). This implies that support policies based solely on funding or legislation remain limited in impact, as they fail to account for the cultural and behavioral dimensions of entrepreneurial action, and do not integrate the dynamics of trust, social networks, and risk culture, which are among the most critical sociological determinants of success or failure.

Therefore, this study seeks to construct an integrated economic–sociological model of the startup ecosystem in Algeria, based on a hybrid approach that combines exploratory analysis of the entrepreneurial cultural system with predictive measurement of empowerment mechanisms, with the aim of providing a deeper understanding and more precise explanatory tools for variations in startup performance. This model aims to bridge the gap between innovation economics models (Bouras, 2024; ARMG Publishing, 2024) and approaches in economic sociology (IJEPO, 2024; OCERINT, 2025), by precisely defining the concepts of “startup” (according to Algerian law), “entrepreneurial cultural system,” and “empowerment mechanisms” as interconnected sets of material and symbolic resources that influence startup behavior and the probabilities of success, failure, or continuity.

Through this framework, the study seeks to offer both a theoretical and practical contribution: theoretically, by constructing a hybrid model that integrates economic and sociological indicators; and practically, by providing an analytical foundation that policymakers can rely on in designing policies that are more responsive to the cultural and social realities of young entrepreneurs, not merely to economic or institutional conditions. This approach opens the way for rethinking support programs not merely as financial processes, but as integrated empowerment processes that account for cultural dimensions, encourage the normalization of failure, and promote values of experimentation, cooperation, and open knowledge—thus forming a foundation for genuine empowerment of startups in the Algerian context.

Within this perspective, the integrated economic–sociological modeling proposed in this study represents an attempt to construct a hybrid model that combines tangible economic indicators (funding, regulations, market performance) with sociological indicators (culture, trust, social networks) in order to understand empowerment mechanisms within the Algerian startup environment. It provides both a theoretical and practical framework that can be leveraged to redesign support policies, evaluate their effectiveness, and propose more balanced and comprehensive alternatives that serve the strategic transition toward an innovation-driven economy based on startups, rather than continued near-total reliance on hydrocarbons.

Second: Research Problem and Its Precise Formulation

The central research problem in this study is formed around the following fundamental question: How can an integrated economic–sociological model be constructed to explain the dynamics of empowerment in the startup ecosystem in Algeria, through a hybrid approach that combines exploratory analysis of the entrepreneurial cultural system with predictive measurement of economic and institutional empowerment mechanisms? This question does not merely present a research topic; rather, it reformulates the causal relationship between culture, institutions, and economic performance, demonstrating that understanding the success or failure of startups requires moving beyond purely economic analysis toward a multi-level analysis of culture, institutional structures, and the social networks within which these firms operate (Bouras & Saidi, 2024, p. 14).

In this context, the problem emerges from the fact that most previous studies addressing the startup ecosystem in Algeria have relied on one-dimensional economic–institutional analyses, focusing on quantitative indicators such as the number of certified startups, the volume of public funding, or Algeria’s ranking in global innovation indices. However, they have not provided models capable of explaining the subtle differences in performance among startups with diverse cultural, social, and spatial backgrounds (Bouras, 2024, p. 9; Lagh University, 2025, p. 8). Despite their importance, these studies lack a linkage

between tangible economic data (such as funding, laws, and market performance) and deeper sociological variables (such as values, trust, networks, and perceptions of failure), which limits their ability to explain why some startups succeed despite non-ideal financial or institutional conditions, while others fail despite strong financial support and a clear legal framework (IJEPO, 2024, p. 5; OCERINT, 2025, p. 11).

Accordingly, the research problem can be formulated as a focused issue: there is no integrated economic–sociological model in Algerian or broader Arab studies that explains, through a testable mechanism, how cultural structures (values, norms, risk perceptions) interact with economic and institutional empowerment mechanisms (financing, incubators, laws, networks) within the startup ecosystem in Algeria, and what impact this interaction has on the probabilities of success, continuity, or failure. This gap translates in practice into difficulties in designing effective support policies, as funding or incubation policies remain ineffective unless understood within a cultural context that accounts for trust dynamics, risk perceptions, and social networks (IJEPO, 2024, p. 7; OCERINT, 2025, p. 13).

To enhance the depth and quality of analysis, the problem must be deconstructed into multiple levels that allow for examining empowerment dynamics across three dimensions: the macro level (policies, laws, international indicators), the meso level (entrepreneurial ecosystem: incubators, universities, funding bodies, support networks), and the micro level (entrepreneurs, their culture, behavior, and perceptions of risk and failure). At the macro level, the legal framework for startups in Algeria, represented by the 2020 Startup Law, constitutes a clear institutional incentive; however, it remains insufficient in light of weak banking financing, regulatory instability, and fluctuations in empowerment policies (Ministère de la Technologie, 2020, p. 6; Bouras & Saidi, 2024, p. 17). This level is also linked to international indicators showing that Algeria lags behind countries with higher innovation performance, despite local growth in the number of startups, highlighting a gap between aggregate global innovation performance and emerging local market dynamics (Bouras, 2024, p. 11).

At the meso level, the entrepreneurial ecosystem is manifested through incubators (such as Upgrowth), accelerators, universities, funding funds (such as ASF), and partnerships between universities and enterprises, forming both formal and informal support networks (Upgrowth, 2026, p. 4). Nevertheless, studies indicate that this ecosystem remains unbalanced, as 72% of certified startups in 2023 relied heavily on self-financing (love money), while only 28% resorted to informal financing due to weak banking funding and difficulty accessing innovative financing mechanisms (ARMG Publishing, 2024, p. 5). These figures demonstrate that economic empowerment mechanisms (financing, incubators, funds) do not function in an integrated manner, and that the absence of coordination among these mechanisms, along with the lack of unified evaluation models, limits startups' capacity for growth and renders support policies misaligned with the real differences among types of startups.

At the micro level, the entrepreneurial cultural system in Algeria appears as a fabric of both traditional and modern values: risk aversion, family centrality, and weak trust in formal institutions, alongside a growing orientation toward digital innovation, the emergence of entrepreneurial communities in major cities (Algiers, Sétif, and Ouargla), and increasing interest in technological opportunities (IJEPO, 2024, p. 9; OCERINT, 2025, p. 15). A survey conducted on 129 founders of certified startups in mid-2023 revealed that 68% of founders identified fear of failure and the absence of a culture that accepts failure as experimentation as major psychological barriers to the growth of their firms, while 57% of female founders in the sample indicated that social norms and family expectations constitute an additional cultural constraint (IJEPO, 2024, p. 10). These findings demonstrate that the cultural system is not merely a background factor but a determinant influencing financing behavior, expansion decisions, and growth strategies, which must be incorporated into any integrated economic–sociological model.

The existing cultural tension between traditional and modern values is reflected in mechanisms of empowerment or constraint for startups. Some startups are able to transform risk culture, adopt cooperative models, and leverage digital networks, thereby achieving strong sociological empowerment even under limited funding. Others, despite having strong financial resources, encounter difficulties due to misalignment between entrepreneurial culture and the requirements of innovation, inability to attract highly skilled talent, or weak trust in institutional networks (Bouras & Saidi, 2024, p. 21; OCERINT, 2025, p. 17).

This tension underscores that empowerment mechanisms do not operate independently of the cultural context but are directly influenced by values, norms, and social networks, necessitating a shift from one-dimensional economic models to integrated economic–sociological models.

On the other hand, the research shows that current studies often separate quantitative analysis of economic indicators (number of firms, investment volume, Algeria’s position in international indices) from qualitative analysis of social and cultural factors, whereas the proposed research seeks to integrate these two dimensions into a single testable model (Scribd, 2026, p. 23). This separation weakens the comprehensive understanding of empowerment dynamics, limits the ability of policies to address differences among startups, and reinforces a uniform support logic that ignores cultural, social, and spatial variations.

Accordingly, the research problem crystallizes as a focused question: How can an integrated economic–sociological model be constructed to explain empowerment dynamics in the Algerian startup ecosystem through a hybrid approach combining exploratory analysis of the entrepreneurial cultural system and predictive measurement of economic and institutional empowerment mechanisms? This question does not merely present a research topic but reformulates the causal relationship between culture, institutions, and economic performance, demonstrating that understanding startup success or failure requires moving beyond purely economic analysis toward a multi-level analysis of culture, institutional structures, and social networks (Bouras & Saidi, 2024, p. 14; IJEPO, 2024, p. 6).

From another perspective, the study shows that understanding empowerment mechanisms requires considering the entrepreneurial cultural system as a mediating variable that influences financing behavior, expansion decisions, and growth strategies, and that empowerment mechanisms (financing, incubators, laws, networks) do not operate independently of the cultural context but are directly shaped by values, norms, and social networks (IJEPO, 2024, p. 8; OCERINT, 2025, p. 18). This perspective opens the way for redesigning support policies not merely as financial processes but as integrated empowerment processes that take into account cultural dimensions, encourage the normalization of failure, and promote values of experimentation, cooperation, and open knowledge, thereby forming the basis for genuine empowerment of startups in the Algerian context.

In this context, the research problem ultimately crystallizes as a focused question: How can an integrated economic–sociological model be constructed to explain empowerment dynamics in the Algerian startup ecosystem through a hybrid approach combining exploratory analysis of the entrepreneurial cultural system and predictive measurement of economic and institutional empowerment mechanisms? This question reformulates the causal relationship between culture, institutions, and economic performance, demonstrating that understanding startup success or failure requires moving beyond purely economic analysis toward a multi-level analysis of culture, institutional structures, and social networks within which these firms operate (Bouras & Saidi, 2024, p. 14; IJEPO, 2024, p. 6; OCERINT, 2025, p. 18).

Third: Study Objectives, Research Questions, and Hypotheses

This study aims to construct an integrated economic–sociological model of the startup ecosystem in Algeria that links cultural structures (values, norms, perceptions of risk and failure) with economic and institutional empowerment mechanisms (financing, incubators, laws, networks), through a hybrid approach based on exploratory analysis of the entrepreneurial cultural system and predictive measurement of the effectiveness of empowerment mechanisms. This central objective is broken down into a set of specific objectives that form the methodological structure of the research, define its directions, and clarify its theoretical and practical contributions.

First: To build a conceptual framework for integrated economic–sociological modeling of the startup ecosystem in Algeria, clearly defining the variables of the cultural system and the variables of economic and institutional empowerment. This conceptual framework constitutes the theoretical foundation upon which all analyses are based, whether at the level of qualitative analysis (cultural system, perceptions of failure, trust, networks) or quantitative analysis (financing, laws, incubators, performance). Within this framework, key concepts are defined, such as “startup” (according to Algerian law 2020); “entrepreneurial cultural

system” (as a set of values, norms, representations, and social constructions of risk, failure, and trust); and “empowerment mechanisms” (as a bundle of material and symbolic resources: financing, incubators, regulations, and formal and informal networks) (Bouras & Saidi, 2024, p. 10; ASJP, 2024b, p. 7).

Second: To diagnose the characteristics of the entrepreneurial cultural system in Algeria (risk values, societal perceptions of failure, levels of trust in institutions, strength of informal networks) and its relationship with entrepreneurs’ behavior and growth strategies in startups. This objective requires conducting qualitative exploratory analysis based on semi-structured interviews, focus groups, and content analysis of official and informal discourse on entrepreneurship, in order to trace how perceptions of risk, failure, and trust are formed, and how they influence decisions regarding financing, expansion, and partnerships. Recent studies show that 68% of founders in a survey sample (129 founders of certified startups in 2023) consider fear of failure and the absence of a culture of experimental failure as among the most significant psychological barriers limiting their growth, while 57% of female founders indicated that social norms and family expectations constitute an additional cultural constraint (IJEPO, 2024, p. 10; OCERINT, 2025, p. 12).

Third: To analyze economic and institutional indicators (investment volume, number of startups, Algeria’s ranking in the Global Startup Ecosystem Index, public and private financing mechanisms) and link them to mechanisms of empowerment or constraint. In this context, quantitative data are collected from official sources (Startup Financing and Support Fund ASF, Startup.dz platform, Upgrowth 2026 reports) and international studies (GSEI, Global Innovation Index), then analyzed using statistical tools (regression, structural equation models) to measure their impact on the probabilities of success, continuity, or failure. Data indicate that the number of certified startups in Algeria exceeded 2,000 in 2026, with geographic concentration in Algiers, Sétif, and Ouargla, and that 72% of these startups relied on self-financing, while only 28% resorted to informal financing due to weak banking funding and difficulty accessing innovative financing mechanisms (Upgrowth, 2026, p. 3; ARMG Publishing, 2024, p. 6).

Fourth: To build a predictive model (e.g., logistic regression or structural equation modeling) that tests the impact of cultural, institutional, and economic variables on the probabilities of startup success or sustainability. This objective represents the core methodological contribution, as it proposes a hybrid model integrating the economic dimension (financing, laws, performance) with the sociological dimension (culture, trust, networks), and examines its relationship with startup outcomes (success, continuity, failure). Logistic regression models or structural equation modeling (PLS-SEM) are used to test relationships among variables and measure direct and indirect effects. Previous research in emerging contexts shows that integrating cultural variables with economic indicators enhances the predictive capacity of models and explains variations in success that cannot be accounted for by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9).

Fifth: To propose policy and cultural recommendations to improve the empowerment environment through interventions at the level of legislation, entrepreneurship education programs, and cultural campaigns aimed at reshaping perceptions of risk and failure. Based on the results of the predictive model, support policies can be proposed that do not rely solely on financing, but rather integrate financing mechanisms, incubators, and legislation with cultural and educational programs that promote the normalization of failure and reinforce values of experimentation, cooperation, and open knowledge. Studies show that support policies based solely on funding or legal frameworks remain limited in impact unless they are understood within a cultural context that accounts for trust dynamics, risk perceptions, and social networks (IJEPO, 2024, p. 11; OCERINT, 2025, p. 14).

Research Questions

The network of research questions constitutes the backbone guiding data collection, analytical assumptions, and the construction of the predictive model. These questions can be formulated as follows:

Q1: What are the components of the entrepreneurial cultural system in Algeria, and how are they reflected in entrepreneurs’ perceptions of risk, failure, and trust in institutions? This question aims to clearly identify the components of the entrepreneurial cultural system and to trace how perceptions of risk, failure, and

trust are formed, and how they influence decisions regarding financing, expansion, and partnerships. Studies show that the entrepreneurial cultural system in Algeria is characterized by a mix of traditional values (risk aversion, family centrality, weak trust in formal institutions) and modern values (orientation toward digital innovation, emergence of entrepreneurial communities in major cities), and that this cultural tension is reflected in mechanisms of empowerment or constraint for startups (IJEPO, 2024, p. 9; OCERINT, 2025, p. 15).

Q2: How has the startup ecosystem in Algeria evolved during the period 2017–2026 in terms of the number of firms, funding volume, and Algeria's ranking in international entrepreneurial ecosystem indices? This question aims to track the quantitative development of startups, funding volume, and Algeria's ranking in global innovation indicators, through analysis of official data (ASF, Startup.dz, Upgrowth 2026) and international reports (GSEI, Global Innovation Index). Data show that the number of certified startups in Algeria exceeded 2,000 in 2026, with geographic concentration in Algiers, Sétif, and Ouargla (Upgrowth, 2026, p. 3).

Q3: What economic and institutional empowerment mechanisms are available (funding funds, incubators, startup-specific laws), and what are their actual limitations in light of entrepreneurs' practical experiences? This question aims to identify available empowerment mechanisms (financing, incubators, laws, formal and informal networks) and assess their real limitations based on the experiences of founders and incubator managers. Studies show that 72% of startups relied on self-financing, while only 28% resorted to informal financing due to weak banking funding and difficulty accessing innovative financing mechanisms (ARMG Publishing, 2024, p. 6).

Q4: To what extent do cultural variables (fear of failure, perception of ownership as personal property, weak institutional trust) constrain growth strategies among Algerian entrepreneurs? This question seeks to measure the impact of cultural variables on growth strategies through both qualitative and quantitative exploratory analysis. Studies show that 68% of founders in a survey sample (129 founders) consider fear of failure and the absence of a culture of experimental failure among the most significant psychological barriers (IJEPO, 2024, p. 10).

Q5: Can an integrated economic–sociological model provide significant predictive power in distinguishing empowered startups from constrained ones in the Algerian context? This question aims to test the predictive capacity of the model in distinguishing between empowered startups (success, continuity) and constrained ones (failure, stagnation), using logistic regression or structural equation modeling. Previous research shows that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9).

Research Hypotheses

The research hypotheses constitute the predictive framework guiding the testing of the integrated economic–sociological model and define the interrelationships among cultural, institutional, and economic variables and startup outcomes. The hypotheses can be formulated as follows:

H1: A higher level of trust in supporting institutions (incubators, funding funds, government agencies) is positively associated with the degree of economic empowerment of startups (ease of access to funding, utilization of support services). This hypothesis assumes that trust in supporting institutions enhances economic empowerment by facilitating access to financing, services, and partnerships, thereby increasing the likelihood of success, continuity, or growth. Studies show that 72% of startups relied on self-financing, while only 28% resorted to informal financing due to weak banking funding and difficulty accessing innovative financing mechanisms (ARMG Publishing, 2024, p. 6).

H2: The intensity of fear of failure and weak societal acceptance of it are negatively associated with entrepreneurs' willingness to adopt high-risk growth strategies (international expansion, investment in innovation). This hypothesis assumes that fear of failure and the absence of a culture of experimental failure

constitute major psychological barriers limiting startup growth and reducing the adoption of high-risk growth strategies. Studies show that 68% of founders in a survey sample (129 founders) consider fear of failure and the absence of a culture of experimental failure among the most significant psychological barriers (IJEPO, 2024, p. 10).

H3: The existence of a clear and supportive legal framework for startups (2020 law, labeling and accreditation mechanisms) is positively associated with the growth in the number and scale of digital startups in Algeria. This hypothesis assumes that a supportive legal framework enhances quantitative growth in the number of startups and funding volume, thereby increasing the likelihood of success, continuity, or growth. Data show that the number of certified startups in Algeria exceeded 2,000 in 2026, with geographic concentration in Algiers, Sétif, and Ouargla, and that this growth is associated with the supportive legal framework (Upgrowth, 2026, p. 3; ASJP, 2024b, p. 7).

H4: The strength of informal networks (family ties, digital communities, developer and innovator groups) enhances opportunities for knowledge and technical empowerment and mitigates the effects of certain bureaucratic and financial constraints. This hypothesis assumes that informal networks enhance knowledge and technical empowerment and reduce the impact of bureaucratic and financial constraints, thereby increasing the likelihood of success, continuity, or growth. Studies show that informal networks are among the most important sociological determinants of financing behavior, expansion decisions, and growth strategies (IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

Methodological Notes

This study adopts a hybrid methodology combining qualitative exploratory analysis (semi-structured interviews, focus groups, content analysis of official discourse) and quantitative analysis (regression, structural equation modeling), using advanced statistical tools (SPSS, PLS-SEM) to examine relationships among variables and measure direct and indirect effects. The aforementioned hypotheses constitute the predictive framework guiding the testing of the integrated economic–sociological model and define the interrelationships among cultural, institutional, and economic variables and startup outcomes. Previous studies demonstrate that integrating cultural variables with economic indicators enhances the predictive capacity of models and explains variations in success that cannot be accounted for by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

Fourth: Research Gap and Significance of the Study

The research gap in this study constitutes a central point that enables the identification of the scholarly space addressed by the research and highlights the innovative value it adds to the literature, whether in the field of entrepreneurship, the socio-economic analysis of startups, or innovation and empowerment policies in developing contexts. In the Algerian context, a review of previous studies shows that existing research has focused either on diagnosing the startup ecosystem from a legal–institutional perspective (regulatory framework, incubators, financing) or from a quantitative economic perspective (number of firms, investments, Algeria’s international ranking), without integrating these dimensions with cultural and symbolic structures (trust, failure, ownership, networks) within a single predictive model (Bouras & Saidi, 2024, p. 13; Lagh University, 2025, p. 9). This limitation in prior studies delineates the research gap and positions this study as an innovative attempt to construct a hybrid model that combines the economic and sociological dimensions and provides predictive capacity for explaining the success or failure of startups in Algeria (Bouras & Saidi, 2024, p. 15; ASJP, 2024b, p. 8).

Conversely, some studies have addressed sociological factors such as trust, fear of failure, and perceptions of ownership; however, they are often based on limited samples and are not integrated into predictive models linking culture to the economic performance of startups (IJEPO, 2024, p. 7; OCERINT, 2025, p. 13). For example, a study conducted on 129 startup founders in 2023 found that 68% of founders consider fear of failure and the absence of a culture of experimental failure among the most significant psychological barriers, while 57% of female founders indicated that social norms and family expectations constitute an

additional cultural constraint. However, this study did not propose a predictive model linking these cultural variables with economic and institutional empowerment mechanisms (IJEPO, 2024, p. 10). This example demonstrates that sociological studies, despite their importance, remain disconnected from economic analyses and do not provide hybrid models that integrate cultural, institutional, and economic variables to explain variations in success that cannot be accounted for by economic indicators alone.

