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Presenting a Theoretical Framework Based on the Organic Metaphor in Futures Studies and Entrepreneurship: Introducing "Economic Spencerism" for Understanding Firm Adaptation and Survival in the Future Ecosystem

ABSTRACT

In today's complex, turbulent, and rapidly changing conditions, traditional models of futures studies and strategic management—mostly grounded in static trend forecasting and scenario planning—may no longer adequately address the realities of business ecosystems and economic environments. This review article, drawing on the organic metaphor, offers a novel perspective on futures studies and the analysis of organizational behavior and survival in the ecosystem of the future. The organic metaphor views businesses as living organisms that, in order to survive, are compelled to learn, remain flexible, adapt, and coexist within a competitive ecosystemic context. In this article, based on relevant literature, a theoretical framework entitled Economic Spencerism is proposed for analyzing the dynamics of adaptation and survival of business firms. This framework integrates evolutionary logic; theories of evolutionary economics, the resource-based view, organizational resilience, intellectual capital, and innovation systems. Findings derived from the analysis of data from firms active in the national big data industry indicate that organizational survival in the future ecosystem depends on simultaneous and balanced performance across three levels; weakness or dysfunction at any of these levels significantly increases the probability of elimination. Furthermore, the results confirm that survivorship bias may lead to incomplete understandings of ecosystem dynamics, and thus, attention to data concerning failures and exits is essential for a comprehensive grasp of the mechanisms of natural selection in the economy. Accordingly, only those organizations that consistently strengthen their infrastructures, expand their innovative capacities and cross-sectoral interactions, and simultaneously align with institutional and environmental changes will be able to sustain and flourish in the future ecosystem. Moreover, through the analysis of the concept of survivorship bias, this study emphasizes the necessity of considering the data of eliminated and failed entities. This research demonstrates that in the future environment—conceived as an ecosystem and as an active, living, selective, and ruthless entity—only organizations that continuously enhance their adaptive capabilities, innovation, and cross-sectoral interactions will have the chance to survive.

Keywords: Organic metaphor; Economic Spencerism; Future ecosystem; Futures studies; Firm survival; Firm adaptability; Survivorship bias.

Introduction

The accelerating complexity, turbulence, and uncertainty of today's global business environment increasingly challenge the adequacy of traditional strategic management and forecasting models. In contexts shaped by technological disruptions, environmental constraints, and institutional volatility, firms can no longer rely solely on linear predictions or static approaches to competitive advantage. Instead, the concept of ecosystems—adopted both as metaphor and as analytical framework—

has become central in explaining entrepreneurial dynamics, innovation processes, and organizational survival. The notion of ecosystem captures interdependencies, co-evolution, and adaptation in ways that align with the realities of contemporary business environments [1].

The intellectual foundation for ecosystem thinking is rooted in evolutionary economics. This field, revitalized after Schumpeter's work, highlights processes of variation, selection, and retention as fundamental to economic and technological change [2, 3]. Firms, in this perspective, are adaptive entities embedded in broader socio-technical systems, whose long-term survival depends on their ability to continuously learn, innovate, and reconfigure capabilities [4, 5]. Complementing this economic tradition, sociology introduced the organism metaphor to describe systemic interdependence and adaptation in social systems [6]. Together, these streams of thought laid the groundwork for understanding organizations not as isolated actors but as components of evolving ecosystems.

Entrepreneurship ecosystem research has further advanced these perspectives. As argued by Isenberg [7], entrepreneurial ecosystems represent more than a collection of firms; they are structured configurations of institutions, cultural norms, networks, and resources that collectively shape entrepreneurial behavior. Eisenberg [8] also emphasized that fostering entrepreneurship ecosystems requires a paradigm shift in economic policy, calling for systemic interventions that account for multiple actors and relationships. These insights highlight the necessity of viewing ecosystems as dynamic structures whose health and resilience determine the outcomes for individual firms.

