



# An exploratory framework for Entrepreneurship from an evolutionary perspective

## Un marco exploratorio para el emprendimiento desde una perspectiva evolutiva

**Dr. Oscar Javier Montiel-Méndez** is a professor and researcher at the Universidad Autónoma de Ciudad Juárez (México) (oscar.montiel@uacj.mx) (<http://orcid.org/0000-0003-0434-1649>)

**Dra. Argentina Soto-Macié** is a teacher and researcher at the Universidad Anahuac (México) (argentina.soto@anahuac.mx) (<http://orcid.org/0000-0003-2671-1479>)

### Abstract

*Entrepreneurship research is evolving more than ever (Carlsson et al., 2013). As a research stream that is gaining more and more attention, it is imperative to understand it more deeply, given the relevance of entrepreneurship, entrepreneur, and businesses in today's global economy, and under a multidimensional lens. Through an extensive literature review, an exploratory view of its evolutionary perspective was made, from a Darwinian initial point, where the lack of a formal framework was found and therefore a 3-dimensional theoretical model (Entrepreneurship, Entrepreneur and Firm, EEF) is proposed for its study, where the multidimensional context and the involvement that the family generally has, influence the back and forth and iterative relationships that appear between the dimensions, and that is influenced by the evolutionary perspective. The results suggest that there is great interest in the academic field in this evolutionary view, a need to further explore this approach, theoretically and empirically under the relationships the model proposed among the various lines of research in entrepreneurship, family business, economics, and firm theory, population ecology, and strategic choice, as well as in the entrepreneur himself and its entrepreneurial cognition and learning, to develop strategies and public policies that support the organizations and the various stakeholders of the entrepreneurial ecosystem.*

### Resumen

La investigación en emprendimiento está evolucionando más que nunca (Carlsson et al., 2013). Como una línea de investigación que está ganando cada vez más atención, es imperativo entenderla más profundamente, dada la relevancia del emprendimiento, el emprendedor y las empresas en la economía global actual y bajo una lente multidimensional. A través de una extensa revisión de la literatura, se realizó una visión exploratoria de su perspectiva evolutiva, tomando como punto de partida aquella darwiniana, donde se encontró la falta de un marco formal y, por tanto, se propone un modelo teórico tridimensional (Emprendimiento, Emprendedor y Empresa, EEE) para su estudio, donde el contexto multidimensional y la participación que generalmente tiene la familia influyen en las relaciones ida y vuelta e iterativas que aparecen entre las dimensiones y que están influenciadas por la perspectiva evolutiva. Los resultados sugieren que existe un gran interés en la academia en esta visión evolutiva, una necesidad de explorar más este enfoque, teórico y empíricamente bajo las relaciones que el modelo propone entre las diversas líneas de investigación en emprendimiento, empresa familiar, economía y teoría de la empresa, ecología de la población y la elección estratégica, así como en el propio emprendedor y en su cognición y aprendizaje emprendedor; para desarrollar estrategias y políticas públicas que apoyen a las empresas y al ecosistema emprendedor.

### Keywords | palabras clave

*Evolution, entrepreneurship, entrepreneur, firms, strategic choice, population ecology, entrepreneurial ecosystem, context.*  
Evolución, emprendimiento, emprendedor, empresa, elección estratégica, ecología poblacional, ecosistema emprendedor, contexto.

**Suggested citation:** Montiel-Méndez, O.J., and Soto-Macié, A. (2020). An exploratory framework for Entrepreneurship from an evolutionary perspective. *Retos Revista de Ciencias de la Administración y Economía*, 10(20), pp. 343-354. <https://doi.org/10.17163/ret.n20.2020.10>

## 1. Introduction

All start from Imagination, Creativity, Innovation, Entrepreneurship, Tina Seelig's Inventure Cycle. A virtuous circle under which it is proposed is based on the genesis and dynamics of an enterprise (whatever its nature is, not only focused on business).