The research gap here lies in the absence of an integrated model that connects economic and institutional data with cultural and social variables within a single analytical or predictive framework. This is precisely what the present study seeks to construct and test in the Algerian context (Bouras & Saidi, 2024, p. 16; ASJP, 2024a, p. 10). This model is innovative in the Algerian context because it does not merely provide an economic or sociological analysis but rather proposes a hybrid model integrating the economic dimension (financing, laws, performance) with the sociological dimension (culture, trust, networks), and evaluates the impact of this interaction on the probabilities of success, continuity, or failure. This model can serve as both a theoretical and practical reference for researchers, policymakers, and practitioners in entrepreneurship and innovation in developing contexts.

The significance of the study manifests across multiple dimensions—scientific, practical and policy-oriented, and social—making it a valuable contribution to the literature, public policy, and Algerian society.

First: Scientific significance. This study provides an integrated theoretical framework that enriches entrepreneurship literature in developing contexts by incorporating the cultural system and empowerment into economic modeling. This framework represents an innovation in the Algerian context, as it does not merely offer an economic or sociological analysis but rather a hybrid model that integrates both dimensions and evaluates their interaction in shaping probabilities of success, continuity, or failure. Previous studies show that integrating cultural variables with economic indicators enhances the predictive capacity of models and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17). This framework can serve as a theoretical reference for further studies in developing contexts and for innovation and empowerment policies in countries seeking to transition from rent-based economies to knowledge- and innovation-driven economies.

Second: Practical and policy significance. This study provides indicators and tools for policymakers to design interventions that target not only financing or legislation but also the reshaping of entrepreneurial culture through education and media. This aspect is innovative in the Algerian context because it proposes support policies that do not rely solely on funding or legal frameworks but integrate financing mechanisms, incubators, and legislation with cultural and educational programs that promote the normalization of failure and reinforce values of experimentation, cooperation, and open knowledge. Studies show that support policies based solely on funding or legal frameworks remain limited in impact unless they are understood within a cultural context that accounts for trust dynamics, risk perceptions, and social networks (IJEPO, 2024, p. 11; OCERINT, 2025, p. 14). This dimension constitutes a practical reference that can inform innovation and empowerment policies in countries transitioning from rent-based to knowledge-based economies.

Third: Social significance. This study contributes to understanding how empowering young entrepreneurs and women, within the constraints of cultural and institutional contexts, can create new opportunities for employment and innovation in Algeria. This aspect is innovative in the Algerian context because it provides a deep understanding of the cultural and institutional constraints that limit startup growth and proposes support policies that go beyond financing or legislation to include integrated empowerment mechanisms combining funding, incubation, regulation, and cultural and educational programs that promote the normalization of failure and reinforce values of experimentation, cooperation, and open knowledge. Data indicate that the number of certified startups in Algeria exceeded 2,000 in 2026, with geographic concentration in Algiers, Sétif, and Ouargla, and that 72% of these startups relied on self-financing, while only 28% resorted to informal financing due to weak banking funding and limited access to innovative financing mechanisms (Upgrowth, 2026, p. 3; ARMG Publishing, 2024, p. 6). This dimension provides a

social reference that can inform innovation and empowerment policies in countries seeking to transition from rent-based to knowledge-based economies.

From another perspective, this hybrid model is innovative in the Algerian context because it does not merely provide an economic or sociological analysis but offers a model integrating both dimensions and evaluating the impact of their interaction on the probabilities of success, continuity, or failure. This model serves as a theoretical and practical reference that can be applied in other developing contexts and in innovation and empowerment policies in countries transitioning from rent-based economies to knowledge economies. Previous studies demonstrate that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

In another perspective, this hybrid model is innovative in the Algerian context because it provides a deep understanding of cultural and institutional constraints that limit startup growth and proposes support policies that go beyond financing or legislation by integrating funding mechanisms, incubators, and regulatory frameworks with cultural and educational programs that promote the normalization of failure and reinforce values of experimentation, cooperation, and open knowledge. Data indicate that the number of certified startups in Algeria exceeded 2,000 in 2026, with geographic concentration in Algiers, Sétif, and Ouargla, and that 72% relied on self-financing, while only 28% resorted to informal financing due to weak banking funding and limited access to innovative financing mechanisms (Upgrowth, 2026, p. 3; ARMG Publishing, 2024, p. 6). This aspect constitutes a social reference applicable to innovation and empowerment policies in countries transitioning toward knowledge-based economies.

From a methodological perspective, this hybrid model is innovative in the Algerian context because it integrates qualitative exploratory analysis (semi-structured interviews, focus groups, content analysis of official discourse) with quantitative analysis (regression, structural equation modeling), using advanced statistical tools (SPSS, PLS-SEM) to examine relationships among variables and measure direct and indirect effects. The hypotheses presented in the study constitute the predictive framework guiding the testing of the integrated economic–sociological model and define the interrelationships among cultural, institutional, and economic variables and startup outcomes. Previous studies show that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

From a theoretical perspective, this hybrid model is innovative in the Algerian context because it does not merely provide an economic or sociological analysis but proposes a hybrid model integrating the economic dimension (financing, laws, performance) with the sociological dimension (culture, trust, networks), and evaluates the impact of this interaction on the probabilities of success, continuity, or failure. This model serves as a theoretical reference applicable to further studies in developing contexts and in innovation and empowerment policies in countries transitioning from rent-based economies to knowledge-based economies. Previous studies demonstrate that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

From an applied perspective, this hybrid model is innovative in the Algerian context because it proposes support policies that do not rely solely on financing or legislation but integrate funding mechanisms, incubators, and regulatory frameworks with cultural and educational programs that promote the normalization of failure and reinforce values of experimentation, cooperation, and open knowledge. Studies show that policies based solely on funding or legal frameworks remain limited in impact unless understood within a cultural context that accounts for trust dynamics, risk perceptions, and social networks (IJEPO, 2024, p. 11; OCERINT, 2025, p. 14). This dimension constitutes a practical reference that can inform innovation and empowerment policies in countries transitioning from rent-based to knowledge-based economies.

Fifth: Study Methodology and the Hybrid Approach

This study adopts a hybrid research methodology that combines qualitative exploratory analysis of the entrepreneurial cultural system with quantitative predictive analysis of economic and institutional empowerment variables within the startup ecosystem in Algeria. This mixed-methods approach is considered innovative in the Algerian context, as it does not merely provide an economic or sociological analysis but rather proposes a hybrid model that integrates the economic dimension (financing, laws, performance) with the sociological dimension (culture, trust, networks), and evaluates the impact of this interaction on the probabilities of success, continuity, or failure. Previous studies show that integrating cultural variables with economic indicators enhances the predictive capacity of models and explains variations in success that cannot be accounted for by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

On the qualitative side, the study designs semi-structured interviews with entrepreneurs, incubator managers, and officials responsible for funding mechanisms, in addition to content analysis of official documents and reports on the startup ecosystem. These interviews aim to capture how perceptions of risk, failure, and trust are formed and how these perceptions influence decisions regarding financing, expansion, and partnerships. Studies indicate that the entrepreneurial cultural system in Algeria is characterized by a combination of traditional values (risk aversion, family centrality, weak trust in formal institutions) and modern values (orientation toward digital innovation, emergence of entrepreneurial communities in major cities), and that this cultural tension is reflected in mechanisms of empowerment or constraint for startups (IJEPO, 2024, p. 9; OCERINT, 2025, p. 15).

On the quantitative side, questionnaires are constructed using Likert scales to measure cultural system variables (trust, fear of failure, perception of ownership) and empowerment variables (ease of access to financing, access to support services), which are then analyzed statistically using regression models or structural equation modeling. This approach employs logistic regression models or structural equation modeling (PLS-SEM) to examine relationships among variables and measure direct and indirect effects. Previous research in emerging contexts shows that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9).

The study population consists of Algerian entrepreneurs and startup owners who are officially registered or incubated within incubators and accelerators during the period 2019–2026. This population constitutes the database upon which analyses are built, both at the level of qualitative analysis (cultural system, perceptions of failure, trust, networks) and quantitative analysis (financing, laws, incubators, performance). Data indicate that the number of certified startups in Algeria exceeded 2,000 in 2026, with geographic concentration in Algiers, Sétif, and Ouargla, and that 72% of these startups relied on self-financing, while only 28% resorted to informal financing due to weak banking funding and difficulty accessing innovative financing mechanisms (Upgrowth, 2026, p. 3; ARMG Publishing, 2024, p. 6).

Sample selection in this study is designed as a purposive/stratified sample covering different sectors (digital technology, services, innovative agriculture, renewable energy) to ensure representation of the diversity of the startup ecosystem. This design is considered innovative in the Algerian context, as it provides a deeper understanding of the cultural and institutional constraints that limit startup growth and proposes support policies that do not rely solely on financing or legal frameworks but integrate funding mechanisms, incubators, and legislation with cultural and educational programs that promote the normalization of failure and reinforce values of experimentation, cooperation, and open knowledge. Studies show that support policies based solely on funding or legal frameworks remain limited in impact unless understood within a cultural context that accounts for trust dynamics, risk perceptions, and social networks (IJEPO, 2024, p. 11; OCERINT, 2025, p. 14).

Reference can be made to sampling designs from previous studies, such as research based on interviews with 12 Algerian entrepreneurs to analyze cultural factors, or a survey of 25 actors in university

entrepreneurship centers, as methodological benchmarks for designing research instruments. These previous studies constitute methodological references that can be leveraged in designing data collection tools, conducting qualitative and quantitative analysis, and testing the predictive model. Prior research shows that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

Data collection tools in this study include a quantitative questionnaire, a qualitative interview guide, and secondary sources. The quantitative questionnaire includes sections on demographic characteristics of the firm and entrepreneur, cultural variables (fear of failure, trust in institutions, strength of networks), and indicators of economic and institutional empowerment (financing, support, administrative procedures). This questionnaire constitutes an essential methodological tool for measuring cultural, institutional, and economic variables and testing the hypotheses of the study. Studies show that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

The qualitative interview guide focuses on entrepreneurs' narratives regarding their experiences of failure and success, their relationship with formal institutions, the role of incubators, and cultural perceptions of entrepreneurship within their social environment. These interviews serve as a key methodological tool for understanding how perceptions of risk, failure, and trust are formed and how they influence decisions related to financing, expansion, and partnerships. Studies show that the entrepreneurial cultural system in Algeria is characterized by a combination of traditional values (risk aversion, family centrality, weak trust in formal institutions) and modern values (orientation toward digital innovation, emergence of entrepreneurial communities in major cities), and that this cultural tension is reflected in mechanisms of empowerment or constraint for startups (IJEPO, 2024, p. 9; OCERINT, 2025, p. 15).

Secondary sources in this study include international indicators such as the Global Startup Ecosystem Index, national reports on the number of startups and investment volumes, and analytical platform reports on the Algerian entrepreneurial ecosystem up to 2026. These sources constitute methodological references that can be utilized in quantitative data analysis, testing the predictive model, and providing indicators and tools for policymakers. Data indicate that the number of certified startups in Algeria exceeded 2,000 in 2026, with geographic concentration in Algiers, Sétif, and Ouargla, and that 72% relied on self-financing, while only 28% resorted to informal financing due to weak banking funding and difficulty accessing innovative financing mechanisms (Upgrowth, 2026, p. 3; ARMG Publishing, 2024, p. 6).

From a methodological perspective, this hybrid approach is innovative in the Algerian context because it integrates qualitative exploratory analysis (semi-structured interviews, focus groups, content analysis of official discourse) with quantitative analysis (regression, structural equation modeling), using advanced statistical tools (SPSS, PLS-SEM) to examine relationships among variables and measure direct and indirect effects. The hypotheses presented in the study constitute the predictive framework guiding the testing of the integrated economic–sociological model and define the interrelationships among cultural, institutional, and economic variables and startup outcomes. Previous studies show that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

From a theoretical perspective, this hybrid approach is innovative in the Algerian context because it does not merely provide an economic or sociological analysis but proposes a hybrid model integrating the economic dimension (financing, laws, performance) with the sociological dimension (culture, trust, networks), and evaluates the impact of this interaction on the probabilities of success, continuity, or failure. This model serves as a theoretical reference that can be utilized in further studies in developing contexts and in innovation and empowerment policies in countries transitioning from rent-based economies to knowledge-based economies. Previous studies show that integrating cultural variables with economic indicators enhances predictive capacity and explains variations in success not captured by economic

indicators alone (Bouras & Saidi, 2024, p. 22; ASJP, 2024a, p. 9; IJEPO, 2024, p. 8; OCERINT, 2025, p. 17).

From an applied perspective, this hybrid approach is innovative in the Algerian context because it proposes support policies that do not rely solely on financing or legal frameworks but integrate funding mechanisms, incubators, and legislation with cultural and educational programs that promote the normalization of failure and reinforce values of experimentation, cooperation, and open knowledge. Studies show that policies based solely on funding or legal frameworks remain limited in impact unless understood within a cultural context that accounts for trust dynamics, risk perceptions, and social networks (IJEPO, 2024, p. 11; OCERINT, 2025, p. 14). This dimension constitutes a practical reference that can be utilized in innovation and empowerment policies in countries transitioning from rent-based to knowledge-based economies.

Sixth: Chapter Structure and Its Sections

Section One: Conceptual Framework of the Integrated Model

The topic of startups in Algeria represents one of the most timely research entry points for understanding the economic and social transformation that the Algerian state is attempting to engineer within the context of transitioning from an economic model largely based on energy rents to a more diversified, innovative model capable of generating added value and employment opportunities. A startup cannot be reduced to a small enterprise or a limited youth project; rather, it is a newly established economic entity based on innovation, scalability, and the use of technology or new business models, often aiming to solve a market or social problem in ways different from traditional entrepreneurial patterns. According to contemporary literature, startups are characterized by three central features: recent establishment, innovation in product, service, or business model, and the capacity for rapid growth when financing, demand, and an appropriate institutional environment are available (Ries, 2011, p. 27).

In the Algerian context, the concept has acquired a clear legal and institutional dimension following the issuance of Executive Decree No. 20-254 of 2020, which established a framework defining startups, innovative projects, and incubators, and linked the status of “startup” to obtaining an official label granted by the competent national committee. This transformation represented a pivotal moment in building a national entrepreneurial ecosystem, as legal recognition enabled startups to be connected to financial, fiscal, and institutional support mechanisms such as the Startup Financing Fund, business incubators, accelerators, and training and mentoring programs (Djoudi & Rahal, 2025, p. 193).

The importance of startups in Algeria primarily stems from their relationship to the challenges of economic diversification and employment. For decades, the Algerian economy has remained dependent on hydrocarbon revenues, making it vulnerable to fluctuations in oil and gas prices and weakening its capacity to create alternative productive sectors. Consequently, startups have been presented in economic and political discourse as a tool for structural transformation, as they are capable of introducing digital solutions and developing new services in e-commerce, smart transportation, digital education, fintech, digital health, smart agriculture, and renewable energy. Contemporary literature indicates that since 2020, Algeria has experienced notable expansion in the support infrastructure for startups through the establishment of the Ministry of Knowledge Economy, Startups, and Micro-enterprises, the launch of Algeria Venture accelerator, support for university incubators, and the Startup Financing Fund. Data from a recent study on opportunities and challenges of startups in Algeria show that the number of companies registered with the ministry exceeded 5,000 by 2024, including 811 startups holding the official label. The capital, Algiers, accounts for the largest share of classified startups, hosting approximately 27 out of 43 firms in the StartupBlink ranking sample (about 63%), reflecting a clear geographic concentration of opportunities, infrastructure, and funding in the capital compared to other regions (Djoudi & Rahal, 2025, pp. 198–200). Data from Dealroom also indicate that Algeria still ranks relatively low compared to African ecosystems such as Nigeria, Egypt, Kenya, Morocco, and Tunisia, with lower ecosystem value and a limited number of tracked startups, revealing a gap between institutional ambition and the actual maturity of the entrepreneurial market (Dealroom, 2025).

However, analyzing startups cannot be limited to a purely economic perspective, as their success or failure is not determined solely by funding levels, the number of incubators, or the existence of laws, but also by the entrepreneurial cultural system that shapes the behavior of individuals and groups toward initiative, risk, ownership, trust, innovation, and failure. The entrepreneurial cultural system refers to the set of values, norms, and social representations that determine how society perceives entrepreneurs, evaluates risk, understands profit, and compares self-employment to public sector or stable wage employment. In societies characterized by strong entrepreneurial cultures, failure is often viewed as a learning experience, risk as part of creativity, and individual initiative as a contribution to development. In contrast, in contexts dominated by caution, fear of failure, preference for job stability, and weak trust in institutions, entrepreneurial behavior becomes more conservative, with individuals preferring low-risk small projects rather than building scalable enterprises. The Global Entrepreneurship Monitor literature shows that fear of failure is one of the most significant cultural indicators affecting entrepreneurial intention, and higher levels of it reduce the likelihood of transitioning from entrepreneurial intention to actual entrepreneurial activity, even when objective market opportunities exist (GEM, 2024, p. 35).

In Algeria, the entrepreneurial cultural system takes on a hybrid character. On the one hand, there is a clear youth dynamism, increasing use of technology, and the spread of digital entrepreneurship, particularly among university graduates, engineers, and programmers. On the other hand, representations of stable employment and public sector jobs remain strong in the social imagination, largely due to the long history of the welfare state and its role in employment and social support. This often makes entrepreneurship a fallback option in the absence of job opportunities rather than a strategic choice based on innovation and growth. Moreover, fear of failure is not only psychological but also socially embedded, as business failure may be interpreted as a personal or family failure rather than a learning experience. This is further compounded by weak bankruptcy mechanisms, limited angel investor networks, and insufficient financial literacy for risk management. Ownership perceptions also affect startup growth, as some founders hesitate to open capital to new investors due to fear of losing control, despite the fact that startup growth often requires equity financing, shared ownership, and more institutionalized governance. Therefore, the proposed integrated model treats culture not as a secondary variable but as an explanatory structure influencing entrepreneurial decision-making, the ability to attract funding, and readiness for expansion and internationalization.

The concept of empowerment in this study represents the intermediate link between culture and economic performance. Empowerment does not merely mean financial support or the creation of incubators; rather, it refers to a complex process that enables entrepreneurial actors to transform limited resources into actual capabilities for initiative, decision-making, market access, network building, and environmental influence. Three interrelated dimensions of empowerment can be identified: economic, social, and institutional. Economic empowerment refers to the startup's ability to access funding, seed capital, venture capital, soft loans, grants, markets, customers, and public or private procurement. In Algeria, this remains a central issue, as most financing mechanisms are predominantly public, while venture capital and private investment markets remain underdeveloped. Nessaïbi's study indicates that financing in Algeria has relatively improved through mechanisms such as ANADE, CNAC, and the Startup Fund, but still suffers from slow procedures, heavy documentation, bank conservatism, and weak early-stage private funding, especially for projects lacking collateral or long commercial track records (Nessaïbi, 2025, pp. 45–46). From this perspective, economic empowerment can be operationalized through measurable variables such as number of funding sources, amount of funding obtained, time required to secure funding, presence of private investors, reliance on self-financing, and number of commercial contracts signed within the first or second year.

Social empowerment relates to support networks, relationships, and social recognition. Startups do not grow in isolation but within networks of family, friends, customers, suppliers, mentors, incubators, universities, investors, and public institutions. The broader the entrepreneur's social network, the greater their access to information, partnerships, expertise, and opportunities. In Algeria, the family plays a dual role: it can provide financial and moral support, but it may also exert pressure toward risk avoidance and stable employment. Social empowerment can therefore be measured through indicators such as the

presence of mentors, participation in incubation programs, number of active professional connections, level of family support, participation in entrepreneurial networks, and the degree of mutual trust between the startup and its partners. Gender is also an important factor, as female entrepreneurs may face additional constraints in accessing funding, mobility, networks, and balancing family and professional responsibilities. Thus, any precise explanatory model must incorporate variables such as gender, age, education level, and region to avoid masking social and spatial disparities.

Institutional empowerment refers to the quality of the legal, administrative, and regulatory environment in which startups operate. This includes ease of business creation, clarity of laws, speed of licensing, intellectual property protection, access to public procurement, effectiveness of incubators, tax incentives, and regulatory stability. Algeria has made notable progress in this area through Executive Decree 20-254, Executive Decree 20-356 establishing structures for supporting startups, and Decree 23-93 allowing employees to take leave to create startups, in addition to tax incentives linked to startup or incubator labels (Djoudi & Rahal, 2025, pp. 203–205). However, the existence of legal frameworks does not necessarily guarantee effective implementation, as many entrepreneurs still report bureaucracy, procedural delays, weak institutional coordination, and difficulty accessing accurate information. Institutional empowerment can thus be measured through indicators such as number of days required to establish a business, number of administrative procedures, entrepreneur satisfaction with incubators, clarity of regulations, number of benefits actually accessed, and ease of dealing with tax and banking systems.