The resilience of organizations has emerged as a particularly critical factor in ecosystem survival. Damoah [9] demonstrated that organizational resilience, combined with entrepreneur resilience, significantly influences the survival of SME exporters operating in turbulent environments. This resonates with findings from Hormiga [10], who stressed that intellectual capital—comprising knowledge, human, and social assets—is decisive for the success of new ventures. Similarly, Waseem [11] established that intellectual capital enhances both innovation capacity and organizational performance, reinforcing the argument that intangible resources are indispensable in uncertain conditions.

Evidence from Iran underscores the centrality of supportive institutional and ecosystemic factors. Abbasian [12] highlighted the importance of institutional support for startup survival, pointing to the role of mentorship, financial resources, and infrastructure in shaping entrepreneurial outcomes. Kermanshahi [13] expanded this line of inquiry by developing a conceptual model of inter-actor interactions within Iran's innovation ecosystem, demonstrating the complex dynamics between government, academia, and industry. Sepidbar [14] examined the relationship between entrepreneurship indices and employment at the provincial level, showing that entrepreneurship not only contributes to firm survival but also to broader socio-economic development. Collectively, these studies emphasize the interplay between institutional design, entrepreneurial activity, and long-term sustainability in emerging economies.

At the global level, sustainability considerations have become increasingly integrated into ecosystem frameworks. Buzzao [15] examined how universities contribute to sustainable entrepreneurship in nature-protected areas, emphasizing their "third mission" as drivers of sustainability transitions. Vinujah [16] explored the impact of entrepreneurial school garden projects on students' environmental attitudes, revealing the importance of early-stage educational interventions in cultivating ecological awareness and entrepreneurial values. These contributions suggest that ecosystems must be understood not only as economic structures but also as socio-cultural and ecological systems oriented toward long-term sustainability.

Industrial policy literature reinforces this view by underlining the role of institutions and policies in shaping innovation and industrial development. Cimoli [17] argued that industrial progress depends heavily on institutional design, while Nill [18] demonstrated how evolutionary approaches can guide sustainable innovation policies through niche development and paradigm transitions. These perspectives are consistent with Nelson and Winter's evolutionary theory of economic change [4], which frames firms as evolving entities, and Dosi's foundational work [5], which introduced evolutionary theories as essential tools for understanding dynamic economic processes.

Complementing these evolutionary approaches, the resource-based view (RBV) provides insights into the micro-foundations of firm survival. Rugman [19] revisited Edith Penrose's contributions to RBV, highlighting the importance of unique firm resources and capabilities for sustaining competitive advantage. This perspective is strengthened by the focus on intellectual capital in recent scholarship [10, 11]. Yet, unlike static resource-based interpretations, evolutionary economics insists that resources must be continually reconfigured to align with changing environmental demands.

Contemporary research has increasingly adopted integrative approaches that combine these streams. Rostami [20] examined drivers of entrepreneurship development in renewable energy, using structural interpretive modeling and foresight approaches to show how interconnected factors such as technology, regulation, and market dynamics shape entrepreneurial opportunities. These findings underscore the systemic and multi-dimensional nature of ecosystems, particularly in industries central to sustainability transitions.

The ecological metaphor continues to provide valuable conceptual grounding in this regard. Levine [6] demonstrated the enduring relevance of the organism metaphor in sociology, while Willis [1] traced the historical evolution of ecosystem thinking, illustrating how shifts in ecological science have influenced its application in the social sciences. Together, these works validate the use of ecological analogies in entrepreneurship and innovation studies, where firms are conceived as adaptive organisms embedded within complex living systems.

These perspectives converge on the view that survival in future ecosystems depends less on static competitive advantages and more on continuous adaptation, resilience, and co-evolution. Policies and strategies that cultivate entrepreneurial ecosystems must therefore embrace systemic logics, integrating insights from evolutionary economics [2, 4, 5], institutional frameworks [17, 18], and strategic resource perspectives [19], while also acknowledging the central role of resilience [9], sustainability [15], and intellectual capital [10, 11].