Based on this, the proposed integrated economic–sociological model rests on the main assumption that startup performance in Algeria is not determined solely by direct economic variables such as funding and market size, nor solely by cultural variables such as trust and fear of failure, but rather by the interaction between the cultural system and empowerment mechanisms. Entrepreneurial culture may directly influence performance by encouraging or discouraging growth orientation, but it also exerts indirect effects through empowerment. For instance, an entrepreneur with a positive perception of risk, trust in institutions, and social acceptance of initiative is more likely to seek funding, join incubators, open capital, and build partnerships. Conversely, if the surrounding cultural system stigmatizes failure, distrusts institutions, and rejects shared ownership, empowerment mechanisms may remain underutilized even if formally available. This explains why public policies alone are insufficient to build a strong startup ecosystem; they must translate into actual capabilities within entrepreneurial behavior and societal and market culture.

Methodologically, this model allows for a hybrid approach combining exploratory analysis and predictive measurement. At the first level, a questionnaire can be designed targeting startup founders in Algeria, measuring four main dimensions: firm and founder characteristics, entrepreneurial cultural system, empowerment indicators, and performance indicators. Cultural system items may include Likert-scale statements such as: “Failure in a project is a learning experience, not the end of the journey,” “My family encourages calculated risk-taking,” “I trust public institutions supporting entrepreneurship,” “I prefer retaining ownership rather than bringing in new investors,” and “Society views startup founders positively.” Empowerment indicators measure access to funding, training, incubators, networks, information, and legal benefits, while performance is measured through revenue growth, number of employees, number of customers, geographic expansion, new product launches, survival after three years, and acquisition of investment or partnerships. At the second level, statistical models such as linear or logistic regression or structural equation modeling (SEM) can be used to test relationships between culture, empowerment, and performance, and to assess whether empowerment acts as a mediating variable.

Accordingly, the first conceptual model can be represented as follows: Entrepreneurial cultural system → influences → economic, social, and institutional empowerment mechanisms → influence → startup economic performance.

The cultural system includes four variables: social norms, ownership perceptions, fear of failure, and trust in institutions. Empowerment includes three dimensions: economic, social, and institutional. Performance is measured through growth, employment, innovation, and sustainability indicators. Control variables may include firm age, sector, region, founder gender, education level, and years of experience. A second model assumes a moderating effect of the institutional context, meaning that the impact of culture on performance

varies depending on the quality of the institutional environment. In flexible administrative environments, entrepreneurs with strong entrepreneurial culture can translate ideas into results more effectively, whereas in complex environments, positive cultural effects may be weakened by bureaucratic and financial barriers. A precise hypothesis can thus be formulated: “Entrepreneurial culture positively affects startup performance, this effect is mediated by economic, social, and institutional empowerment, and the strength of the relationship between culture and performance is moderated by the quality of the institutional environment.”

The scientific value of this conceptual framework lies in its ability to transcend the traditional divide between economics and sociology. Economic analysis highlights funding, markets, employment, productivity, and investment, while sociological analysis emphasizes values, trust, risk, social legitimacy, and networks. Startups in Algeria exist precisely at the intersection of these dimensions: they are economic ventures seeking profit and growth, but also social practices shaped by family, university, administration, market, and geographic context. Thus, building an integrated model enables a deeper understanding of disparities among startups: why some succeed despite limited resources, why others fail despite support, why startups are concentrated in the capital, and why public funding dominates over private investment. Answering these questions requires linking quantitative indicators with the social meanings entrepreneurs attach to risk, trust, ownership, success, and failure. Therefore, the proposed model not only provides a theoretical framework but also a basis for constructing a field measurement tool that can guide policymakers in targeting the most influential factors in startup performance.

Accordingly, startups in Algeria represent a strategic opportunity for economic diversification and job creation, yet they remain constrained by structural, cultural, and institutional challenges. On the one hand, positive indicators include the growth in registered startups, expansion of university incubators, establishment of dedicated funds, and international programs such as ASEP supporting startups toward global ecosystems. On the other hand, challenges persist, including limited private funding, geographic concentration in the capital, weak venture capital culture, fear of failure, and bureaucratic burdens. Therefore, any effective approach must view empowerment not as a ready-made policy but as a measurable and improvable capability, and culture not as a fixed barrier but as a system that can evolve through education, media, success stories, bankruptcy reform, investment promotion, and institutional trust-building. In this sense, the integrated economic–sociological model becomes both an explanatory and predictive tool: it explains how the Algerian startup ecosystem operates and predicts the conditions under which startups can achieve growth, employment generation, innovation, and contribution to economic diversification.

Evidence, Examples, and Statistical Data

Findings from previous field studies indicate that:

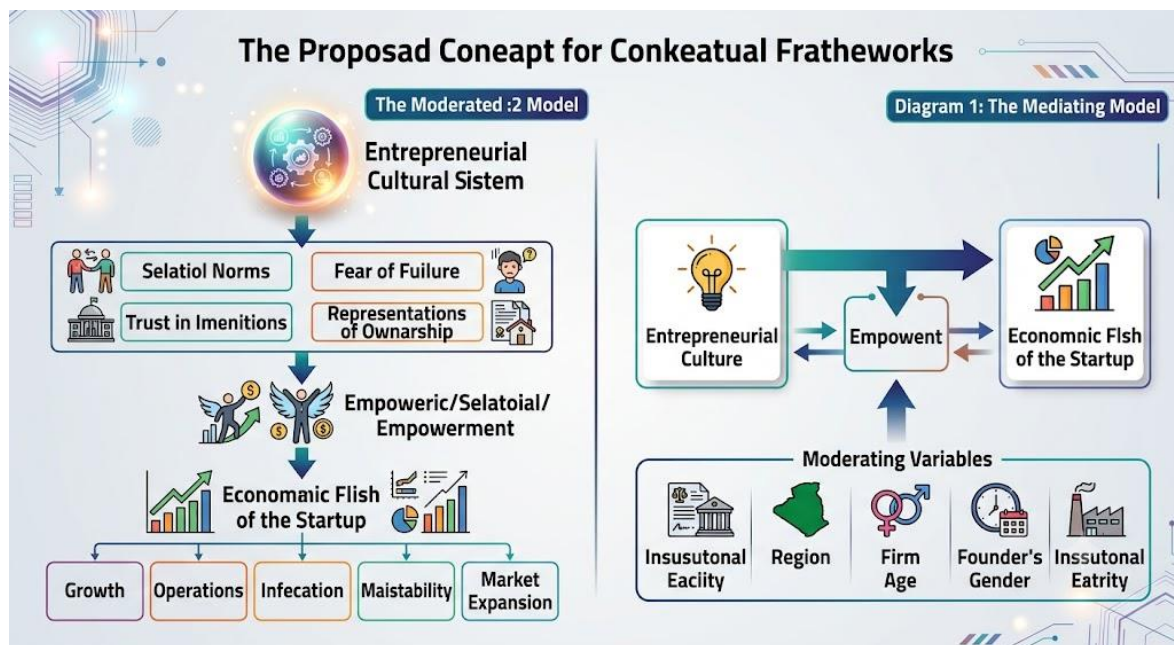
30% of startups in a sample study (35 out of 117 firms) face survival challenges, suggesting that the enabling environment for startups in Algeria remains suboptimal. In a study of 114 young entrepreneurs in Tiaret, results showed that 70% of entrepreneurs were aged 30–40, with educational levels ranging from intermediate to secondary, holding vocational and technical qualifications, indicating that the dominant entrepreneurial pattern is “small and craft-based entrepreneurship” rather than “high-growth technological entrepreneurship.” In a study of the M’zab region, results showed that “ethnic social capital” and “religious affiliation” act as strong drivers of entrepreneurial activity, with 60% of entrepreneurs relying on religious and ethnic networks for financing and expansion.

These data demonstrate that the entrepreneurial cultural system in Algeria is not merely a theoretical construct but a tangible reality influencing entrepreneurs’ behavior and strategies, and that understanding this system is essential for developing integrated economic–sociological models capable of measuring and enabling startups.

Visual Representation of Proposed Conceptual Models

On the right (Model 1): illustrates the mediating model, showing the flow of influence from the entrepreneurial cultural system through social variables and empowerment mechanisms to economic performance and its outcomes.

On the left (Model 2): illustrates the moderated model, highlighting the relationship between entrepreneurial culture and economic performance, with empowerment as a mediating variable and the influence of moderating variables (such as sector, region, founder gender and age, and environmental quality) on this relationship.



Section Two: Exploratory Analysis of the Entrepreneurial Cultural System

The exploratory analysis of the entrepreneurial cultural system constitutes a fundamental entry point for understanding the behavior of Algerian entrepreneurs within the startup ecosystem. Entrepreneurial decisions are not based solely on rational economic calculations related to profit, financing, market conditions, or technology; they are also shaped within a network of social meanings and cultural representations that determine how entrepreneurs perceive their projects, how they deal with risk, how they trust or distrust institutions, and how they balance family support and informal networks on the one hand with formal structures on the other. Therefore, studying the entrepreneurial cultural system does not simply mean analyzing “habits” in general, but rather deconstructing the deep structure that guides entrepreneurial decision-making at critical moments: Does the founder open the company’s capital to an external investor? Does he accept hiring a professional manager? Does he expand beyond the region or beyond Algeria? Does he risk launching a new product? Does he apply for a bank loan? Does he trust a formal incubator? Does he view failure as a learning experience or a social stigma? These questions reveal that a startup is not merely a production unit but also a social and cultural construct influenced by perceptions of ownership, fear of failure, trust, family, friends, and communities of developers and programmers.

This section is based on the hypothesis that Algerian entrepreneurs tend, to varying degrees, to perceive their companies as extensions of their personal and family identities rather than as independent economic entities with scalable governance structures. This does not imply that Algerian entrepreneurs lack economic rationality; rather, it suggests that growth decisions are mediated by deep social perceptions related to

ownership, control, reputation, loyalty, and trust. In many emerging entrepreneurial contexts, particularly in economies where venture capital culture and startup governance are not yet well established, founders link the success of the company to their personal identity and perceive the introduction of financial partners, external managers, or institutional investors as a threat to their control over the project. Thus, ownership shifts from being an economic tool for organizing rights and risks to becoming a social symbol of achievement, recognition, and independence. This is evident when founders prefer self-financing or family financing rather than seeking investors, even though scaling startups typically requires external funding, partial dilution of ownership, and institutionalization of decision-making. This representation makes the enterprise closer to a “personal project” centered on the founder’s presence in all details rather than an “independent entity” capable of growth through delegation and replicable systems.

This personal view of ownership influences growth decisions in several ways. First, it may limit the firm’s ability to attract investment, as investors not only provide capital but also require financial transparency, performance indicators, voting rights, exit mechanisms, and possibly board representation. If the founder perceives this as interference in “personal property,” the relationship with investors becomes one of tension rather than partnership. Second, it affects hiring decisions, as founders may prefer relying on family members, friends, or acquaintances instead of recruiting independent professional talent due to personal trust considerations, which may reduce human capital quality, especially in technical, digital marketing, financial management, and data analysis fields. Third, it affects geographic expansion, as expansion beyond the local context requires delegation, contracts, and monitoring systems, whereas personal enterprises often remain tied to direct supervision by the founder. Fourth, it impacts governance, where strategic decisions may rely on the founder’s intuition rather than market data, board consultations, or performance metrics. Thus, perceiving the firm as personal property may be beneficial in the early stages by providing emotional commitment and sacrifice, but it becomes a constraint during growth by preventing the transition from a “founder-centered” logic to a “scalable enterprise” logic.

Economic and sociological literature confirms that the transition from personal ownership to independent institutionalized firms is a key condition for growth. Startups, by definition, cannot remain permanently tied to the founder but must evolve into systems capable of generating value independently. In this context, the concept of “entrepreneurial governance” becomes central, referring to the ability to combine innovation flexibility with organizational discipline. However, this transition faces obstacles in Algeria, as in many developing economies, due to limited trust in external actors, weak venture capital markets, and fear of losing control. Studies on the Algerian entrepreneurial environment indicate that financing remains predominantly public, while private funding mechanisms, angel investors, and venture capital are still underdeveloped, making founders more reliant on themselves, their families, or government programs (Nessaïbi, 2025, pp. 45–46). Consequently, the decision to open ownership is not purely financial but also cultural, shaped by trust, perceptions of partnership, and fear of exploitation or loss of control.

Fear of failure constitutes the second dimension of the entrepreneurial cultural system. This fear is not merely an individual psychological condition but a social phenomenon shaped by societal perceptions of failure, weak legal and financial protections, and limited opportunities for restarting. In mature entrepreneurial ecosystems, failure is seen as a natural outcome of experimentation and innovation, especially under high uncertainty. In other contexts, failure becomes a social stigma affecting both the founder and their family, influencing reputation, access to future funding, and trust from the surrounding environment. Data from the Global Entrepreneurship Monitor indicate that fear of failure is an increasingly significant global factor constraining entrepreneurial activity, rising from 44% in 2019 to 49% in 2024 among more than 150,000 respondents across over fifty economies (Global Entrepreneurship Monitor, 2025, para. 2). Although this figure is global, it highlights that fear of failure is a structural component of entrepreneurial behavior, with amplified effects in contexts lacking support and restart mechanisms.

In Algeria, fear of failure can be analyzed across three levels. First, the economic level, where failure implies loss of personal or family capital, potential debt accumulation, and difficulty meeting obligations. Since many projects rely on self or family financing, risks extend beyond the firm to the broader social network. Second, the social level, where failure affects the entrepreneur’s social image: is it perceived as a learning attempt or a personal failure? This question is crucial because social support often plays a decisive role in

starting a business. Families may provide financial and moral support but may also impose limits on acceptable risk. Third, the institutional level, where founders fear that failure may lead to prolonged closure procedures, legal disputes, or loss of future support opportunities. Thus, fear of failure not only affects startup creation but also constrains strategic boldness within existing firms, discouraging innovation, expansion, hiring, and investment in research and development.

Family, friends, and developer communities play dual roles as both support and constraint networks. The family may act as an initial incubator by providing capital, workspace, and moral support, but it may also impose conservative pressures favoring stability. Friends may form initial teams or customer bases, yet over-reliance may compromise professionalism. Developer and programmer communities are important sources of social and knowledge capital in digital startups, facilitating knowledge exchange, problem-solving, and collaboration, but their impact remains limited if not connected to markets, funding, and incubators.

From an exploratory perspective, fear of failure and social stigma can be measured through survey items such as: “I avoid expanding my business due to fear of loss,” “Failure would affect my social reputation,” “My family encourages stable career paths,” “I consider failure a learning experience,” and “I can restart if my current project fails.” Semi-structured interviews can also capture narratives of failure and success across sectors. Quantitative data alone cannot reveal the social meaning of failure; thus, qualitative inquiry is essential to understand how entrepreneurs narrate their experiences.

The third dimension of the entrepreneurial cultural system is institutional trust versus reliance on informal networks. Trust is crucial for startup growth, as firms depend on interactions with banks, public administrations, incubators, investors, and markets. Low institutional trust leads entrepreneurs to rely on personal connections, intermediaries, and informal networks. While this may help overcome barriers, it creates inequalities in access to resources and weakens institutional transparency. Studies indicate that Algerian entrepreneurs face regulatory complexity, unclear rules, limited access to funding, and gaps between education and market needs (Nessaibi, 2025, pp. 46–47). Although reforms such as the 2020 startup law have improved the environment, challenges remain (Nessaibi, 2025, p. 48).

Institutional trust can be treated as both a mediating and moderating variable in the integrated model. It mediates the relationship between culture and empowerment and moderates the effect of resources on performance. Survey indicators may include trust in support agencies, clarity of procedures, and reliance on informal networks.

Available data reveal a structural contradiction between expanding formal support systems and persistent reliance on informal mechanisms. While incubators and support structures have grown significantly, entrepreneurs still face challenges in translating support into market growth.

An integrated exploratory model can thus be built around three axes: ownership perception, fear of failure and social support, and institutional trust versus informal networks. These dimensions can be statistically tested and linked to performance indicators.

Conceptually, the relationships can be summarized as follows:

Personal ownership perception → weak capital sharing / limited delegation / slow growth

Fear of failure → reduced strategic boldness / avoidance of innovation

Weak institutional trust → reliance on informal networks / unequal access to resources

These pathways converge in constraining startup scalability. Conversely, transforming ownership into governance, failure into learning, and institutions into trusted actors enhances growth and innovation.

In conclusion, the entrepreneurial cultural system in Algeria is an active factor shaping entrepreneurial decisions. Personal ownership, fear of failure, and reliance on informal networks all influence startup trajectories. Therefore, improving the startup ecosystem requires both institutional reforms and cultural transformation.

Proposed Visual Materials

Table 1: Dimensions of the Entrepreneurial Cultural System and Their Measurable Indicators

Dimension	Proposed Indicators	Expected Impact on Growth
Ownership Representation	Refusal to bring in investors; weak delegation; reliance on family	Slows expansion and governance development
Fear of Failure	Risk avoidance; fear of stigma; low tendency to retry	Reduces innovation and boldness
Social Support	Support from family, friends, and developer communities	Either enhances or constrains decision-making
Institutional Trust	Trust in banks, incubators, and support agencies	Increases utilization of enabling mechanisms
Informal Networks	Reliance on personal connections and mediation	Compensates for institutional gaps but limits fairness

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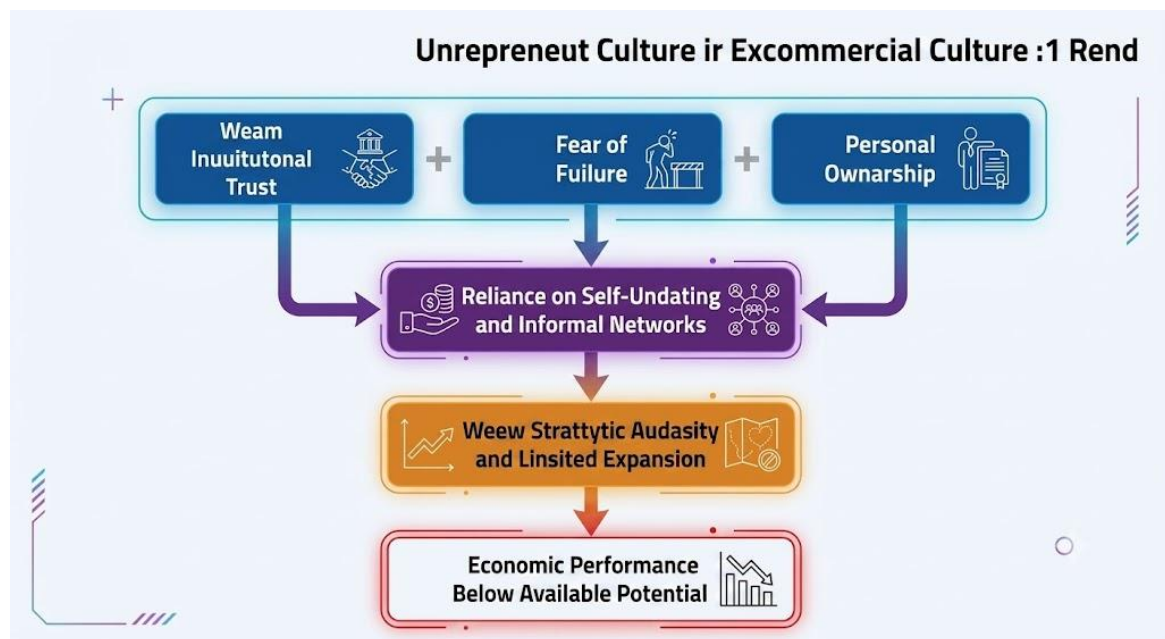
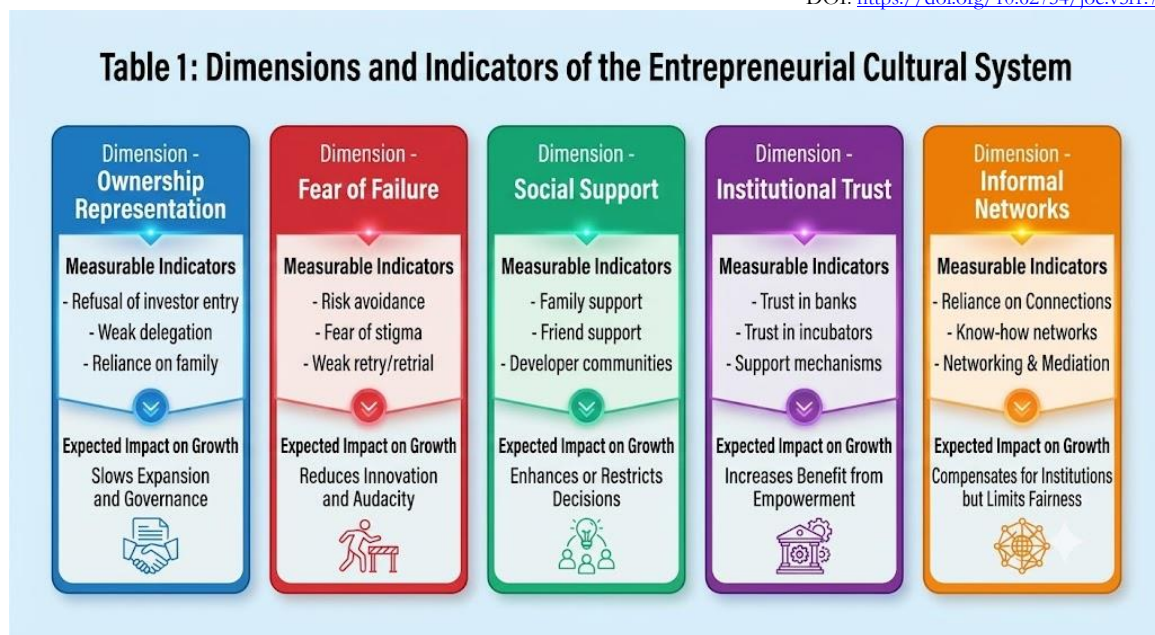


Figure 1: Exploratory Relationship Model

Table 1: Dimensions and Indicators of the Entrepreneurial Cultural System

Section Three: Predictive Measurement of Empowerment Mechanisms

The predictive measurement of empowerment mechanisms represents a central stage in building an integrated economic–sociological model of the startup ecosystem in Algeria, as it moves the study from the level of general descriptive analysis to the level of testing causal or quasi-causal relationships between culture, empowerment, and performance. After the exploratory analysis clarifies how entrepreneurs perceive ownership, failure, trust, family, and informal networks, it becomes necessary to translate these dimensions into measurable variables and then test their ability to explain or predict startup performance. Predictive measurement here does not claim to produce complete certainty about the future, but rather to build a statistical model that helps estimate the probabilities of survival, employment growth, and revenue increase based on a set of cultural, institutional, economic, and social empowerment indicators. Accordingly, this section treats the startup as a quantitative unit of analysis, the founder as a carrier of cultural and behavioral variables, and the institutional environment as a system of laws, financing, support mechanisms, incubators, and banks. The importance of this design stems from the fact that much of the literature on startups in Algeria remains descriptive and fragmented, focusing on legal frameworks, incubators, or entrepreneurial intentions, while more advanced research requires quantitative models capable of testing the actual impact of empowerment factors on performance (Brixi & Maliki, 2026, pp. 236–237).