Building on these foundations, the current study aims to introduce the concept of *Economic Spencerism* as a theoretical framework for understanding firm adaptation and survival in the ecosystems of the future.

Methods and Materials

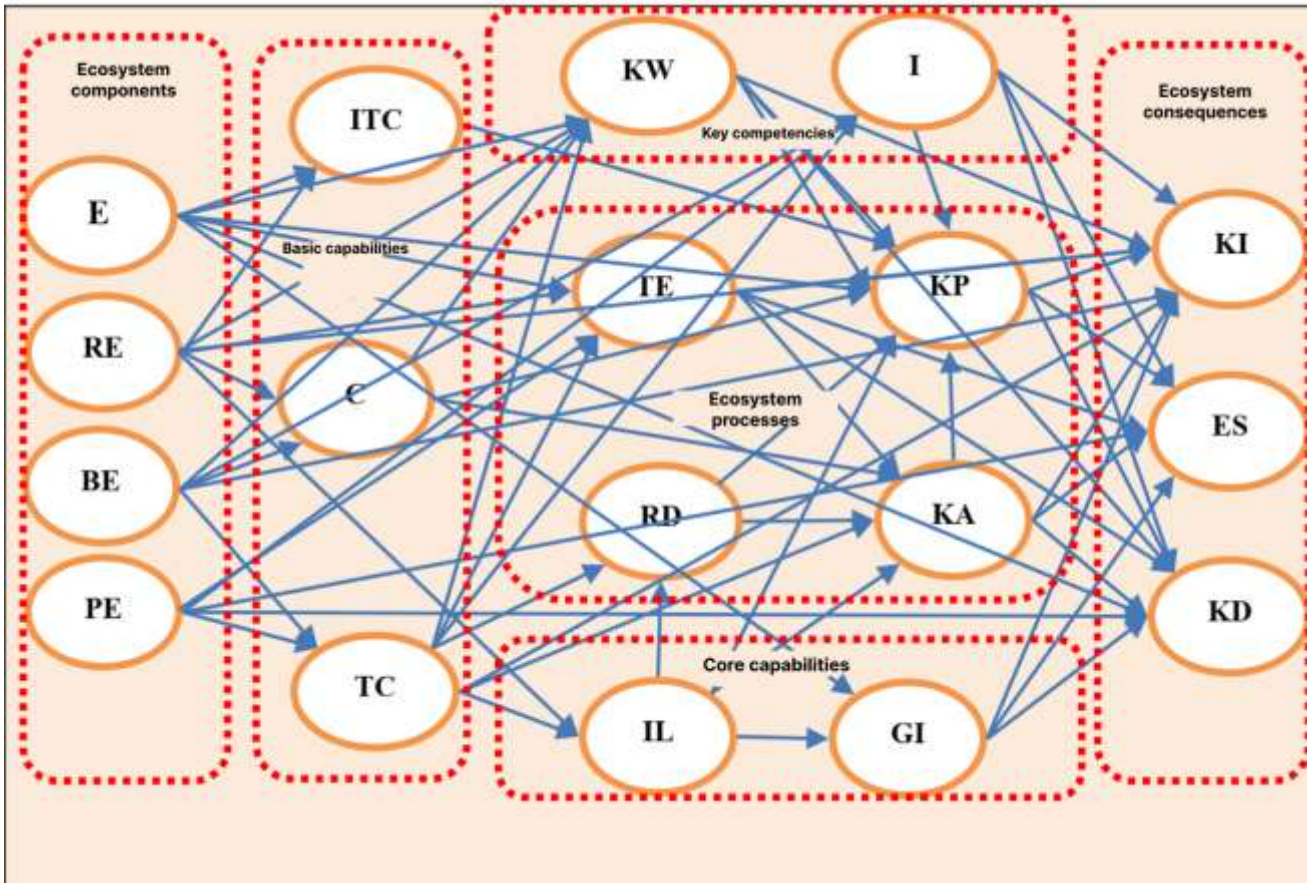
This study, in terms of purpose, has a developmental–theoretical nature and seeks to provide a new conceptual framework for explaining firm adaptation and survival in the future ecosystem based on the organic metaphor. In terms of research approach, the present study is qualitative and inductive; meaning that, through the examination of data obtained from the analysis of scientific texts and expert opinions, key concepts are extracted and a theoretical framework is developed. Regarding research strategy, the qualitative content analysis method and metaphorical reasoning are employed. Accordingly, the Millennium Ecosystem Model was selected as the baseline model for assessing the natural ecosystem and was translated and localized into the big data ecosystem evaluation model through the logic of metaphor. In the next stage, the proposed