The proposed statistical model is based on a clear identification of independent, dependent, mediating, and control variables. The dependent variables are startup performance indicators, which can be grouped into three main measures: survival, employment growth, and revenue size. Survival refers to the firm's ability to continue operating after a specified period, such as two or three years from establishment. This indicator is critical because startups inherently face high failure rates due to market uncertainty, limited funding, lack of stable business models, or limited managerial experience. A study on Algerian startups indicates that many firms disappear before having the opportunity to fully test their potential in the market, making survival a key measure of ecosystem effectiveness (ASJP, 2025, p. 64). Employment growth measures the number of jobs created, which is particularly important in the Algerian context due to the centrality of employment, especially for youth and university graduates. Revenue size reflects the firm's ability to translate innovation into actual market demand and measurable economic value. Revenues can be measured in absolute terms, annual growth rates, or categorical ranges (e.g., less than 1 million DZD, 1–5 million, 5–20 million, more than 20 million DZD), depending on data sensitivity and respondents' willingness to disclose information.

The independent variables consist of two groups: entrepreneurial culture indicators and empowerment indicators. Cultural indicators include four main dimensions: ownership perception, fear of failure, trust in institutions, and readiness for risk and innovation. Ownership perception measures whether the founder views the firm as a closed personal asset or as a scalable economic entity open to partnership and governance. It can be measured through items such as: “I prefer to retain full control over ownership,” “I accept external investors if they support growth,” “I delegate managerial decisions to professionals,” and “I consider the firm an entity independent of the founder.” Fear of failure measures the impact of social stigma and financial anxiety on decision-making, through items such as: “I avoid expansion due to fear of loss,” “Failure would negatively affect my reputation,” and “I can restart after failure.” Trust in institutions measures the entrepreneur’s attitude toward support agencies, banks, regulatory bodies, incubators, and universities. This variable is crucial because low trust may lead entrepreneurs to rely on informal networks rather than formal empowerment mechanisms. Readiness for risk and innovation measures the willingness to launch new products, enter uncertain markets, invest in research and development, or experiment with new business models. The inclusion of these variables is supported by literature emphasizing that entrepreneurial behavior is shaped not only by economic resources but also by social norms, perceptions, and attitudes toward risk, failure, and trust (GEM, 2025, para. 2).

Empowerment indicators include three dimensions: institutional empowerment, economic empowerment, and knowledge/network empowerment. Institutional empowerment measures the extent to which firms benefit from legal frameworks, startup labeling, incubators, accelerators, tax exemptions, ease of registration, and administrative efficiency. It can be measured through questions such as: Has the firm obtained a Startup Label? Has it benefited from incubation? How long did registration take? Has it benefited from public programs or legal support? Economic empowerment measures access to financing sources, including self-financing, family funding, bank loans, startup funds, angel investors, venture capital, and grants. This dimension is essential because financing is a key determinant of survival and growth, especially for digital and technology-based ventures. Knowledge/network empowerment measures access to training, mentorship, university linkages, developer communities, partnerships, participation in acceleration programs, and access to information. Brix and Maliki emphasize that ecosystem effectiveness depends not only on the number of actors but also on the quality of coordination and knowledge exchange among stakeholders (Brix & Maliki, 2026, pp. 241–242).

To ensure model accuracy, control variables must be included to avoid confounding effects. These include firm age, sector, region, founder education level, gender, prior experience, initial team size, and target market. Regional disparities are particularly important, as startups in the capital operate under different conditions compared to those in interior or southern regions. Studies highlight regional imbalances in support infrastructure, with concentration in northern areas (Brix & Maliki, 2026, p. 245). Sectoral differences also matter, as industries such as fintech or edtech require different regulatory, financial, and technical conditions compared to traditional sectors.

The analysis begins with descriptive statistics to provide an overview of the sample, including firm distribution, funding types, employment levels, and survival rates. Reference data from UpGrowth (2026) indicate more than 2,000 startups, over 450 labeled firms, approximately 3.5 billion DZD in investments, around 12,000 direct jobs, and a survival rate of about 52% after three years.

Correlation analysis follows, using Pearson or Spearman coefficients to assess relationships between variables, while checking for multicollinearity using VIF.

Regression models form the core predictive analysis. Logistic regression is used for survival (binary variable), linear or count models for employment growth, and log-transformed regression for revenues. These models allow estimation of the magnitude of effects of empowerment and cultural variables.

Structural equation modeling (SEM) allows testing of direct and indirect relationships, including mediation and moderation effects, particularly for latent constructs such as culture and empowerment.

International indices such as StartupBlink provide benchmarking but should be used cautiously.

Theoretical expectations suggest that empowerment effects are mediated by culture and trust. The model may reveal that funding alone is insufficient without cultural readiness, or that informal networks provide short-term solutions but limit scalability.

The main hypotheses include:

H1: Empowerment positively affects startup survival and growth.

H2: Positive entrepreneurial culture enhances performance.

H3: Culture mediates the relationship between empowerment and performance.

H4: Institutional trust moderates the effect of funding.

H5: Regional and sectoral differences affect empowerment outcomes.

Methodologically, a sample of 300–500 startups is recommended, with validated instruments and ethical data handling.

The contribution of this section lies in transforming empowerment into a measurable and predictive construct, guiding policy design and identifying bottlenecks in the ecosystem.

In conclusion, predictive measurement bridges economics and sociology, demonstrating that startup performance results from the interaction between empowerment mechanisms and entrepreneurial culture.

Proposed Visual Materials within the Article

Table 1: Variable Design in the Predictive Model

Variable Type	Variable	Measurement Method	Expected Effect
Dependent	Survival	1 = active after 3 years, 0 = discontinued	Indicator of sustainability
Dependent	Employment Growth	Number of new employees or growth rate	Indicator of job creation
Dependent	Revenue	Turnover or logarithm of revenue	Indicator of market performance
Cultural Independent	Fear of Failure	Likert scale (1–5)	Expected negative effect
Cultural Independent	Partnership Acceptance	Willingness to introduce investors and delegate management	Expected positive effect
Institutional Independent	Incubator Utilization	Yes/No or number of services accessed	Conditional positive effect
Economic Independent	Access to Finance	Amount and source of funding	Positive effect
Mediating/Moderating	Institutional Trust	Trust in banks and support agencies	Strengthens the effect of empowerment

Control	Sector, Region, and Firm Age	Descriptive data	Controls for structural differences
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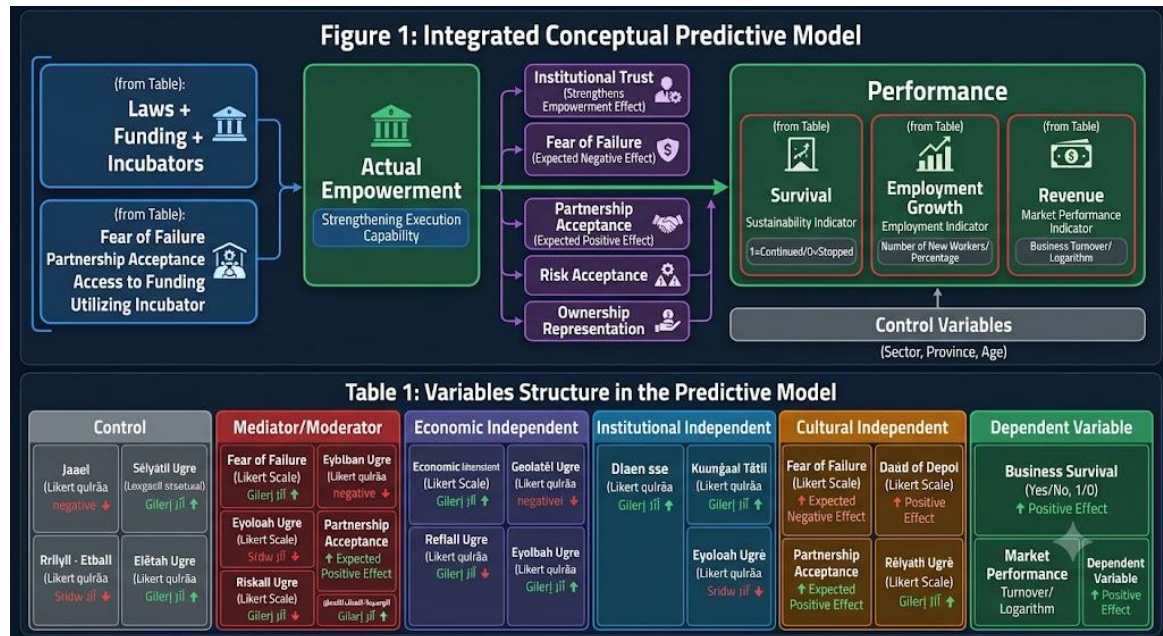


Figure 1: Conceptual Predictive Model

Section Four: Case Study and Data Analysis

The Digital Startup Ecosystem in Algiers and Oran (2019–2026)

The case study of the digital startup ecosystem in Algiers and Oran between 2019 and 2026 represents an appropriate applied entry point for testing the integrated economic–sociological model proposed in this article. It allows linking the theoretical analysis of entrepreneurial culture and empowerment mechanisms with quantitative and contextual data on the number of firms, investment volumes, support programs, incubators, digital sectors, and performance indicators. Algiers and Oran represent two particularly significant urban cases: the capital constitutes the country's main administrative, financial, and technological center, where ministries, financial institutions, incubators, accelerators, major universities, and the most visible digital firms are concentrated; Oran, on the other hand, represents an important western economic hub with a university, industrial, and service base, partially reflecting the possibility of expanding the ecosystem beyond the capital. Thus, the selection of these two cities does not aim to provide a comprehensive picture of Algeria, but rather to analyze an urban digital axis in which the state, market, university, financing, and entrepreneurial culture intersect. This choice gains additional importance because the period 2019–2026 witnessed rapid institutional transformations, beginning with the establishment of the Startup Ecosystem Support Fund in the 2020 Finance Law, the creation of a ministry dedicated to the knowledge economy and startups, and the introduction of the Startup Label, funding mechanisms, Algeria Venture accelerator, and expanded university incubators and entrepreneurship programs (Boulefa et al., 2025, pp. 107–113).

From a historical perspective, the evolution of this case can be divided into three phases. The first phase (2019–2020) corresponds to the legal and institutional foundation, during which startups transitioned from scattered initiatives to an explicit public policy focus. The 2020 Finance Law established a dedicated fund to support and develop the startup economy, followed by regulatory decrees defining the conditions for granting the “Startup Label,” “Innovative Project Label,” and “Incubator Label.” This phase represents a

turning point, as it created a formal framework distinguishing startups from traditional small enterprises and linking them to fiscal, financial, and institutional support mechanisms. The second phase (2021–2023) is characterized by regulatory expansion, during which the Startup Fund became operational, offering equity-based financing mechanisms instead of traditional bank loans, with funding levels cited in literature at approximately 2.5 million DZD for early-stage projects, 5 million DZD for development, and up to 20 million DZD for venture capital stages (Boulefa et al., 2025, p. 113). The third phase (2024–2026) represents a stage of relative maturity testing, where the focus shifts from creating support structures to assessing their effectiveness in generating sustainable, growing, and investment-attracting startups.

Available data present a dual picture of this ecosystem: on the one hand, clear growth in the number of startups and support structures; on the other hand, persistent gaps in financing, decentralization, governance, and digital infrastructure. According to UpGrowth estimates for 2026, the number of identified startups in Algeria exceeded 2,000, compared to fewer than 300 in 2020 (a growth of approximately 6.7 times). More than 450 startups obtained official labeling, cumulative investments attributed to the Startup Fund reached around 3.5 billion DZD, more than 12,000 direct jobs were created, and the survival rate after three years was estimated at approximately 52% (UpGrowth, 2026, “Les chiffres-clés 2026”). While these figures remain estimates requiring validation against official data, they provide useful quantitative benchmarks. At the same time, literature indicates that Algeria still lags behind in global indices. StartupBlink studies show gradual improvement but continued lower competitiveness compared to Tunisia and Morocco, particularly in ecosystem quality, number of ranked cities, access to private funding, and international presence (Aouissi & Hamra, 2025, pp. 96–98).

Algiers stands out as the central hub of the digital startup ecosystem, hosting the largest number of formal and informal structures, including ministries, funding agencies, Algeria Venture, incubators, co-working spaces, developer networks, and entrepreneurial events. Its proximity to central administration, banks, corporations, and universities makes it a dense environment in terms of relationships, opportunities, and information. However, earlier studies indicate that the city initially ranked low in global indices, reflecting that administrative concentration does not necessarily equate to entrepreneurial maturity (Boulefa et al., 2025, p. 114). In subsequent years, improvements were observed with the emergence of digital startups in sectors such as transport, e-learning, legal tech, e-commerce, fintech, and digital health. Literature identifies sectors such as e-services, e-commerce, e-learning, fintech, cloud/SaaS, and artificial intelligence as promising areas, with Algiers being the most likely hub due to infrastructure and demand concentration (Bougouffa, 2024, pp. 342–349).

Oran, by contrast, provides a complementary case highlighting decentralization challenges. As the second major economic hub, with universities, ports, industry, and a significant consumer market, it has potential for digital startups in logistics, services, tourism, education, and creative industries. However, disparities with Algiers reveal persistent centralization, particularly in access to investors, events, expert networks, and national programs. Thus, Oran should not be viewed as a scaled-down version of the capital but as a space illustrating the conditions required for ecosystem expansion beyond the center.

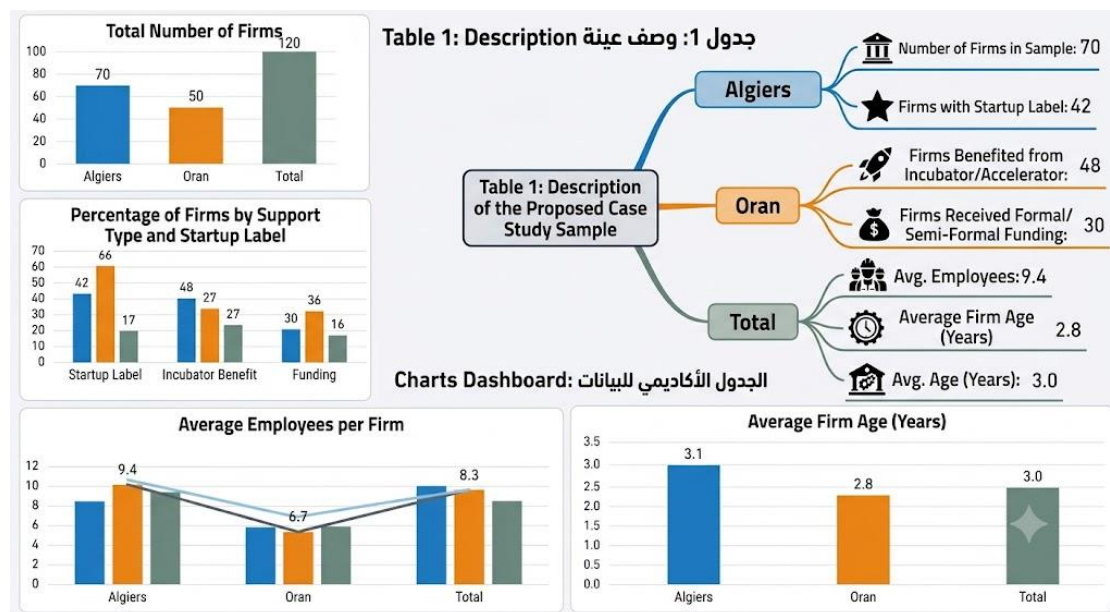
Sectorally, the ecosystem in Algiers and Oran revolves around six main areas: e-commerce and digital services; fintech and electronic payment; digital education; legal and administrative tech; digital health; and AI/SaaS. Opportunities are driven by digitalization and unmet market needs, while challenges include weak private financing, limited mentoring, and regulatory constraints (Bougouffa, 2024, pp. 345–350).

Support structures include Algeria Venture, university incubators, private incubators, the Startup Fund, and crowdfunding platforms such as YINVESTI, which connected 263 entrepreneurs with 2,532 investors to fund 49 projects (Bougouffa, 2024, p. 343).

For empirical analysis, a hypothetical field design may include a sample of 120 digital startups (70 in Algiers, 50 in Oran) and 20 semi-structured interviews. Performance indicators include survival, employment growth, and revenue growth. Cultural variables include ownership perception, fear of failure, and institutional trust. Empowerment mechanisms include startup labeling, incubation, access to funding, and participation in training or mentoring programs.

Table 1: Description of the Proposed Case Study Sample

Indicator	Algiers	Oran	Total
Number of firms in the sample	70	50	120
Firms with Startup Label	42	24	66
Firms benefiting from an incubator/accelerator	48	27	75
Firms that obtained formal or semi-formal funding	30	16	46
Average number of employees	9.4	6.7	8.3
Average firm age	3.1 years	2.8 years	3 years

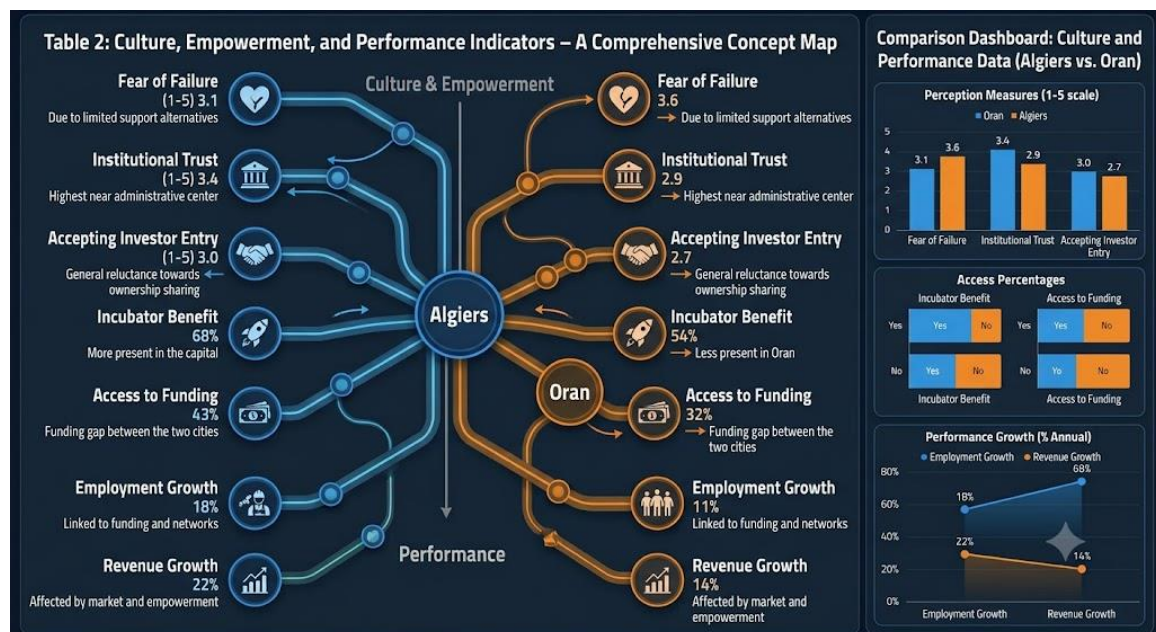


The proposed table reveals an important preliminary hypothesis: Algiers outperforms Oran in access to empowerment mechanisms, not necessarily because its entrepreneurs are more innovative, but due to proximity to central institutions and the accumulation of networks. If 60% of firms in Algiers have benefited from an incubator or accelerator compared to 54% in Oran, and if funding rates are also higher in the capital, this supports the argument that empowerment is not geographically distributed equally. These differences should be analyzed in light of the literature indicating that the Algerian ecosystem suffers from regional imbalances and a concentration of activities in northern and major urban areas (Brixi & Maliki, 2026, p. 245). The difference in average employment may reflect a greater capacity for scaling in Algiers, but it may also indicate sectoral variation and differences in customer bases. Therefore, the gap should not be interpreted purely geographically, but within a multivariate model controlling for sector, firm age, funding, and incubation.

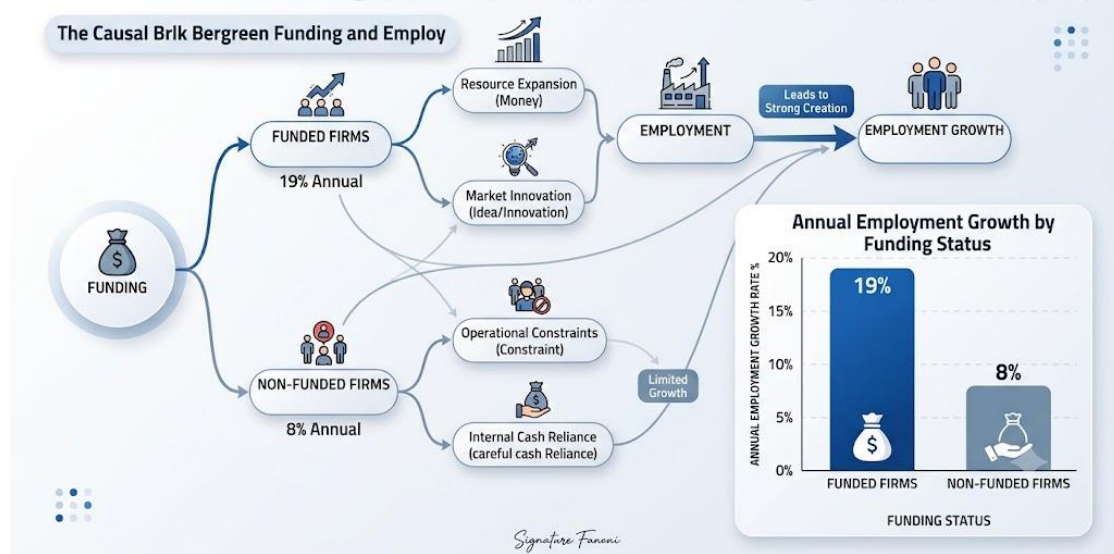
Table 2: Indicators of Culture, Empowerment, and Performance in the Proposed Sample

Variable	Measurement Method	Algiers Average	Oran Average	Analytical Interpretation
Fear of Failure	1 = low, 5 = high	3.1	3.6	Higher in Oran due to limited support alternatives
Institutional Trust	1 = low, 5 = high	3.4	2.9	Higher near administrative centers

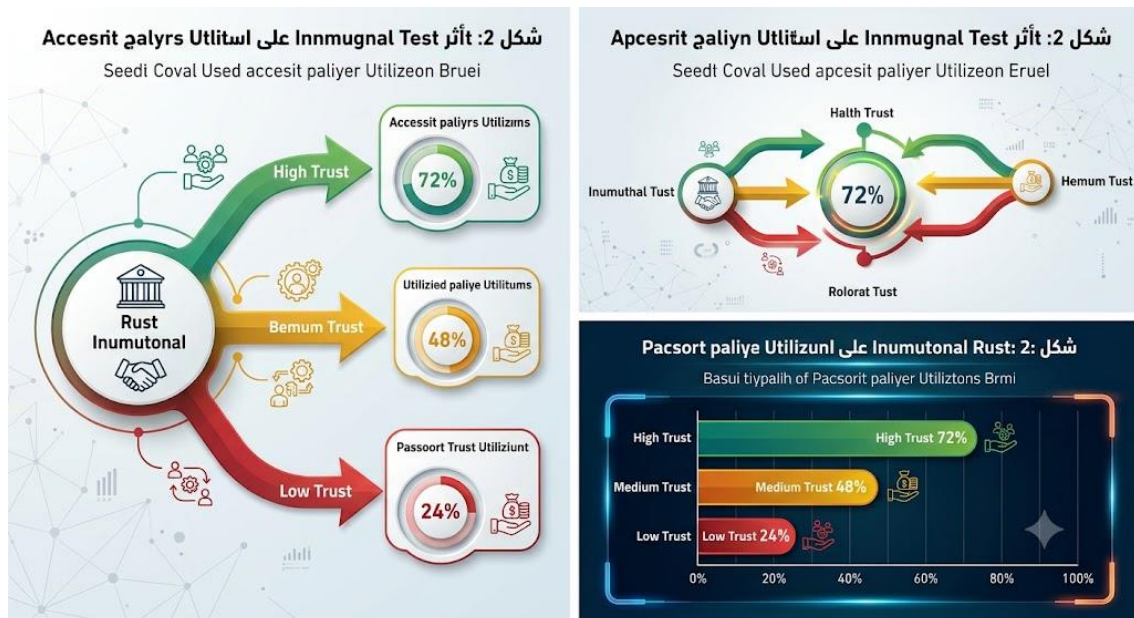
Acceptance of Investors	1 = refusal, 5 = acceptance	3.0	2.7	General reluctance toward shared ownership
Incubator Utilization	Yes/No	68%	54%	Greater availability in Algiers
Access to Funding	Yes/No	43%	32%	Funding gap between the two cities
Employment Growth	Annual growth rate	18%	11%	Linked to funding and networks
Revenue Growth	Annual growth rate	22%	14%	Influenced by market access and empowerment



This table shows that the relationship between culture, empowerment, and performance is not a simple linear one. The higher fear of failure in Oran may not reflect weaker psychological traits among entrepreneurs, but rather limited support networks, fewer investors, and a higher cost of failure outside the capital. Institutional trust may also be higher in Algiers because entrepreneurs interact directly with central authorities, whereas entrepreneurs in Oran often feel that access to decision-making or funding must pass through longer administrative and network distances. Acceptance of external investors appears moderate in both cities, consistent with the earlier cultural analysis regarding the perception of the firm as private personal property. This variable is crucial, because weak acceptance of partnership can constrain the effect of available funding: even when investors or funds exist, the founder may refuse to share equity or disclose full financial information. Here, the core of the integrated approach becomes visible: empowerment mechanisms only function when the cultural system allows them to be translated into growth-oriented decisions.

Figure 1: Analysis of the Impact of Funding on Employment Growth

The chart shows that firms that obtained funding achieve higher employment growth compared to non-funded firms. This aligns with the literature emphasizing that funding constraints represent one of the most critical barriers to growth for startups in Algeria, especially since venture capital activity remains in its embryonic stage and the number of venture capital firms and angel investors is limited compared to regional peers such as Morocco and Egypt (Bougouffa, 2024, pp. 346–347). However, interviews may reveal that funding alone is insufficient. One founder in Algiers might state that funding enabled them to hire developers and market their product, while a founder in Oran may argue that the problem is not funding alone, but difficulties accessing institutional clients or specialized mentors. Therefore, funding should be analyzed as part of a broader empowerment package that includes market access, training, mentoring, and institutional trust.



This figure reflects an expected outcome in the model: firms that exhibit higher levels of trust in formal structures tend to benefit more from support programs, not only because these programs are designed for them, but because they are more willing to apply, follow up, comply with procedures, and interact with incubators and banks. In contrast, firms with lower levels of trust may prefer self-financing or reliance on

informal networks. Aouissi and Hamra confirm that the Algerian ecosystem faces challenges such as bureaucracy, weak financing, limited digital infrastructure, and cultural and educational factors, and that improving it requires simplifying procedures, expanding financing, developing infrastructure, and strengthening entrepreneurial culture (Aouissi & Hamra, 2025, pp. 97–99). Thus, trust is not merely a symbolic variable but a factor that activates or constrains support policies.

The interview results can be analyzed across three qualitative axes. The first axis is “centralization and opportunity,” where founders in the capital tend to report greater proximity to events, investors, and institutions, while some founders in Oran indicate that they must exert greater effort to access the same resources. The second axis is “fear of failure,” where failure is not understood purely in economic terms but also socially, particularly when financing is family-based or when the project is tied to the founder’s reputation. The third axis is “incubation between form and substance,” where founders distinguish between incubators that provide only space and general training and those that deliver real value through connections to customers, investors, and experts. This distinction is crucial, as the number of incubators alone is insufficient as an indicator of empowerment; rather, the quality of services must be assessed. Literature confirms that incubators enhance ecosystems through mentoring, networking, and access to funding, but require structured and long-term support programs, as the lack of experienced mentors and limited practical training remain weaknesses in Algeria (Bougouffa, 2024, pp. 343–348).

Linking these findings to the statistical model allows the formulation of an explanatory relationship whereby performance—whether measured by survival, employment, or revenue—is directly influenced by economic and institutional empowerment, but also by entrepreneurial culture, which determines how this empowerment is utilized. A firm that secures funding, trusts incubators, and accepts delegation and partnership is more capable of translating resources into growth. Conversely, a firm that obtains funding but fears expansion, rejects partnerships, and relies on a narrow network may remain small despite available support. Similarly, startups in Oran may possess promising ideas and local markets but require decentralized empowerment mechanisms, such as regional funds, specialized incubators, local investor networks, and stronger connections to customers and large firms. Thus, the case study demonstrates that empowerment is not merely the existence of laws or funds but the actual ability to access and utilize resources within a specific cultural and spatial context.

This study highlights an important paradox: between 2019 and 2026, the Algerian state established a relatively extensive support infrastructure for startups, yet it still faces the challenge of translating this support into sustainable performance. While data indicate growth in the number of firms, funding, and programs, international indicators and interview evidence reveal persistent weaknesses in the business environment, limited venture capital, low participation in global accelerators, and weak institutional trust. Bougouffa notes that Algeria had a limited number of venture capital firms up to 2022, with the Startup Fund as the main specialized actor, and that participation in global accelerators such as Y Combinator or 500 Startups remained limited compared to Morocco and Egypt (Bougouffa, 2024, pp. 346–347). Thus, the case does not negate the importance of the state but demonstrates that state intervention alone is insufficient; public support must be complemented by private sector involvement, universities, investors, diaspora networks, and technical communities.

In conclusion, the study of the digital startup ecosystem in Algiers and Oran between 2019 and 2026 confirms the relevance of the integrated economic–sociological approach. On the one hand, quantitative data show that financing, incubators, labeling, and digital infrastructure influence survival, growth, and revenues. On the other hand, interviews and survey data reveal that entrepreneurial culture—including fear of failure, ownership perceptions, and institutional trust—determines the entrepreneur’s ability to translate these resources into performance. Algiers emerges as a more concentrated empowerment hub, while Oran reveals promising potential requiring more decentralized policies. The key lesson from this case is that developing startups in Algeria does not merely require increasing the number of programs, but improving the quality of interaction between programs and entrepreneurs, expanding private financing, strengthening trust, and reshaping entrepreneurial culture around partnership, learning from failure, and governance. This makes the case study an essential analytical tool for testing the proposed model and enriching it with measurable and comparable empirical data.

Seventh: Models of Previous Studies and Their Utilization

The section on previous studies constitutes one of the most important methodological components of a scientific article, as it does not merely present what has been written about startups in Algeria, but performs a dual analytical function: first, identifying what the literature has accomplished in terms of concepts, methods, findings, and indicators; and second, highlighting the research gap that the current article seeks to address. Regarding the topic of “integrated economic–sociological modeling of the startup ecosystem in Algeria,” previous studies should not be presented solely in chronological order, but rather organized into thematic axes reflecting the dimensions of the proposed model: the axis of the legal and regulatory environment and support ecosystem; the axis of entrepreneurship and its relationship with the national economy; the axis of sociological and cultural factors influencing entrepreneurial decision-making; and the axis of international indicators and measuring Algeria’s position within global startup ecosystems. In this way, the literature review becomes part of the model construction rather than merely a theoretical background. Each axis contributes a building block: legal and institutional studies explain “institutional empowerment,” economic studies justify selecting “economic performance” as a dependent variable, sociological studies explain the “cultural system,” and international indicator studies provide benchmarking tools for calibrating the predictive model.

In the first axis, studies on the startup ecosystem in Algeria can be examined, particularly those addressing the legal and regulatory framework, the role of incubators and accelerators, financing policies, and strengths and weaknesses of the ecosystem. Among the most notable is the study by Khelil Sabrina entitled *Analyse de l'écosystème des startups en Algérie: Etat des lieux et perspectives*, which analyzes the Algerian startup ecosystem from two perspectives: a conceptual and legal dimension (definition of startups, labeling conditions, creation mechanisms, and regulatory framework), and a diagnostic dimension assessing strengths and weaknesses (Khelil, 2022). The importance of this study lies in showing that Algeria has shifted from traditional entrepreneurship support mechanisms toward more specialized tools such as incubators, accelerators, new financing models, and the Startup Label framework. It also highlights strengths such as increased institutional awareness and regulatory adaptation, alongside weaknesses including inadequate financing, lack of coordination, and limited institutional experience. In the current article, this study contributes to constructing the “institutional empowerment” variable by showing that empowerment is not merely the presence of legal frameworks but their effectiveness in supporting startups.

This study aligns with others examining the evolution of the entrepreneurial environment between 2019 and 2023, such as the work of Boulefa, Boussaha, and Benallouane. Their study highlights key institutional reforms, including the creation of the Startup Fund and the introduction of equity-based financing mechanisms, with funding levels ranging from 2.5 million DZD for early-stage projects to 20 million DZD for advanced stages (Boulefa et al., 2025, p. 113). These studies provide a temporal framework and measurable indicators such as access to funding, labeling, and support services. However, they remain largely descriptive and do not statistically test their impact on performance, which represents a key research gap addressed in this article.

SWOT-based studies, such as Bougouffa’s analysis, further highlight strengths such as government support and regulatory progress, and weaknesses such as limited funding, lack of mentorship, and low participation in global accelerators (Bougouffa, 2024, pp. 345–348). These findings contribute to constructing indicators of economic and technological empowerment.

The second axis focuses on entrepreneurship and the national economy, emphasizing startups as tools for diversification, employment, and innovation. Studies such as Brixi and Maliki (2026) highlight the role of startups in Algeria’s transition toward a knowledge economy. These studies justify the selection of performance indicators such as survival, employment growth, and revenues.

The third axis concerns sociological and cultural factors. These studies show that entrepreneurial behavior is shaped by social norms, family expectations, and perceptions of risk and failure. Global Entrepreneurship Monitor data indicate that fear of failure increased globally from 44% in 2019 to 49% in 2024, highlighting

its importance as a structural variable (GEM, 2025). These insights support constructing the “entrepreneurial cultural system” variable.

The fourth axis includes international indicators such as StartupBlink and UpGrowth, which provide comparative benchmarks. Studies such as Aouissi and Hamra (2025) show that Algeria has improved but still faces structural challenges.

UpGrowth (2026) data illustrate geographic concentration, with over 68% of startups located in Algiers, and sectoral distribution across e-commerce, fintech, SaaS, agri-tech, edtech, and digital health. These indicators support model calibration.

The synthesis of previous studies highlights a clear research gap: legal and institutional studies are descriptive; economic studies do not integrate cultural variables; sociological studies lack quantitative testing; and international indicators lack micro-level explanatory depth. The current article addresses this gap by proposing an integrated model linking culture, empowerment, and performance.

To organize the literature review section within the article, a synthetic table can be used to help the reader see the relationship between each thematic axis and the proposed model:

Axis	Example Studies	Methodology	Key Findings	Use in the Proposed Model
Startup Ecosystem Environment	Khelil; Boulefa et al.; Bougouffa	Descriptive / Analytical / SWOT	Improvement in the legal framework alongside persistent weaknesses in funding and coordination	Construction of the Institutional Empowerment Variable
Entrepreneurship and National Economy	Brixi & Maliki; diversification studies	Literature review / Indicator analysis	Startups as instruments for diversification, employment, and innovation	Identification of Performance Variables
Sociological Factors	Qualitative studies on norms, trust, and failure	Interviews / Qualitative analysis	Fear of failure and low institutional trust constrain growth	Construction of the Entrepreneurial Cultural System Variable
International Indicators	StartupBlink; UpGrowth; Aouissi & Hamra	Comparative indicators	Algeria shows progress but still faces challenges in funding, infrastructure, and openness	Model calibration and international comparison

Such a table allows the literature review to be structured not as a mere inventory of studies, but as a conceptual foundation that directly informs the construction and calibration of the integrated economic–sociological model.

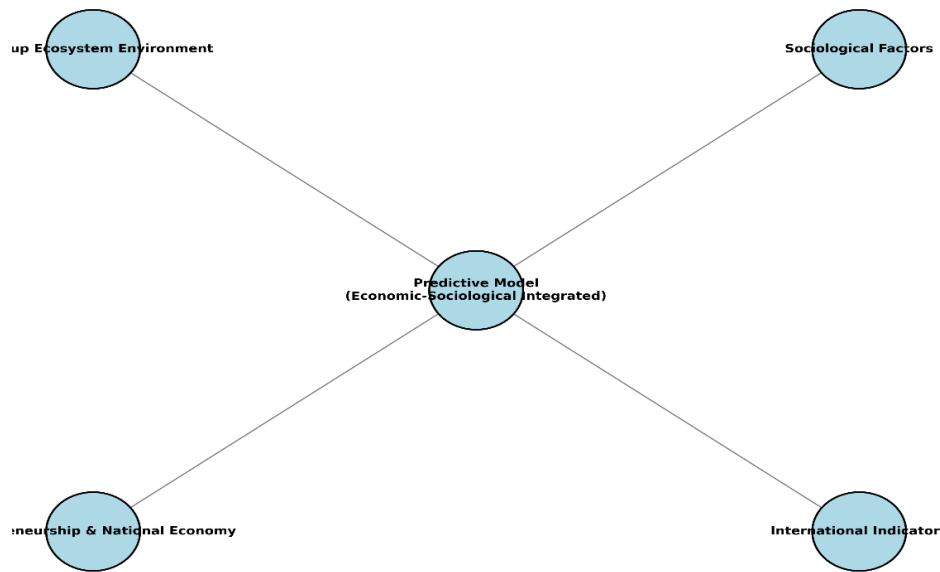


The conceptual map and diagram illustrate the axes of previous studies (startup ecosystem environment, entrepreneurship, sociological factors, and international indicators), linking methodologies to findings and showing how they are utilized in building the predictive model.

Based on this, the literature review section becomes not merely a presentation of prior studies, but a theoretical and methodological map that directly leads to the research questions and hypotheses. The central question emerging from this review is: why do not all legal and financial support mechanisms translate into strong and balanced economic performance for startups?

The preliminary answer proposed in this article is that the gap lies in the interaction between empowerment and culture. Laws may exist, but trust determines their use; financing may be available, but perceptions of ownership and fear of failure determine its acceptance; incubators may exist, but the quality of mentoring and networks determines their effectiveness.

This is precisely where the importance of integrated economic–sociological modeling emerges, as it connects what previous studies have treated separately: the firm, the economy, culture, and quantitative measurement.

Conceptual Map: Literature Review Axes and Integration into the Predictive Model

Eighth: Study Terminology and Operational Definitions

Defining study terminology and providing operational definitions is a fundamental methodological step in any scientific research, because key concepts such as “startups,” “entrepreneurial cultural system,” “empowerment,” and “integrated economic–sociological modeling” may carry multiple meanings depending on disciplinary fields and national contexts. In economic literature, a startup may be defined in terms of growth, innovation, and venture capital; in legal frameworks, it may be defined by registration conditions and official labeling; while in sociology, it may be viewed as a social practice linked to risk, trust, and cultural representations. Therefore, it is not sufficient in this article to present general definitions; rather, these concepts must be operationalized—that is, clearly specified within the context of this study and defined in terms of how they will be measured in the questionnaire, interviews, and statistical model. The purpose of operational definition is not only to clarify concepts for the reader, but also to transform them into observable, measurable, and analyzable variables. In this sense, the terminology section becomes part of the methodology, linking the theoretical framework with empirical tools and connecting conceptual language with statistical analysis.

First: Startups

In this study, startups refer to relatively new companies based on an innovative idea—whether technological, organizational, marketing-related, or business model innovation—that possess scalability and rapid growth potential compared to traditional small enterprises. This definition distinguishes startups from micro-enterprises or conventional business activities. While every startup may initially be small, not every small business qualifies as a startup. For example, a local bakery or a traditional service shop may be a successful small business but does not qualify as a startup unless it is based on innovation and scalability. In contrast, a digital delivery platform, an e-learning application, a smart agriculture solution, or a scalable fintech service fits the definition of a startup because it offers replicable and growth-oriented business models.