framework was validated using semi-structured interviews with experts in big data, futures studies, and entrepreneurship. Experts were selected through purposive sampling, based on criteria such as academic and professional experience.

In terms of data collection timing, the present study is cross-sectional; that is, data collection was conducted during a specific period of time. With respect to data collection method, the first part of the data was obtained through library and documentary studies in order to extract theoretical foundations and research background, while the second part was gathered through in-depth interviews with experts. In terms of data analysis, the interview data were analyzed using thematic analysis with the help of open, axial, and selective coding.

Figure 1.

Conceptual Framework of the Study



ES = Ecological Sustainability, KI = Knowledge Infiltration, KD = Knowledge Diffusion, KW = Innovative Entrepreneurship, GI = Infrastructures, C = Credits, I = Venture Capital, KA = Knowledge Absorption, KP = Knowledge Production, TC = Market Structure, ICT = Information and Communication Technology, IL = Innovation Interactions, RD = Research, TE = Education, PE = Political Environment, BE = Business Environment, RE = Regulatory Environment, E = Public Education.

Findings and Results

Table 1 illustrates the multilayered structure of the proposed ecosystem framework, which is divided into three interdependent layers: the foundational and infrastructural, the knowledge and innovation production, and the environmental and institutional. The foundational layer encompasses ecological sustainability, infrastructure, financial resources, and knowledge flows, functioning as the basic soil and roots that sustain firm growth and adaptation. The knowledge and innovation layer highlights the processes of entrepreneurship, knowledge absorption and production,

innovation interactions, and ICT, which act as the biological and communicative engines driving ecosystem development and renewal. Finally, the environmental and institutional layer includes market structures, political, business, and regulatory environments, and public education, all of which shape the broader boundaries and opportunities for firms to adapt and thrive. The open, axial, and selective coding structure further emphasizes how each component interrelates, from basic inputs to higher-level systemic outcomes, reinforcing the organic metaphor of ecosystems as living, adaptive entities.

Table 1

Ecosystem Layers, Components, Functions, and Coding

Ecosystem Layer	Components (Variables)	Function / Role in Ecosystem	Open Coding	Axial Coding	Selective Coding
Foundational and Infrastructural	ES (Ecological Sustainability)	Providing conditions for continuity of activities and reducing environmental risks	Biological basis	Contextual factor for growth and survival	Foundation for firm development and innovation
	GI (Infrastructures)	Creating physical and digital infrastructure	Infrastructure	Support for firm development	Foundation for firm development and innovation
	C (Credits), I (Venture Capital)	Financial resources for innovation	Financial resources	Contextual factor for growth	Foundation for firm development and innovation
	KI (Knowledge Infiltration), KD (Knowledge Diffusion)	Flow and distribution of knowledge across sectors	Knowledge flows	Knowledge-feeding network	Foundation for firm development and innovation
Knowledge Production and Innovation Exchange	KW (Innovative Entrepreneurship)	Creation of ideas, products, and business models	Innovation	Engine of ecosystem development	Linking foundational resources to innovative outputs
	KA (Knowledge Absorption), KP (Knowledge Production)	Entry and development of new knowledge	Knowledge	Biological innovation process	Linking foundational resources to innovative outputs
	IL (Innovation Interactions)	Collaboration and networking among actors	Interactions	Facilitation of knowledge exchange and cooperation	Engine of sustainable development and innovation
	ICT (Information and Communication Technology)	Facilitating rapid knowledge exchange	Communication arteries	Support for knowledge flows	Engine of sustainable development and innovation
Environmental and Institutional	TC (Market Structure)	Defining boundaries, opportunities, and constraints	Environmental framework	Supportive environmental framework	Stable conditions for survival and growth
	PE (Political Environment), BE (Business Environment), RE (Regulatory Environment)	Setting policies, regulations, and environmental conditions	Institutional framework	Constraints and opportunities	Stable conditions for survival and growth
	E (Public Education)	Enhancing social adaptability and acceptance of innovation	Awareness and education	Strengthening social adaptation	Stable conditions for survival and growth