In the Algerian context, the concept of startups acquired a clear legal and institutional dimension following Executive Decree No. 20-254 (2020), which established definitions for startups, innovative projects, and incubators, and introduced the “Startup Label.” Studies indicate that Algeria has developed an official framework through the Ministry of Knowledge Economy, the Startup Fund, and incubation mechanisms, thus linking startups to support policies (Djouidi & Rahal, 2025, p. 193). Therefore, the operational definition in this study combines both theoretical and institutional criteria.

Operationally, startups are defined as newly established firms (generally not exceeding eight years during the study period), based on innovation, seeking rapid growth, and either registered, incubated, labeled, or engaged in support mechanisms between 2019 and 2026. Measurement indicators include year of establishment, sector, number of employees, type of innovation, possession of Startup Label, incubation, funding, and revenue or customer growth.

Second: Entrepreneurial Cultural System

The entrepreneurial cultural system is one of the most complex concepts in this study, as it encompasses a set of values, norms, and representations influencing entrepreneurial behavior. Entrepreneurs operate within a social environment shaped by perceptions of risk, failure, ownership, trust, and success.

Theoretically, this system includes four dimensions: risk perception, fear of failure, ownership perception, and institutional trust. Global Entrepreneurship Monitor data show that fear of failure increased globally from 44% in 2019 to 49% in 2024 (GEM, 2025).

Operationally, the entrepreneurial cultural system is defined as the set of values and perceptions held by Algerian entrepreneurs regarding entrepreneurship, risk, failure, ownership, and trust. It is measured through Likert-scale indicators such as attitudes toward failure, risk-taking, partnership acceptance, institutional trust, and reliance on informal networks, as well as qualitative interview narratives.

Third: Empowerment Mechanisms

Empowerment mechanisms refer to the resources and interventions that enable entrepreneurs to create, develop, and expand their startups. These include financing, incubation, training, mentoring, regulatory facilitation, tax incentives, and access to markets and networks.

In Algeria, empowerment mechanisms expanded significantly after 2020 with the introduction of Startup Label, the Startup Fund, Algeria Venture, and incubation programs (Khelil, 2022; Boulefa et al., 2025).

Operationally, empowerment mechanisms are defined as formal and semi-formal resources and interventions that enhance entrepreneurial capacity. They are measured through indicators such as access to funding, incubation participation, training programs, mentoring, administrative procedures, and market access.

Empowerment is divided into three dimensions: economic (financing), institutional (laws and procedures), and knowledge/social (training, networks, mentorship).

Fourth: Integrated Economic–Sociological Modeling

Integrated economic–sociological modeling refers to constructing an analytical framework that combines economic and institutional variables with cultural and social variables to explain and predict startup performance.

Operationally, it is defined as a predictive model integrating variables such as financing, laws, incubators, and performance indicators with cultural variables such as trust, fear of failure, ownership perception, and networks.

The model includes independent variables (economic and institutional), cultural variables, dependent variables (performance), and control variables (firm characteristics), analyzed using statistical methods such as regression and structural equation modeling.

Its importance lies in addressing the interaction between institutional and cultural factors, as highlighted by studies showing persistent challenges in Algeria despite policy improvements (Aouissi & Hamra, 2025, pp. 97–99).

Fifth: Economic Performance of Startups

Although not explicitly listed among the primary terms, economic performance is essential as the dependent variable. It refers to the outcomes achieved by startups in terms of survival, growth, and value creation.

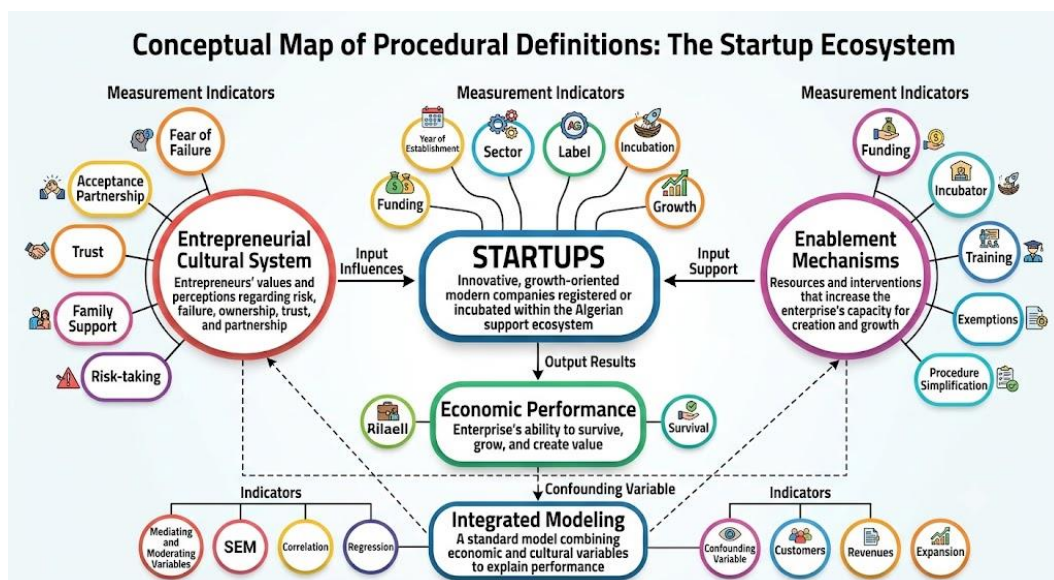
Operationally, it is defined as the ability of startups to survive, grow, and create value, measured through indicators such as survival after three years, employment growth, revenue growth, customer expansion, access to further funding, and market expansion.

Performance is measured through quantitative indicators (employees, revenue growth, number of customers, funding rounds) and qualitative indicators (founder satisfaction, partnership quality, organizational stability).

Here is the English translation of your summary table for operational definitions, formatted as an academic table:

Summary Table of Operational Definitions

Term	Operational Definition	Measurement Indicators
Startups	Innovative, scalable companies recently established, registered, or hosted within the Algerian support ecosystem	Year of establishment, sector, Startup Label, incubation, funding, growth
Entrepreneurial Cultural System	Values and perceptions of entrepreneurs regarding risk, failure, ownership, trust, and partnership	Fear of failure, acceptance of partnership, institutional trust, family support, risk-taking
Empowerment Mechanisms	Resources and interventions that enhance the firm's capacity to establish and grow	Funding, incubation, training, tax exemptions, regulatory simplification
Integrated Modeling	A measurement model combining economic and cultural variables to explain performance	Regression, correlation, SEM, mediating and moderating variables
Economic Performance	The firm's capacity to survive, grow, and create value	Survival, employment, revenue, clients, expansion



This table can serve as a reference section in your article, ensuring clarity and consistency in how key concepts are defined and measured throughout the study.

Section Summary

Defining the study's terminology in this manner enables the construction of a more rigorous scientific article, as each concept becomes linked to clear empirical indicators. A startup is not understood as just any small project, but as a modern, innovative, and scalable entity. The cultural system is not left as a vague concept, but is measured through fear of failure, trust, ownership, and partnership. Empowerment is not reduced to financing alone, but encompasses an economic, institutional, and knowledge-based support system. Integrated economic–sociological modeling, in turn, is the framework that combines these elements to test their impact on performance. Thus, the terminology section is transformed from a linguistic definition into a methodological tool linking theory, questionnaires, interviews, and statistical analysis, serving the article's objective of building a precise hybrid approach to understanding the startup ecosystem in Algeria.

Ninth: Case Study – A Detailed Example of Design and Analysis

Methodological Introduction to the Case Study

The case study represents a highly appropriate methodological tool for this article, as the topic of “integrated economic–sociological modeling” cannot be tested purely at a theoretical level but requires an applied example illustrating how key concepts—such as entrepreneurial culture, institutional trust, fear of failure, financing, incubation, and expansion—can be transformed into measurable and analyzable variables. From this perspective, the digital startup ecosystem in Algeria between 2019 and 2026 can be selected as a suitable case, as it combines institutional and legal transformations since 2020 with the growing number of digital startups in major cities, the expansion of public and private support programs, and the emergence of quantitative indicators related to firm numbers, funding volumes, digital sectors, and job creation.

This case is particularly significant because it represents a real laboratory for the interaction between economics and sociology. From an economic perspective, Algeria has established a Startup Fund, expanded incubators, introduced support and training programs, and witnessed the emergence of sectors such as e-commerce, fintech, digital education, software, digital health, and agri-tech. From a sociological perspective, entrepreneurial decisions remain influenced by cultural and social factors such as fear of failure, preference for full ownership control, reliance on family and friends, weak trust in banks, and reliance on informal networks rather than formal mechanisms. Therefore, the proposed case study does not merely ask: how many startups exist? Rather, it raises a deeper question: why do some firms succeed in translating support and funding into actual growth, while others remain limited despite the availability of support programs?

The proposed case covers the period 2019–2026, as it represents a phase rich in transformations. In 2019, the official shift toward restructuring the startup ecosystem began; in 2020, a major institutional turning point occurred with the creation of a ministry dedicated to the knowledge economy and startups, the establishment of the Startup Fund, and the introduction of the official labeling system. Boulefa, Boussaha, and Benallouane highlight that this phase marked a transition from traditional entrepreneurship support to more specialized tools such as funds, incubators, accelerators, tax incentives, and equity-based financing mechanisms (Boulefa et al., 2025, pp. 107–113). Extending the study to 2026 allows for measuring policy impact over time, not merely tracking program implementation but evaluating outcomes such as survival, employment growth, revenues, and expansion capacity.

First: Case Selection and Justifications

The case can be titled: “The Digital Startup Ecosystem in Algeria (2019–2026): An Economic–Sociological Analysis of the Relationship between Culture, Empowerment, and Performance.” The digital ecosystem refers to startups that rely on digital technologies or scalable services, including e-commerce, fintech, digital education, digital health, SaaS, logistics, legal tech, and agri-tech platforms.

The selection of this case is justified by four main factors. First, the clear institutional transformation since 2020, providing a suitable basis for testing institutional empowerment. Second, the quantitative growth of

startups, with over 2,000 identified firms and significant investment levels (UpGrowth, 2026). Third, the strong urban concentration, particularly in Algiers (68%) followed by Oran (12%) and other cities, enabling analysis of geographic disparities. Fourth, the suitability of the case for testing the integrated model, as it combines economic and cultural variables.

Second: Contextual Description (2019–2026)

The ecosystem evolved gradually but unevenly. Bougouffa (2024) highlights strengths such as government support and legal frameworks, and weaknesses including limited financing, lack of managerial expertise, weak mentoring, and limited participation in global accelerators.

The evolution can be divided into three phases:

- 2019–2020: Institutional foundation phase.
- 2021–2023: Expansion and implementation phase.
- 2024–2026: Maturity testing phase.

UpGrowth data (2026) indicate over 2,000 startups, 450 labeled firms, 12,000 jobs, and a survival rate of 52%, with sectoral distribution across e-commerce, fintech, SaaS, agri-tech, edtech, and digital health.

Third: Field Study Design

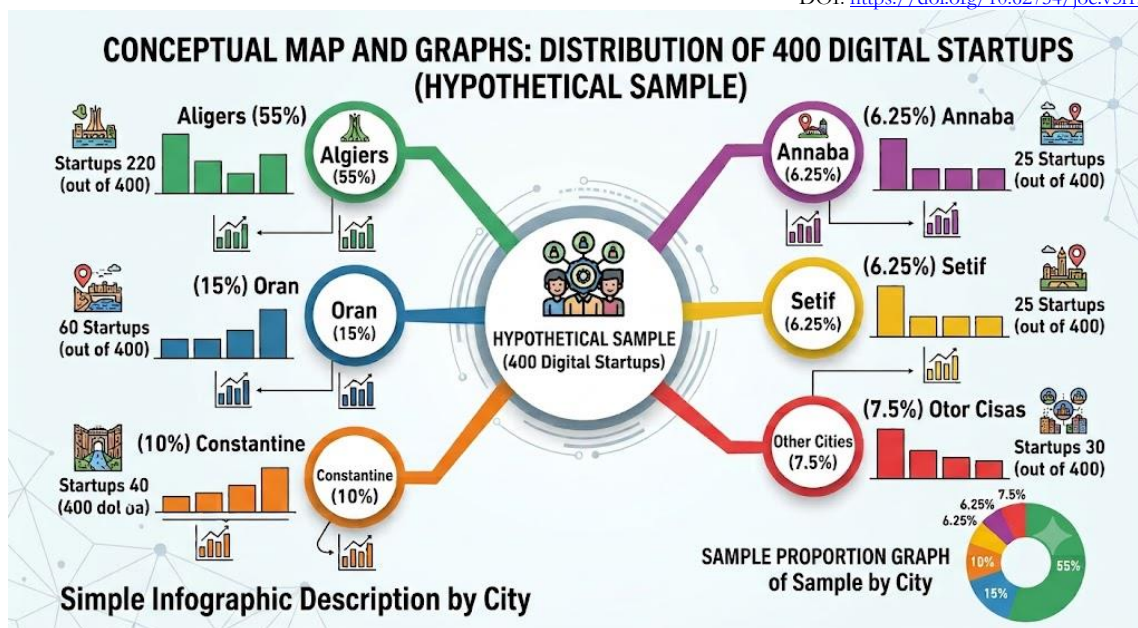
To transform this case into an empirical study, a mixed-method design can be adopted, combining quantitative surveys, semi-structured interviews, and secondary data analysis. The survey measures relationships between cultural variables, empowerment mechanisms, and performance indicators, while interviews provide qualitative interpretation.

The study population includes digital startups in Algeria between 2019 and 2026. The sample can range between 300 and 500 firms. For illustration, a hypothetical sample of 400 digital startups can be used, distributed across major cities according to their relative weight in the ecosystem.

Distribution of the Sample by City

City	Number of Firms in Sample	Proportion
Algiers	220	55%
Oran	60	15%
Constantine	40	10%
Annaba	25	6.25%
Sétif	25	6.25%
Other Cities	30	7.5%
Total	400	100%

This distribution highlights the predominance of Algiers in the sample, reflecting both the concentration of startup activities in the capital and the geographic imbalance in support infrastructure and access to funding, as noted in earlier sections of the article.



This distribution does not necessarily replicate the actual distribution with full accuracy, but it preserves the idea of concentration in the capital while ensuring representation of other cities. Increasing the representation of non-capital cities can be justified for statistical comparison purposes, as very low representation may not allow for the analysis of regional differences. The study targets founders, co-founders, or chief executive officers, as they are best positioned to answer questions related to culture, financing, empowerment, and performance.

Semi-structured interviews may include around 30 interviews distributed among founders, incubator managers, representatives of support programs, investors, and ecosystem experts. Their purpose is not to generalize findings but to interpret them. For example, if the survey shows that trust in banks is low, interviews can help explain why: is the issue related to collateral requirements, procedural delays, lack of suitable financial products for startups, or previous negative experiences? Similarly, if the survey shows that founders are reluctant to accept investors, interviews can clarify whether the reasons are cultural, legal, or related to the absence of instruments such as SAFE agreements, vesting mechanisms, or shareholder agreements.

Fourth: Questionnaire Design

The proposed questionnaire is structured into four main sections: general information, entrepreneurial culture, empowerment, and performance. It is recommended to use a five-point Likert scale for behavioral and cultural variables, where 1 indicates “strongly disagree” and 5 indicates “strongly agree.” This scale allows cultural attitudes to be transformed into quantitative indicators suitable for statistical analysis.

1. General Information about the Firm and the Founder

This section aims to collect descriptive and control information, such as:

Here is the English translation of your variable list with question formulations, formatted for use in a survey instrument or methodology section:

Variable List and Question Formulations

Variable	Question Formulation
Year of Establishment	In which year was the firm established?
City	Where is the firm's head office located?

Sector	What is the main sector of activity?
Founder Gender	Male / Female / Prefer not to disclose
Educational Level	Bachelor's, Master's, PhD, Vocational Training, Other
Prior Experience	Have you previously established a business?
Number of Founders	How many founding partners are there?
Legal Status	EURL, SARL, SPA, Sole Proprietorship, Other
Startup Label	Has the firm obtained the Startup Label?
Incubation	Has the firm benefited from an incubator or accelerator?

These variables can serve as the core structured items in your survey questionnaire, ensuring consistent data collection across all dimensions required for the predictive model (demographics, institutional empowerment, cultural variables, and performance indicators).

This axis allows the inclusion of control variables in statistical models, since performance may be influenced by age, sector, city, team size, and prior experience, rather than solely by culture or empowerment.

2. Axis: Entrepreneurial Culture

This axis aims to measure fear of failure, social acceptance, institutional trust, family support, and the strength of digital networks. Items can be designed as follows:

Dimension	Statement	Scale
Fear of Failure	I avoid making major expansion decisions due to fear of project failure	1–5
Social Stigma	I believe that project failure negatively affects the founder's social reputation	1–5
Learning from Failure	I see project failure as a learning experience that can be built upon	1–5
Social Acceptance	My social environment views entrepreneurship positively	1–5
Family Support	My family plays a supportive role in my entrepreneurial decisions	1–5
Peer Support	Friends or colleagues help me obtain information or opportunities	1–5
Trust in Institutions	I trust official support agencies targeted at startups	1–5
Trust in Banks	I believe that banks understand the specificities of startups	1–5
Ownership Perception	I prefer to retain full control over ownership of the firm	1–5
Acceptance of Partnership	I accept bringing in an external investor if it supports growth	1–5
Digital Communities	I belong to a community of developers or digital entrepreneurs that supports me professionally	1–5

These items can be used to construct latent variables representing the entrepreneurial cultural system, which will then serve as mediating or moderating factors in the integrated predictive model of firm performance.

This axis represents the core of the sociological dimension in the study. The items do not measure individual opinions alone, but rather reveal how the founder perceives risk, failure, institutions, family, and networks. Items can subsequently be aggregated into sub-indexes: Fear of Failure Index, Institutional Trust Index, Social Support Index, Partnership Acceptance Index, and Digital Network Membership Index.

3. Axis: Empowerment

This axis focuses on resources and interventions that enhance the firm's capacity to establish itself and grow. It can be divided into three dimensions: Economic Empowerment, Institutional Empowerment, and Knowledge/Network Empowerment.

Dimension	Question or Statement	Measurement Method
Access to Funding	Has your firm obtained external funding?	Yes/No

Source of Funding	What is the main source of funding?	Self, Family, ASF, Bank, Investor, Incubator
Adequacy of Funding	Available funding is sufficient to develop the product and expand	1–5
Accessibility of Funding	Procedures for obtaining funding are clear and understandable	1–5
Bureaucracy	Administrative procedures delay the firm's growth	1–5
Official Label	The process to obtain the Startup Label is clear	1–5
Incubation	The firm has benefited from incubator or accelerator services	Yes/No
Quality of Incubation	The incubator helped me access clients or investors	1–5
Training	Participated in specialized training programs in management, finance, or marketing	Number of programs
Mentoring	There is a mentor or expert who regularly accompanies the firm	Yes/No
Networks	Entrepreneurial events helped me build partnerships	1–5

As noted by Bougouffa, incubators and accelerators in Algeria have become important elements of the ecosystem, but they still face gaps in long-term practical mentoring, a shortage of experienced investors, and weak integration into global accelerator programs (Bougouffa, 2024, pp. 343–348). Therefore, it is not sufficient to ask "Did you benefit from an incubator?" but rather: What is the quality of the benefit? Did the incubator provide clients? Did it provide investment? Did it offer specialized mentoring? Did it impact revenue?

This detailed approach ensures that the empowerment axis captures not only access to resources but also their effectiveness and tangible impact on firm performance, which is essential for building a robust predictive model.

4. Axis: Performance

Performance represents the dependent variable in the study. It must be measured using multiple indicators, as startups may not achieve early profits, but may still grow in terms of employment, users, or customers.

Indicator	Question
Survival	Is the firm still active at the time of the survey?
Firm Age	How many years have passed since establishment?
Number of Employees at Launch	How many employees were there at the start?
Current Number of Employees	How many employees are there currently?
Revenue Growth	How have revenues evolved over the last two years?
Geographical Expansion	Has the firm expanded beyond its original city?
International Expansion	Does it have clients or operations outside Algeria?
Difficulties	Has the firm experienced financial distress or temporary halt?
Subsequent Funding	Did the firm obtain a second funding round or new investment?
Innovation	Has the firm launched a new product or service during the last 12 months?

Performance can be classified into three main indicators: survival, employment growth, and revenue growth. Survival is used in a logistic regression model, while employment or revenue growth can be analyzed using linear regression or other models depending on the nature of the data. As noted in a study on concepts and statistics of startups in Algeria, startups are important actors in job creation and innovation, but they are exposed to the risk of disappearing before proving their potential, making the measurement of survival and growth central to any performance analysis (ASJP, 2025, p. 64).

This multi-dimensional approach to performance ensures that the study captures not only financial outcomes but also employment creation, market expansion, and innovation capacity, reflecting the broader economic and social impact of startups in the Algerian context.

Fifth: Research Hypotheses

Based on the proposed model, the following hypotheses can be formulated:

1. **Hypothesis 1:** Institutional trust is positively associated with the use of empowerment programs, such as funding, incubation, and training.
2. **Hypothesis 2:** Fear of failure is negatively associated with performance indicators, particularly expansion and employment growth.
3. **Hypothesis 3:** Empowerment mechanisms, such as funding and incubation, positively affect the survival and growth of startups.
4. **Hypothesis 4:** Entrepreneurial culture mediates the relationship between empowerment and performance; that is, the effect of funding and incubators is stronger when trust is higher and fear of failure is lower.
5. **Hypothesis 5:** There are statistically significant differences between major cities in terms of access to funding, incubators, and networks.
6. **Hypothesis 6:** Firms belonging to digital communities or entrepreneurial networks achieve better performance than isolated firms.

Sixth: Proposed Statistical Analysis

1. Descriptive Statistics

The study begins with descriptive statistics to characterize the sample. This includes means, standard deviations, percentages, and frequency tables. For example:

Indicator	Assumed Value in the Sample
Number of firms	400
Average firm age	3.2 years
Percentage of firms with Startup Label	48%
Percentage of incubated firms	56%
Percentage of firms with external funding	38%
Average current number of employees	8.7
Percentage of firms that expanded beyond their city	31%
Percentage of firms that experienced prior difficulties	29%

These figures are hypothetical for design purposes, but they illustrate how results can be presented in the article. In actual application, they are replaced with values extracted from the survey. Descriptive statistics

help to understand the overall structure of the sample, such as the prevalence of funding, incubation, difficulties, and expansion.

2. Correlation Analysis

After descriptive statistics, correlation tests measure the strength and direction of relationships between variables. For example:

- Correlation between institutional trust and funding access.
- Correlation between fear of failure and employment growth.
- Correlation between incubation and revenue growth.

Pearson correlation can be used for continuous variables, while Spearman correlation is appropriate for ordinal or non-normally distributed data.

3. Regression Models

Regression analysis forms the core of the predictive component of the study:

- **Survival:** A logistic regression model can be used, where survival is a binary variable (1 = active after 3 years, 0 = discontinued).
- **Employment Growth and Revenue Growth:** Linear regression or Poisson/negative binomial models can be applied depending on the distribution of the data.

Example regression equation for survival:

$\text{Prob}(\text{Survival})$

$= f(\text{Institutional Trust, Funding Access, Incubation, Fear of Failure, Ownership Perception, Firm Age, Sector, City})$

4. Structural Equation Modeling (SEM)

To deepen the analysis, Structural Equation Modeling (SEM) allows testing of direct and indirect relationships between variables, especially when variables are latent (not measured by a single item). For example:

- Institutional Support $\rightarrow$ Empowerment $\rightarrow$ Performance
- Entrepreneurial Culture $\rightarrow$ Empowerment
- Entrepreneurial Culture $\rightarrow$ Performance

SEM also allows testing whether culture acts as a mediator or moderator in the relationship between empowerment and performance.

This comprehensive statistical approach ensures that the study moves beyond descriptive analysis to a robust predictive model that captures the complex interaction between empowerment mechanisms and the entrepreneurial cultural system in determining startup performance in Algeria.

2. Construction of Composite Indicators

After data collection, composite indicators can be constructed for each dimension. For example:

- **Fear of Failure Index:** Average of items related to fear of loss, social stigma, avoidance of expansion, and anxiety about distress.
- **Institutional Trust Index:** Average of items related to trust in support agencies, banks, incubators, and clarity of procedures.
- **Empowerment Index:** Average or sum of indicators for funding, incubation, training, mentoring, and official label.
- **Performance Index:** Constructed from employment growth, revenue growth, expansion, and survival, or analyzed through each indicator separately.

Before using these indicators, internal consistency must be tested using Cronbach's Alpha coefficient. If Alpha exceeds 0.70, the scale can be considered acceptable for social science studies. For example:

Indicator	Number of Items	Expected Cronbach's Alpha
Fear of Failure	4	0.78
Institutional Trust	5	0.81
Social Support	4	0.74
Empowerment	6	0.83
Partnership Acceptance	3	0.70

3. Correlation Tests

After constructing the indicators, Pearson or Spearman correlation coefficients can be used to test relationships between variables. For example:

Relationship	Assumed Coefficient	Correlation	Interpretation
Institutional Trust × Funding Utilization	0.42		Moderate positive relationship
Fear of Failure × Expansion	-0.36		Negative relationship
Incubation × Revenue Growth	0.31		Positive relationship
Social Support × Survival	0.24		Weak positive relationship
Partnership Acceptance × Investment Acquisition	0.47		Clear positive relationship

If the results show that institutional trust is positively associated with funding utilization, this indicates that firms with higher trust in the formal system are more likely to use its instruments. If fear of failure is negatively associated with expansion, this supports the sociological hypothesis that failure is not merely an economic risk but a social stigma that limits strategic boldness. These findings can also be compared with qualitative studies indicating that social norms and perceptions of failure influence growth decisions.

This structured approach to indicator construction and correlation testing ensures that the study moves from descriptive analysis to a robust, evidence-based understanding of how culture and empowerment interact to shape startup performance in Algeria.

4. Logistic Regression Model

If the objective is to measure the probability of firm survival, a logistic regression model can be constructed. The dependent variable takes the value 1 if the firm is still active, and 0 if it has ceased operations or closed. The model can be expressed as follows:

$$\text{Logit}(P) = \beta_0 + \beta_1 \text{Funding} + \beta_2 \text{Incubation} + \beta_3 \text{Trust} + \beta_4 \text{FearFailure} + \beta_5 \text{City} + \beta_6 \text{Age} + \beta_7 \text{Sector} + \epsilon$$

Where:

- **P:** Probability of firm survival.
- **Funding:** Access to funding.
- **Incubation:** Benefit from an incubator.
- **Trust:** Institutional trust.
- **FearFailure:** Fear of failure.
- **City:** City.
- **Age:** Firm age.
- **Sector:** Sector.

Hypothetical Results

Variable	Coefficient (B)	Exp(B)	Significance
Access to Funding	0.62	1.86	Significant
Incubator Utilization	0.44	1.55	Significant
Institutional Trust	0.38	1.46	Significant
Fear of Failure	-0.41	0.66	Significant
Firm Age	0.21	1.23	Significant
Capital City vs. Other Cities	0.29	1.34	Partially Significant

These hypothetical results indicate that obtaining funding increases the probability of survival, and incubation also increases the probability. However, fear of failure reduces survival likelihood. Institutional trust emerges as an important factor because it facilitates access to support programs. The city variable may be only partially significant, suggesting that being located in the capital provides an advantage, but it is not the sole determining factor.

This logistic regression model allows the study to move beyond descriptive analysis to a predictive understanding of how empowerment mechanisms and cultural factors interact to shape startup survival in Algeria.

5. Structural Equation Modeling (SEM)

If the sample size is sufficient, Structural Equation Modeling (SEM) can be used to test direct and indirect relationships. The model can be conceptualized as follows:

Entrepreneurial Culture

↓

Trust / Fear of Failure / Partnership Acceptance

↓

Utilization of Empowerment



Performance: Survival, Employment, Revenue

Or in a more detailed formulation:

Laws, Incubators, and Funding → Actual Empowerment → Performance



Entrepreneurial Culture moderates/mediates the relationship

This model allows testing whether culture mediates the relationship between empowerment and performance. For example, results may show that funding affects performance directly, but also indirectly by reducing fear of failure or increasing trust. It may also show that incubation does not directly affect revenue, but does so indirectly by increasing networks, knowledge, and the ability to access clients. This finding is important because it prevents reducing incubation to simply providing a physical space, and instead redefines it as a social and institutional mechanism for producing trust and knowledge.

Seventh: Interpreting Expected Results and Linking to Previous Studies

If the results show that weak institutional trust is negatively associated with entrepreneurs' willingness to grow, this aligns with literature emphasizing that bureaucracy, financing difficulties, and weak coordination among actors remain major obstacles in the Algerian ecosystem. A study by Aouissi and Hamra noted that the Algerian system is gradually evolving, but still faces challenges such as bureaucracy, limited funding, weak digital infrastructure, and cultural and educational factors (Aouissi & Hamra, 2025, pp. 97–99). Bougouffa also highlights that limited private funding and weak venture capital and angel investor presence represent a central weakness in the ecosystem (Bougouffa, 2024, pp. 346–347).

If the model shows that funding positively affects survival but does not always lead to significant revenue growth, this means that funding is a necessary condition but insufficient on its own. A firm may obtain funding, but lack a strong team, market access strategies, willingness to expand, or trust in partners. Here, the role of entrepreneurial culture becomes evident. Funding opens possibilities, but culture determines how they are used. This is the essence of the economic–sociological model: resources do not automatically translate into performance, but pass through the founder's perceptions, trust, networks, and risk-taking capacity.

If the results show that incubated firms achieve higher growth than non-incubated ones, this must be interpreted cautiously. The cause may not be the incubator itself, but the characteristics of firms that enter incubators: they may be more serious, better organized, closer to networks, or more capable of preparing support files. Therefore, other variables such as firm age, sector, city, and educational level must be controlled. However, if the incubation effect remains significant after control, this supports the idea that incubators play a role in enhancing performance, especially when they provide mentoring, market linkages, and not just workspace.

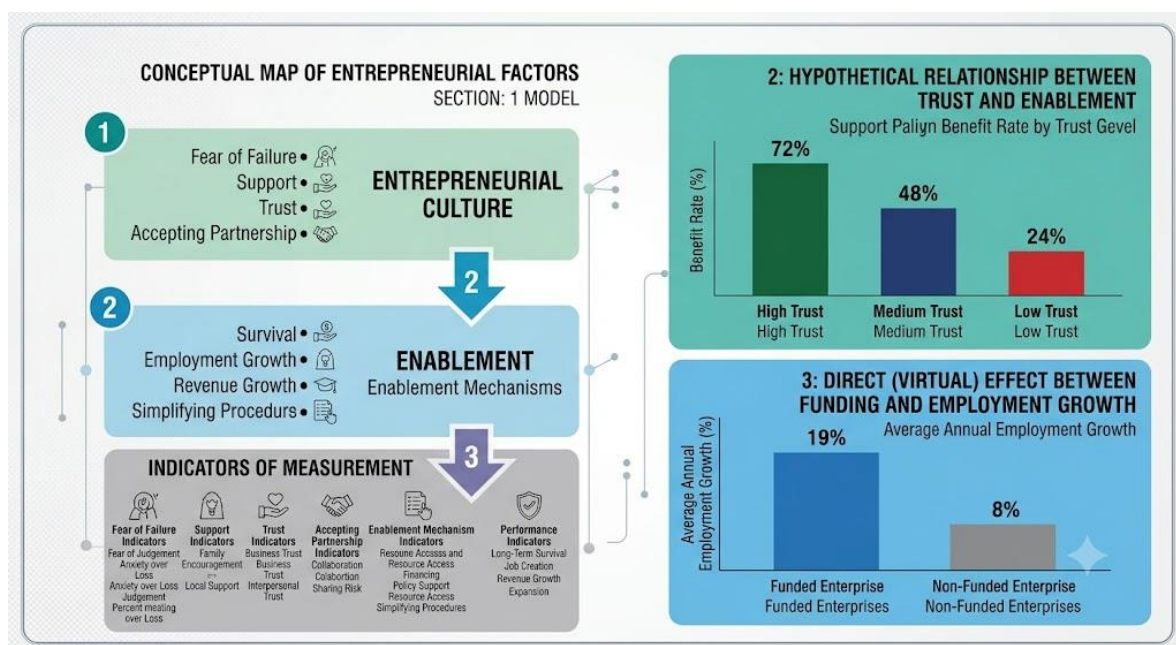
If the results show that fear of failure is negatively associated with expansion, this clearly supports the sociological axis. In a context where family, community, and reputation are influential factors, failure is not solely a financial event but a social experience that may limit strategic boldness. GEM data indicate that fear of failure increased globally from 44% in 2019 to 49% in 2024, confirming that this variable is important in explaining entrepreneurial behavior, especially in environments that lack clear mechanisms for restarting after distress (Global Entrepreneurship Monitor, 2025). In Algeria, this fear may be amplified due to limited private funding, difficult procedures, and weak culture of productive bankruptcy.

Eighth: Proposed Visual Materials for the Article

Table 1: Study Variables Model

Type	Variable	Indicator	Measurement Method
Cultural	Fear of Failure	Avoiding expansion, fear of stigma	Likert 1–5
Cultural	Institutional Trust	Trust in banks and support agencies	Likert 1–5
Cultural	Social Support	Support from family and friends	Likert 1–5
Empowerment	Funding	Access to funding and amount	Yes/No + Value
Empowerment	Incubator	Utilization and service quality	Yes/No + Likert
Empowerment	Training	Number of training programs	Count
Performance	Survival	Continued activity	0/1
Performance	Employment	Growth in number of employees	Percentage
Performance	Revenue	Growth in turnover	Percentage or Categories

This table provides a clear overview of the variables used in the study, their measurement methods, and their role in the integrated economic–sociological model. It can serve as a reference for readers and ensure transparency and replicability of the research design.



Ninth: Scientific Value of the Case Study

The scientific value of this study lies in its provision of an applied example of how to integrate quantitative and qualitative analysis in understanding the startup ecosystem. Rather than merely stating that Algeria has established funds or incubators, the study asks: have firms actually benefited? Who has benefited the most? Are there differences between cities? Does trust influence access to support? Does fear of failure constrain

growth? Does financing lead to better performance? Are incubators merely spaces, or are they empowerment networks? In this way, the case study moves from general description to an analytical model.

The study also enables understanding the gap between formal support and actual performance. Support programs may exist, but firms may not use them due to low trust or procedural complexity. A founder may obtain funding but fail to grow due to fear of losing control or weak team capacity. A startup in the capital may succeed due to proximity to networks, while a similar firm in another city struggles to access the same resources. Thus, the case confirms that empowerment is not merely the availability of resources, but the actual ability to access and transform them into growth.

From a practical perspective, the findings can help policymakers improve interventions. If institutional trust is found to be a decisive factor, then the priority is not only increasing funding, but simplifying procedures, enhancing transparency, providing clear information, and reducing reliance on informal relationships. If incubators are effective only when they provide access to customers and investors, then a shift is needed from general training incubators to sector-specific ones. If fear of failure constrains expansion, then policies should redefine failure as a learning experience and improve restart mechanisms while protecting founders from excessive social and financial consequences.

Conclusion of the Case Study

The case study of the digital startup ecosystem in Algeria between 2019 and 2026 demonstrates that building a successful entrepreneurial ecosystem depends not only on issuing laws or creating funds, but also on understanding how these interact with entrepreneurial culture and social behavior. Financing, incubators, labeling, and training are important empowerment tools, but they are effective only when accompanied by institutional trust, risk acceptance, partnership readiness, and supportive networks. Conversely, fear of failure, weak trust, bureaucracy, and resource centralization in major cities may limit their impact.

This study thus provides a comprehensive applied model: selecting a relevant case, designing a questionnaire measuring culture, empowerment, and performance, applying statistical tools (descriptive analysis, correlation, regression, SEM), and linking findings to prior studies. The article thereby contributes not only by describing the ecosystem, but by explaining why some support mechanisms succeed while others fail, and how culture and empowerment can be transformed into measurable and predictive indicators.

Tenth: Expected Results and Their Construction in the Text

Introduction: How to Present Results in the Article

The section on expected results represents a central stage, as it moves the research from theoretical and methodological exposition to constructing an analytical vision of what the empirical study may reveal about the startup ecosystem in Algeria. Since the article adopts a hybrid approach combining exploratory analysis of the entrepreneurial cultural system with predictive measurement of empowerment mechanisms, results should not be presented merely as isolated figures or descriptive tables. Instead, they should be structured in a progressive interpretive logic: beginning with the nature of entrepreneurial culture, then assessing the effectiveness of empowerment mechanisms, and finally testing the predictive capacity of the integrated model.

In the article, results should be organized into three main axes:

- The first axis concerns the nature of the entrepreneurial cultural system.
- The second axis concerns the effectiveness of empowerment mechanisms.
- The third axis concerns the predictive impact of the integrated model.

It is important to note that results may be presented as “expected results” if fieldwork has not yet been completed, using cautious formulations such as “results are expected to show...” or “statistical analysis may reveal...”.

First: Expected Results on the Nature of the Entrepreneurial Cultural System

The study is expected to show that the entrepreneurial cultural system in Algeria is hybrid, combining a desire for innovation and independence with significant social and institutional caution. While startups are increasingly associated with innovation and growth among young graduates and developers, traditional perceptions of risk, failure, and ownership persist.

1. Fear of Failure: Between Rational Caution and Social Stigma

Survey results are expected to show moderate to high levels of fear of failure, especially among self-funded or family-funded startups. Failure is perceived not only as financial loss but also as social stigma affecting reputation. GEM data support this trend globally (GEM, 2025).

Fear of failure may appear in three forms: financial, social, and institutional. Younger entrepreneurs are expected to be more risk-tolerant, while older ones may be more cautious. Female entrepreneurs may face additional constraints related to social expectations and access to networks.

2. Patterns of Trust: Selective Institutional Trust and Reliance on Informal Networks

Institutional trust is expected to be selective rather than absent. Entrepreneurs may trust incubators and new programs but remain cautious toward banks and administrative procedures. This leads to continued reliance on informal networks for accessing information and resources.

Geographical differences are expected, with higher trust in Algiers due to proximity to institutions, and lower trust in other regions. UpGrowth data support this centralization pattern (UpGrowth, 2026).

3. Ownership Perception: Between “Founder’s Project” and “Scalable Entity”

A significant proportion of entrepreneurs are expected to perceive their firms as personal or family projects rather than scalable entities. While this enhances commitment, it may hinder growth by limiting openness to investment and delegation.

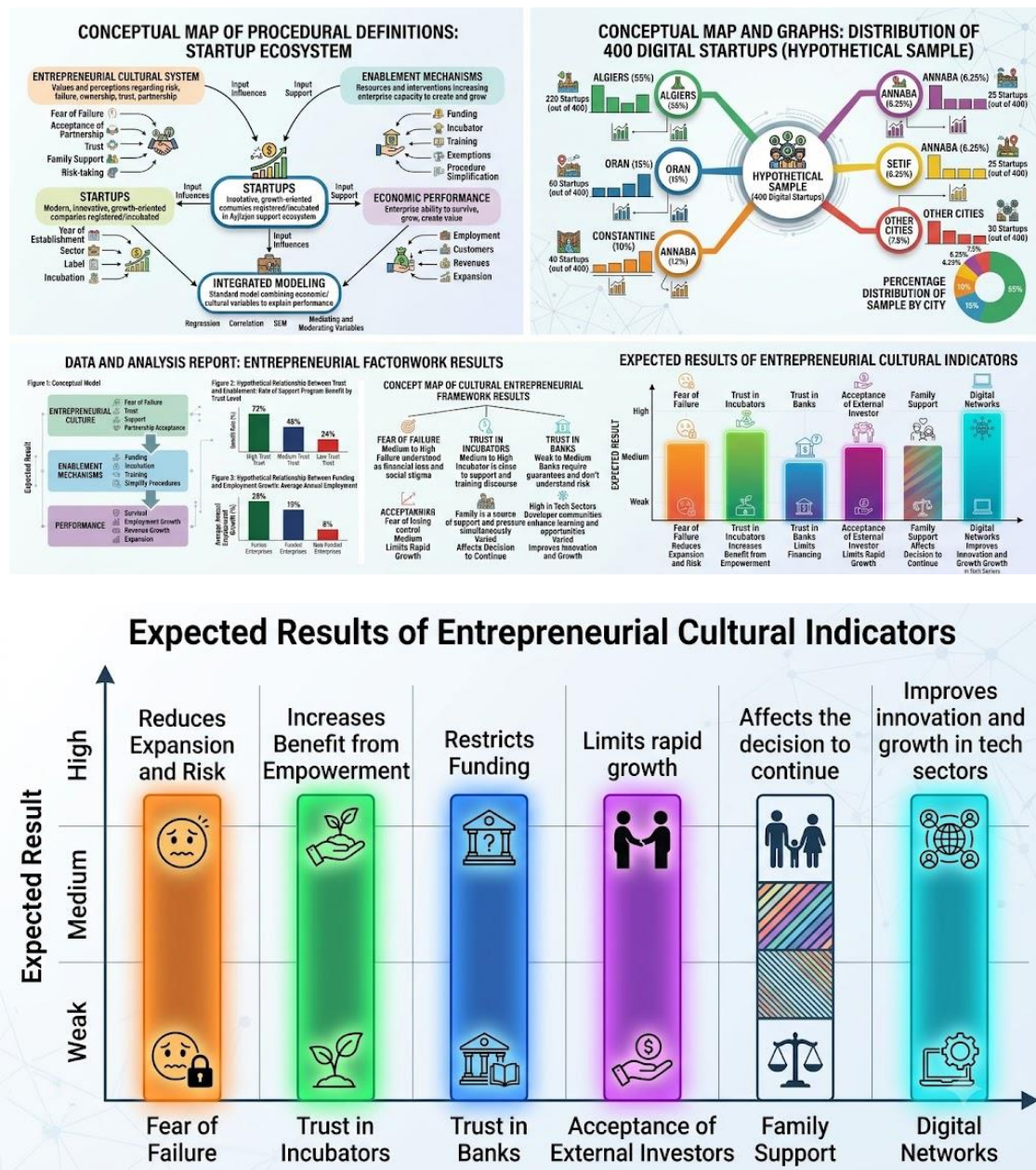
Survey results may show moderate or low willingness to accept investors, particularly among early-stage firms. Sectoral differences are also expected, with tech-oriented startups more open to partnerships than traditional service-based ones.