To interpret the findings, a qualitative matrix of categories was developed based on the Strauss and Corbin grounded theory method. In this matrix, the rows represent the main categories of the ecosystem (the foundational and infrastructural layer, the knowledge production and innovation exchange layer, and the environmental and institutional layer), while the columns represent the extracted selective codes from the data. The symbol "*" indicates the presence or recurrence of each category in the coded statements. Accordingly, the qualitative matrix, in addition to displaying the connection between categories and raw data, provides a clear picture of the process of open, axial, and selective coding, serving as the basis for the formation of the study's final theoretical framework.

Table 2.

Qualitative Data Matrix Table

Selective Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ecological Sustainability (ES)	*			*		*			*			*			*
Infrastructures (GI)		*	*		*		*			*			*		
Credits (C)	*		*			*			*			*			
Venture Capital (I)		*		*		*		*			*				
Knowledge Infiltration (KI)	*				*	*			*				*		
Knowledge Diffusion (KD)		*		*			*			*			*	*	
Innovative Entrepreneurship (KW)	*	*			*	*			*			*			
Knowledge Absorption (KA)			*		*		*			*			*		
Knowledge Production (KP)	*			*		*				*				*	
Innovation Interactions (IL)		*	*			*	*				*				
Information and Communication Technology (ICT)	*			*	*					*	*				
Market Structure (TC)			*			*		*			*			*	
Political Environment (PE)	*	*			*			*				*			
Business Environment (BE)				*			*			*					
Regulatory Environment (RE)	*		*		*			*			*				
Public Education (E)		*		*				*			*			*	

The results of the frequency analysis indicate that certain categories occur more frequently than others. In particular, components such as ecological sustainability, infrastructures, innovative entrepreneurship, and the political environment had the highest repetition among the extracted codes, underscoring their central role in shaping and sustaining the future-oriented ecosystem. Conversely, categories such as knowledge diffusion and the business environment, although recorded with lower frequencies, still function as complementary elements that influence the processes of innovation and firm adaptation. Thus, the distribution of concepts and codes not only confirms the importance of the foundational and institutional layers but also demonstrates that the primary focus of the future ecosystem of foresight and entrepreneurship lies in combining foundational resources, knowledge flows, and stable institutional conditions.

Table 3.

Frequency Distribution of Categories

Category / Component	Frequency (Code Repetitions)	Percentage of Total
Ecological Sustainability (ES)	7	6.8%
Infrastructures (GI)	6	5.8%
Credits (C)	6	5.8%
Venture Capital (I)	5	4.9%
Knowledge Infiltration (KI)	5	4.9%
Knowledge Diffusion (KD)	4	3.9%
Innovative Entrepreneurship (KW)	6	5.8%
Knowledge Absorption (KA)	5	4.9%
Knowledge Production (KP)	5	4.9%
Innovation Interactions (IL)	6	5.8%
Information and Communication Technology (ICT)	5	4.9%
Market Structure (TC)	5	4.9%
Political Environment (PE)	6	5.8%
Business Environment (BE)	4	3.9%
Regulatory Environment (RE)	5	4.9%
Public Education (E)	5	4.9%
Total Codes	102	100%

1 – Foundational and Infrastructural Layer of the Ecosystem

In this layer, components such as ecological sustainability (ES), infrastructures (GI), credits (C), and venture capital (I) act as the foundational elements of the ecosystem. Similar to the roots and fertile soil of a natural ecosystem, these elements

provide the necessary conditions for the growth, adaptation, and survival of firms. Furthermore, knowledge infiltration (KI) and knowledge diffusion (KD), like the flow of nutrients within an ecosystem, enable the transfer and distribution of intellectual resources among different sectors. This initial foundation forms the basis upon which firms develop their capacity for innovation and future-shaping.

2 – Knowledge Production, Exchange, and Innovation Layer

This layer includes variables such as innovative entrepreneurship (KW), knowledge absorption (KA), knowledge production (KP), innovation interactions (IL), and information and communication technology (ICT), which function similarly to biological processes such as photosynthesis or energy exchange in an ecosystem. These interactions among various actors lead to the emergence of new ideas, novel products, and sustainable business models. Information and communication technology in this layer plays the role of communication arteries and learning hubs, facilitating faster and more effective knowledge exchange.

3 – Environmental and Institutional Layer of the Future-Oriented Ecosystem

In this layer, market structure (TC), political environment (PE), business environment (BE), and regulatory environment (RE) resemble the climatic and geographical conditions of an ecosystem, defining the boundaries and opportunities for firm growth. Public education (E), likewise, functions as environmental awareness in nature, enhancing the socio-cultural capacity to embrace innovations. The existence of these environmental and institutional factors enables firms to adapt to changes while discovering new pathways for survival and growth in the future ecosystem, thereby ensuring “adaptation and survival” in accordance with the concept of Economic Spencerism.

In this framework, the future-oriented ecosystem is divided into three key layers, each interacting and interdependent like the vital elements of a natural ecosystem. The foundational and infrastructural layer serves as the basis for all organizational interactions and processes and includes ecological sustainability (ES), physical and digital infrastructures (GI), access to financial resources such as credits and venture capital (C, I), and mechanisms of knowledge infiltration and diffusion (KI, KD). This layer is equivalent to soil, water, and nutrients in nature; without it, no production, innovation, or effective interaction would be possible. The absence of sustainable technological infrastructures, efficient financial systems, or the free flow of knowledge, much like ecosystems deprived of resources, prevents the formation and growth of resilient organizations.

The second layer, knowledge production and innovation exchange, is the lifeblood of the economic ecosystem. This layer encompasses processes such as innovative entrepreneurship (KW), knowledge absorption (KA), knowledge production (KP), innovation interactions (IL), and the utilization of information and communication technologies (ICT). Biologically speaking, this layer can be likened to the process of photosynthesis or the cycle of energy exchange upon which the survival of the entire ecosystem depends. At this level, organizations—similar to species that enhance their diversity and resistance through genetic exchange—develop their innovative and adaptive capacities by combining internal ideas with external knowledge resources. The efficiency of this exchange and the ability to learn from the environment are decisive factors in determining whether organizations endure or are eliminated from the ecosystem of the future.

The third layer, environmental and institutional, provides the macro-level context and regulatory framework of the ecosystem and includes market structure (TC), political conditions and developments (PE), the general business environment (BE), regulatory and legal systems (RE), and public education infrastructures (E). This layer is equivalent to climatic and geographical conditions and seasonal cycles in nature, which directly affect the ability of species to grow and survive. Changes

in laws, political fluctuations, market developments, and cultural trends—similar to temperature variations, rainfall shifts, or predator-prey dynamics—create a dynamic and sometimes ruthless environment in which only those species, or organizations, equipped with structural and behavioral flexibility can endure.

Discussion and Conclusion

The findings of this study demonstrate that the survival and adaptation of firms within the future ecosystem depend on a balanced performance across three interconnected layers: the foundational and infrastructural layer, the knowledge and innovation production layer, and the environmental and institutional layer. Weakness in any of these dimensions significantly increases the risk of organizational elimination, underscoring the importance of systemic resilience and adaptability. Furthermore, the results reveal that survivorship bias distorts the understanding of ecosystem dynamics, as analyses based solely on successful firms neglect the critical lessons that can be drawn from failures and exits. This aligns with the concept of "natural selection" in economic and evolutionary theory, where both success and failure jointly shape the evolutionary trajectory of industries and ecosystems.