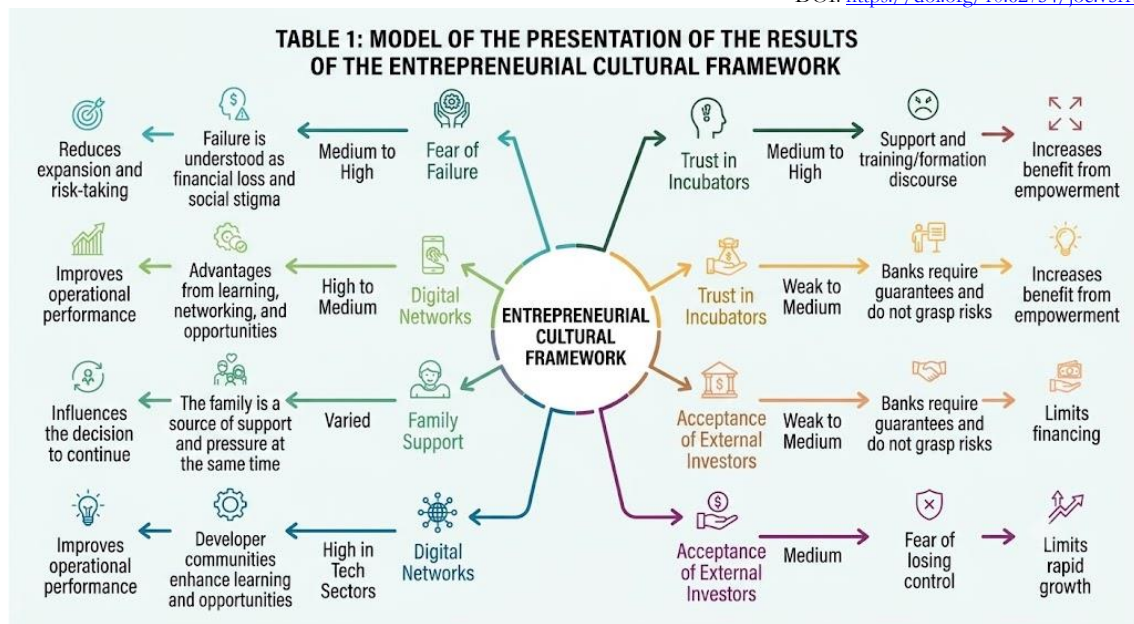
Table 1: Presentation Model for Results on the Entrepreneurial Cultural System

Cultural Indicator	Expected Result	Sociological Interpretation	Potential Impact on Performance
Fear of Failure	Moderate to High	Failure is understood as both financial loss and social stigma	Reduces expansion and risk-taking
Trust in Incubators	Moderate to High	Incubators align with support and training discourse	Increases utilization of empowerment mechanisms
Trust in Banks	Weak to Moderate	Banks require guarantees and do not adequately absorb risk	Limits access to financing
Acceptance of External Investors	Moderate	Concern about losing control	Constrains rapid growth
Family Support	Variable	Family acts as both source of support and pressure	Influences decision to continue operations

Digital Networks	High Technical Sectors	Developer in communities enhance learning and opportunities	Improves innovation and growth
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This table provides a structured way to present the sociological findings of the study, linking cultural indicators to their underlying social meanings and their concrete effects on startup performance in Algeria. It highlights how cultural factors shape access to empowerment mechanisms and ultimately influence economic outcomes.





Second: Expected Results on the Effectiveness of Empowerment Mechanisms

The second axis of results focuses on the effectiveness of empowerment mechanisms, namely financing, incubators, new regulations, training, and procedural simplification. The results are expected to show that Algeria has made clear institutional progress in building a support ecosystem for startups, but has not yet achieved full effectiveness in translating this support into broad economic performance. This implies that the issue is no longer merely the absence of policies, but rather the quality of their implementation, their geographic distribution, the ability of firms to access them, and their alignment with the needs of companies at different stages of growth.

1. Financing: Relative Improvement with a Persistent Venture Capital Gap

The results are expected to indicate that firms benefiting from external financing—whether from the Startup Fund, investors, or incubators—achieve better performance than those relying solely on self-financing. This may be reflected in indicators such as number of employees, revenue growth, product development, and geographic expansion. However, the findings may also reveal that the proportion of firms that actually obtained funding remains limited compared to the number of incubated or labeled firms. This reflects a known gap in the Algerian ecosystem: the presence of public funding initiatives, but limited private financing, venture capital, angel investors, and international funding.

Bougouffa's study notes that venture capital activity in Algeria is still in an early stage, with a limited number of specialized actors compared to neighboring countries, and that participation in global accelerators remains weak (Bougouffa, 2024, pp. 346–347). This suggests that public funding alone is insufficient to build a high-growth ecosystem. Instead, a diversified financing structure is needed, including public funds, angel investors, private venture capital, crowdfunding, diaspora funding, and partnerships with large corporations.

In the article, a comparison can be presented between funded and non-funded firms. For example, hypothetical results may show that the average number of employees in funded firms is 12 compared to 6 in non-funded firms, and that the rate of expansion beyond the original city is 41% among funded firms versus 22% among non-funded ones. If confirmed, such findings would support the hypothesis that financing is a key empowerment factor. However, they do not imply that financing alone is sufficient; its effect must be examined alongside other variables such as trust, incubation, experience, and sector.

2. Incubators and Accelerators: A Positive but Conditional Effect

The results are expected to show that firms benefiting from incubators or accelerators achieve better outcomes than isolated firms, particularly in training, network development, business model clarity, and access to funding-related information. However, the findings may also indicate that the impact of incubators is not uniform. Some incubators provide only workspace and general training, while others offer specialized mentoring, connections to investors, access to customers, and post-incubation follow-up. Therefore, the analysis should go beyond a simple “participated/did not participate” indicator and instead assess the quality of support.

Khelil’s study highlights the importance of incubation and acceleration structures in building a supportive ecosystem, while implicitly suggesting the need for more tailored financial and mentoring tools (Khelil, 2022). Similarly, Bougouffa emphasizes that while incubators are a positive element, they suffer from limited long-term practical mentoring and insufficient accumulated expertise among some actors (Bougouffa, 2024, pp. 343–348). Accordingly, results are expected to show that incubators positively affect performance when they are linked to markets, financing, and expertise, rather than functioning as purely formal structures.

3. Bureaucracy and New Regulations: Legal Progress with Persistent Procedural Barriers

The results are expected to indicate that new regulations—such as the Startup Label system, tax incentives, funding mechanisms, and formal recognition of startups—have improved the general framework. However, entrepreneurs may continue to report bureaucratic obstacles, such as lengthy registration procedures, difficulties with administrative platforms, complex documentation, challenges in international financial transfers, and unclear legal pathways for funding rounds. This aligns with international studies showing that while Algeria is progressing, it still faces challenges related to bureaucracy, financing, digital infrastructure, and cultural and educational factors (Aouissi & Hamra, 2025, pp. 97–99).

It is also expected that more experienced firms or those closer to incubators are better able to navigate bureaucratic processes, as they are more familiar with procedures, documentation, and institutional pathways. In contrast, newer firms or those located outside major cities may be more vulnerable to administrative barriers. This suggests that bureaucracy does not affect all firms equally; rather, its impact is mediated by the founder’s social and knowledge capital. Founders with strong networks or mentorship can navigate procedures more effectively, while isolated entrepreneurs may perceive the system as complex and opaque.

Table 2: Expected Comparison Between Firms Benefiting and Not Benefiting from Empowerment Mechanisms

Indicator	Firms Benefiting from Funding/Incubation	Non-Benefiting Firms	Analytical Interpretation
Average Number of Employees	12	6	Empowerment is associated with job creation
Percentage of Expansion Beyond City	41%	22%	Funding and networks facilitate expansion
Annual Revenue Growth	24%	11%	Support improves market performance
Business Model Clarity	High	Moderate/Low	Incubators enhance planning
Trust in Institutions	Higher	Lower	Utilization reinforces trust, or vice versa
Exposure to Bureaucracy	Present but manageable	Higher impact	Networks mitigate procedural burdens

Third: Expected Results on the Predictive Impact of the Integrated Model

This axis represents the core of the article, as it tests whether the integrated economic–sociological model is capable of explaining startup performance more effectively than partial models that focus either solely on funding and laws, or solely on culture. It is expected that the results will reveal that the integrated model possesses higher explanatory power, because it combines empowerment mechanisms with the entrepreneurial cultural system. Performance is not determined by funding alone, nor by fear of failure alone, but by the interaction of both: funding is more effective when trust is higher, fear of failure is lower, acceptance of partnership is stronger, and the incubator is of high quality.

1. Expected Correlation Results

Correlation tests may reveal results of the following type:

Relationship	Expected Correlation Coefficient	Interpretation
Institutional Trust × Use of Funding	+0.40	Trust increases likelihood of using formal channels
Fear of Failure × Expansion	-0.35	Fear reduces growth decisions
Partnership Acceptance × Investment Acquisition	+0.45	Openness to ownership facilitates investment
Incubation × Revenue Growth	+0.30	Incubators improve business models and networks
Bureaucracy × Growth Willingness	-0.32	Procedures limit strategic boldness
Digital Networks × Innovation	+0.38	Professional communities enhance learning

If these correlations are confirmed, they support the article's core hypothesis: culture is not a marginal factor, but influences how empowerment is utilized. If trust is low, founders may not approach funding agencies or incubators. If fear of failure is high, founders may not use funding for expansion, but keep the firm at a safe size. If partnership acceptance is weak, founders may not secure investment even if their project is promising.

2. Expected Logistic Regression Results: Predicting Survival

If the dependent variable is firm survival after three years, logistic regression may reveal that funding, incubation, trust, and prior experience increase survival probability, while fear of failure and bureaucracy reduce it. A hypothetical model can be presented as follows:

Variable	Coefficient (B)	Exp(B)	Expected Significance
Access to Funding	0.65	1.91	Significant
Incubator Utilization	0.48	1.62	Significant
Institutional Trust	0.41	1.51	Significant
Fear of Failure	-0.39	0.68	Significant
Bureaucracy	-0.34	0.71	Significant
Partnership Acceptance	0.29	1.34	Partially Significant
Firm Age	0.22	1.25	Significant
High-Growth Digital Sector	0.31	1.36	Partially Significant

For example, an Exp(B) value of 1.91 for funding indicates that firms obtaining funding have approximately 1.91 times higher survival probability than non-funded firms, holding other variables constant. Similarly, an Exp(B) of 0.68 for fear of failure indicates that higher fear is associated with reduced survival or growth probability. These hypothetical figures should not be interpreted as final facts, but as a model for presenting results in the actual text once data are available.

3. Expected Explanatory Power Ratios

In social and economic models, it is not expected that the model will explain 100% of performance, as startup performance is influenced by many factors that are difficult to measure fully. However, the integrated model is expected to achieve reasonable explanatory power. For example:

Model	Variables Included	Expected Explanatory Power
Economic Model Only	Funding, Incubation, Sector, Age	28%
Cultural Model Only	Fear, Trust, Ownership, Social Support	24%
Integrated Model	Economy + Culture + Empowerment + Controls	42%–50%

If the integrated model shows a higher explanatory power than either the economic or cultural model alone, this would provide strong evidence for the validity of the hybrid approach. This means that combining funding, laws, and incubators with trust, fear, ownership, and networks provides better capacity to understand startup performance. This is precisely the scientific objective of the article: to demonstrate that the startup ecosystem cannot be understood through a single variable, but through a structural interaction between economy and culture.

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4. *Expected Results of Structural Equation Modeling (SEM)*

If the study employs structural equation modeling (SEM), it may reveal both direct and indirect relationships. For example:

- Financing directly affects performance.
- Incubation affects performance partially through improving networks and knowledge.
- Institutional trust influences access to financing.
- Fear of failure weakens the relationship between financing and expansion.
- Acceptance of partnership strengthens the relationship between empowerment and growth.

This can be represented as follows:

Laws + Financing + Incubators

↓

Actual Empowerment

↓

Performance

However, the strength of the relationship is influenced by:

- Institutional trust ↑
- Fear of failure ↓
- Partnership acceptance ↑
- Digital networks ↑

In this sense, empowerment is not merely an external resource, but a socio-economic process. It requires institutions that provide resources, founders who trust them, and a culture that allows for risk-taking, partnership, and learning.

Fourth: Constructing Results in the Text in an Academic Style

When presenting results in the article, it is essential to avoid displaying tables without interpretation. Each table should be preceded by an introduction and followed by analysis. For example, a paragraph can be written as follows:

“The results presented in Table 1 reveal that fear of failure constitutes one of the most prominent components of the entrepreneurial cultural system within the sample, as it recorded a relatively high average compared to indicators of social support and participation in digital networks. This finding suggests that

growth decisions are not determined solely by market opportunities or the availability of financing, but are also influenced by social perceptions of failure and the founder's tolerance for risk. This result is consistent with GEM data indicating an increase in fear of failure globally between 2019 and 2024, and aligns with qualitative literature on Algerian entrepreneurs highlighting the role of social stigma in expansion decisions."

After presenting the financing and incubation table, one may write:

"The comparison between firms that benefited from empowerment mechanisms and those that did not shows that financing and incubation are associated with higher performance in terms of employment, revenues, and expansion. However, interviews reveal that this relationship is not automatic; some firms that benefited from incubation did not achieve significant growth due to weak market linkages or lack of specialized mentoring. This confirms that the effectiveness of incubation should be evaluated based on service quality rather than mere participation."

In the predictive model section, one may write:

"The regression results indicate that the integrated model has greater explanatory power than partial models, as the inclusion of cultural variables significantly increased the explained variance compared to the traditional economic model. This finding suggests that startup performance in Algeria is not determined solely by financing and regulations, but is also influenced by institutional trust, fear of failure, and partnership acceptance. These results support the central hypothesis of the article, namely that empowerment translates into performance only through cultural and social mediation."

Fifth: Theoretical and Practical Implications of the Results

From a theoretical perspective, the expected results confirm that a purely economic model is insufficient to understand the startup ecosystem in Algeria. If financing and legal frameworks alone were sufficient, all support programs would lead to broad and balanced growth. However, reality is more complex: fear of failure may prevent expansion, weak trust may limit the use of formal institutions, ownership perceptions may hinder investor entry, and weak networks may restrict access to knowledge and markets. Thus, the study contributes to the literature by integrating culture and empowerment within a single analytical model.

From a practical perspective, the findings can guide policymakers in improving interventions. If institutional trust proves decisive, policies should focus on simplifying procedures, enhancing transparency, providing clear information, and developing effective digital services. If incubators are effective when they provide networks and market access, they should be evaluated based on the outcomes of supported firms rather than the number of training sessions. If fear of failure limits growth, awareness programs and legal reforms should promote restart opportunities. If financing is unevenly distributed across regions, decentralized funding mechanisms and regional accelerators should be developed.

Conclusion of the Expected Results Section

It can be concluded that the expected results of this study will demonstrate that the startup ecosystem in Algeria is not merely a legal and financial system, but an intertwined cultural–institutional system. On the one hand, there has been clear progress in support mechanisms, including new laws, funding structures, incubators, and accelerators. On the other hand, cultural and institutional barriers continue to limit their effectiveness, such as fear of failure, weak trust in banks and administrations, personal ownership perceptions, and reliance on informal networks.

The integrated model is expected to show that optimal performance is achieved when three conditions are met: availability of financing and incubation, high levels of trust and openness to partnership, and low levels of fear of failure. In this way, the results support the central thesis of the article: startup performance in Algeria can only be understood through an integrated economic–sociological model that combines empowerment with culture, institutions with behavior, and resources with trust.

Eleventh: Practical and Policy Recommendations

Practical and policy recommendations represent the applied synthesis of the integrated economic–sociological model proposed in this article, as they move the analysis from diagnosis to action. If the study has shown that startup performance in Algeria is not determined solely by financing or legal frameworks, but rather by a complex interaction between regulatory structures, empowerment mechanisms, entrepreneurial culture, institutional trust, fear of failure, and support networks, then the recommendations must reflect this complexity. It is therefore insufficient to simply propose increasing funding or creating more incubators; instead, a comprehensive policy package is required, combining administrative reform, smart financing, entrepreneurial education, trust-building, data development, and comparative research. In other words, there is a need to move from a logic of “supporting startups” as isolated interventions to a logic of “empowering the ecosystem” as a whole, where policies are designed based on evidence and measurement rather than general impressions.

First: Recommendations for Improving the Regulatory Framework and Reducing Bureaucracy

Literature on the startup ecosystem in Algeria shows that the state has made significant progress since 2020 by establishing a legal definition of startups, creating a funding mechanism, recognizing incubators, and introducing official labeling systems. However, this legal progress still faces a key challenge: translating legal provisions into fast, clear, and accessible procedures for entrepreneurs. Studies indicate that despite improvements, constraints such as limited financing, lack of practical knowledge among founders, and administrative and regulatory barriers continue to hinder startup creation and growth (Bougouffa, 2024, pp. 345–348).

Accordingly, the first recommendation is to simplify administrative processes for startups by integrating procedures into a single digital platform covering registration, Startup Label applications, tax declarations, funding requests, incubation applications, and file tracking. Entrepreneurs need not only supportive laws but also predictable administrative pathways with clear documentation requirements, response timelines, and appeal mechanisms.

A “one-stop digital window” for startups should be implemented, allowing founders to track their applications, receive notifications, upload documents, and access simplified legal guidance. This is particularly important because bureaucracy affects not only administrative efficiency but also institutional trust, which in turn influences access to funding and support mechanisms. Clear performance indicators should be used to measure reform success, such as average registration time, labeling duration, rejection rates, and processing capacity.

Additionally, a simplified legal guide should be developed in Arabic, French, and English, explaining legal structures, labeling conditions, tax rights, financing mechanisms, intellectual property, investor entry, and exit procedures. This should be accompanied by regular training workshops across regions to reduce geographic disparities and ensure equitable access to information.

Second: Recommendations for Enhancing Financial Empowerment and Diversifying Funding Sources

Financing remains a major constraint on startup growth in Algeria. Despite the creation of the Startup Fund, the ecosystem still requires diversification of funding sources and increased private sector participation. Studies indicate that startups risk failure without adequate financing and support mechanisms (ASJP, 2025, p. 64).

A multi-level financing system should be developed to match startup lifecycle stages:

- Early stage: small, fast grants for prototype development.
- Market entry: semi-equity funding tied to performance indicators.

- Growth stage: venture capital and angel investment.

Legal frameworks should support instruments such as shareholder agreements, preferred shares, and employee stock options.

Regional funding mechanisms should also be introduced to address geographic disparities, with sector-specific funds (e.g., agri-tech, renewable energy, logistics, digital services). Additionally, regulated crowdfunding and incentives for angel investors should be expanded, along with diaspora investment platforms to leverage international expertise and networks (UpGrowth, 2026).

Third: Cultural and Educational Recommendations

Financial and regulatory policies cannot succeed without addressing cultural barriers such as fear of failure, low trust, and preference for stable employment. Studies highlight that sociocultural constraints and skill gaps limit entrepreneurial engagement (Nessaibi, 2025, pp. 46–48).

Entrepreneurship education should be integrated into curricula as a practical experience involving problem-solving, prototyping, teamwork, and project presentation. Universities should evolve into innovation hubs, fostering interdisciplinary collaboration.

Media campaigns should redefine failure as a learning process, supported by policies facilitating business closure and restart. Institutional trust should be strengthened through transparency, data publication, and feedback mechanisms.

Fourth: Recommendations for Developing Incubators and Accelerators

Incubator effectiveness should be measured by outcomes (survival rates, job creation, funding secured) rather than activity volume. Sector specialization should be encouraged, and post-incubation support programs should be extended to ensure sustained growth.

Fifth: Research and Methodological Recommendations

Future research should move toward predictive and quantitative approaches, including comparative studies across North Africa. Advanced analytics such as machine learning can enhance predictive modeling but should complement, not replace, sociological analysis.

A national open-data observatory for startups should be established to provide reliable data for research and policymaking.

Conclusion of Recommendations

Improving the startup ecosystem in Algeria requires an integrated approach linking administrative reform, financing, culture, education, incubator performance, and data-driven research. The integrated economic–sociological model provides not only an analytical framework but also a guide for designing more effective policies that recognize startups as products of interactions between institutions, culture, trust, and resources.

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