One of the central insights of the study is the recognition of firms as adaptive entities that must constantly evolve in response to ecosystemic pressures. This finding is consistent with the evolutionary economics literature, which frames economic change as a process of variation, selection, and retention [4, 5]. The evidence from this study confirms that firms capable of recombining resources and developing adaptive capacities are better positioned to survive in turbulent environments. Such insights echo the broader calls for reviving evolutionary approaches in economics [2], and resonate with Freeman's reappraisal of Schumpeter's *Business Cycles* where cycles of innovation and adaptation are seen as the fundamental drivers of economic transformation [3].

The role of intellectual capital emerged as another vital factor in the findings. Firms that actively leveraged intangible resources—knowledge, networks, and human capital—were more likely to innovate and sustain themselves across challenging contexts. This is consistent with Hormiga's research on new ventures, where intellectual capital was identified as decisive for success [10], and with Waseem's demonstration that intellectual capital boosts both innovation capability and organizational performance [11]. The evidence suggests that intellectual capital does not function in isolation but operates within the broader logic of resource-based theory, which emphasizes unique and difficult-to-imitate resources as foundations for sustained competitive advantage [19].

In addition, the study highlights the infrastructural and institutional preconditions for firm survival. The foundational layer—including ecological sustainability, infrastructure, credits, and venture capital—functions analogously to the roots and soil in natural ecosystems, providing essential resources for growth and resilience. This finding mirrors Abbasian's argument that institutional support mechanisms in Iran's entrepreneurial ecosystem are essential for startup survival [12]. Similarly, Kermanshahi's conceptual model of inter-actor interactions in Iran demonstrates that relationships between state, academia, and industry must provide a robust infrastructure for innovation [13]. The study's results confirm that ecosystems with stronger infrastructural supports foster more adaptive and resilient firms.

The second layer of the framework—the production and exchange of knowledge and innovation—emphasizes processes such as knowledge absorption, knowledge production, and innovation interactions. The study shows that firms embedded in dense knowledge flows are more capable of generating new products and sustainable business models. This is consistent

with Isenberg's notion of entrepreneurship ecosystems, which rely on continuous knowledge flows, cultural supports, and networks [7], and Eisenberg's perspective that policies should focus on cultivating systemic conditions that enable such interactions [8]. These findings also correspond with Vinujah's work showing how engagement in entrepreneurial activities fosters new environmental attitudes [16], and with Buzzao's demonstration that universities contribute to sustainability transitions by embedding entrepreneurship support in knowledge systems [15].

The third layer—the environmental and institutional context—proved equally decisive. Firms must navigate political, regulatory, and market environments that shape their boundaries and opportunities. The findings reveal that adaptability to institutional shifts is as critical as technological or knowledge-based innovation. This is consistent with Cimoli's assertion that institutions and policies profoundly influence industrial development [17] and with Nill's evolutionary approach to sustainable innovation, which highlights the role of supportive policy niches in enabling paradigm shifts [18]. The results also mirror Rostami's findings that drivers of entrepreneurship in renewable energy are multi-dimensional, requiring foresight and systemic coordination [20].

A distinctive contribution of this study is its focus on survivorship bias. The findings confirm that analyzing only surviving firms leads to incomplete and often misleading interpretations of ecosystem dynamics. In line with the logic of evolutionary theory, where extinction is as important as survival, it is essential to consider the role of failure in shaping selection processes [4, 5]. The neglect of failure, or what Damoah terms "survivorship bias," obscures how systemic vulnerabilities and mismatches contribute to firm elimination [9]. By integrating data from both surviving and failed firms, the present research demonstrates a more comprehensive view of ecosystem selection mechanisms, echoing Levine's use of the organism metaphor to capture not only adaptation but also decline and death within systemic processes [6].

The study's results also reinforce the central role of co-evolutionary dynamics. Firms were shown to survive not merely through internal adaptation but through active engagement with cross-sectoral interactions and institutional environments. This reflects the ecological metaphor traced by Willis, who described ecosystems as historically evolving concepts that highlight interdependence and adaptation [1]. By positioning firms as living entities in continuous interaction with their environments, the study extends evolutionary theories of economics and integrates them with ecological metaphors. This confirms Freeman's and Fagerberg's insistence that economic development must be understood as a systemic and evolving process [2, 3].

Moreover, the findings align with broader sustainability-oriented scholarship. The emphasis on ecological sustainability, public education, and environmental awareness in the ecosystem framework confirms that long-term survival requires alignment with social and ecological imperatives. This supports Buzzao's findings on the role of universities in supporting sustainable entrepreneurship [15] and resonates with Vinujah's demonstration that entrepreneurship education can enhance ecological consciousness [16]. These alignments indicate that the future entrepreneurial ecosystem cannot be reduced to economic logics but must also incorporate cultural, social, and ecological dimensions.

Taken together, the study affirms that survival in future ecosystems requires systemic integration of infrastructural resources, knowledge production, and institutional adaptation. This echoes Nelson and Winter's view that economic change is evolutionary and shaped by multiple interacting dimensions [4], as well as Dosi's call for integrative frameworks that capture complex adaptation processes [5]. The evidence from this research suggests that firms able to balance their

performance across all three layers—while avoiding the distortions of survivorship bias—are best positioned to thrive in dynamic and unforgiving environments.

Despite its contributions, this study is not without limitations. First, the research relied on qualitative methods and case evidence from specific industries, which may limit the generalizability of the findings across different sectors and contexts. While qualitative approaches provide rich insights into ecosystem dynamics, they may not capture the full complexity or diversity of entrepreneurial ecosystems at the national or global scale. Second, the study's focus on firms that were accessible during the research period introduces potential survivor bias, as failed or inactive firms may have been underrepresented in the sample. Third, while the framework developed in this study integrates multiple theoretical streams, it remains an interpretive model that requires further empirical testing using quantitative methods. Lastly, contextual factors such as cultural dynamics, informal institutions, and global market shocks were not fully addressed, which may have influenced ecosystem behavior in ways not captured by the study.

Future research should expand the empirical base of ecosystem studies by adopting mixed-methods approaches that combine qualitative depth with quantitative rigor. Longitudinal studies are particularly needed to trace the evolution of firms and ecosystems over time, capturing how adaptation strategies unfold across different phases of growth, crisis, and renewal. Comparative studies across countries and regions would also provide valuable insights into how institutional, cultural, and environmental factors shape ecosystem dynamics. Moreover, future studies could investigate the role of digital transformation, artificial intelligence, and platform economies in reshaping the logics of ecosystem survival. Finally, more attention should be given to the role of failure and exit in ecosystems, exploring how unsuccessful firms contribute to knowledge spillovers, resource reallocation, and systemic learning.

For practitioners, the findings underscore the importance of adopting a systemic approach to firm survival and adaptation. Managers should view their organizations not as isolated entities but as interconnected actors within broader ecosystems, requiring continuous interaction with institutions, infrastructures, and other firms. Firms must invest in building intellectual capital, resilience, and sustainability-oriented practices, while simultaneously engaging with institutional frameworks to ensure alignment with policy and regulatory environments. Policymakers should prioritize creating supportive ecosystems by strengthening infrastructure, enabling innovation, and fostering cross-sectoral collaboration. Educators and universities can play a critical role in embedding sustainability and innovation in entrepreneurial education, preparing the next generation of entrepreneurs for the challenges of future ecosystems. Ultimately, survival in the ecosystems of the future will depend on the ability of firms and institutions to co-evolve, adapt, and sustain systemic resilience.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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