Once such a social fact begins, how to ensure its evolution (or Devolution) and avoid its failure? Everyone knows the high mortality of small businesses in all contemporary economies. Their importance is more than evidenced throughout multiple studies, as well as the high impact that these companies have on various national indicators, such as employment.

Therefore, investigating and recounting the dynamics that various companies in this sector currently present, remains superlative. The socialization of these experiences that allow these sectors to permeate and be informed, as well as various interest groups such as government and educational institutions present in the so-called entrepreneurial ecosystem (Malecki, 2011; Jackson, 2011) something vital and angular, even when it might be under discussion if this construct exists or is only a biological allegory.

Given our economy, affirming that there are such ecosystems it seems to be quite pretentious. From the moment there is an innovation policy, there is an innovation system? Even if it does not work (Mexico, and in general, in Latin America, it is dysfunctional)? Just as there is a typology for companies (micro, small, medium, as well as large), then perhaps there should be one in ecosystems, and that, if no more emphasis is placed to categorize it, the risk is run to prostitute this concept. Therefore, it would be necessary to place some previous ones and, once it is functional, now call it an ecosystem. Thus, it is proposed to call it an innovation system, and when it is functional to call it an ecosystem, since, being complex dynamic systems, the flows and stocks of capacities are energized. An example of what might well be an evolution of its analysis.

In the current literature on family businesses, the relationship between entrepreneurship and small businesses is a constant concern. It is suggested there is a convergent evolution in them. In evolutionary biology, this is considered to take place when species of different ancestors share similar traits because of a shared environment or other selection pressure. Whales and fish have similar characteristics, both developed methods to move through the same medium: water. In this case, the market.

Thus, ensuring the evolution of these ventures towards strong, established firms is necessary for any public policy related to the subject. It is not possible to continue allowing their failures. Because not only, as mentioned, are those first years where the organization struggles to survive. And what about the evolution (involution?) presented by these and the entrepreneur himself as the years goes by? What happens when the entrepreneur and the organization start the entrance to a comfort zone?

Various factors can create fertile ground for this. The problem of succession, lack of innovation, altruism, the dilemma of the Samaritan, the dark side of family businesses. Without forgetting its multidimensionality, the creation of a theory grounded in contributions from, for example, of social evolution, which can address, the diverse links and effects between entrepreneurship, entrepreneur, and small firms, but also as a preventive of their future mortality. Millions of jobs demand it, as do national economies and society.

There is a constant, almost obsessed need to a quantitative view on entrepreneurship, trying to explain and detect influencing factors on the firms' success, the human capital of the entrepreneur (education, experience, locus of internal control, need for achievement and resilience), financial resources, number of partners, frequency and breadth of external communication, missing the point that all of this variables need to

evolve just because of this simple fact: Markets, organizations, and people, are always changing its patterns. Evolution, an evolutionary perspective that might provide a powerful framework for bringing the three pillars (entrepreneurship, entrepreneur and the firm) back into theory precisely because is the activity of introducing new activities, production methods, and products into an economy, and economic variation is the prerequisite for economic transformation and development, the fundamental historical fact about capitalism is its internal capacity for transformation (Metcalfe, 2006).

## 2. Methodology

An extensive literature search was made throughout multiple databases (e.g. Google Scholar, Scopus, Springer, Proquest, etc.). A systematic review was considered not to be made since this evolutionary approach, as the literature review shows, it is scarce in the Entrepreneurship Field. We use keywords in both Spanish and English “Entrepreneurship”, “Evolution”, “Theory”.

## 3. Literature review

It is fair to acknowledge that voices are calling for a more conservative view. For example, Freeman (1991) warns on the discussion to use biological analogies in the theory of evolutionary economics, whilst recognizing the positive role of such analogies in stimulating a historical approach to economic systems and that selective processes do indeed play an important part in the development of science and technology, nevertheless argues that there are serious dangers in pushing the biological analogy too far. He stated that not only is the social environment much more complex than the natural environment, but the role of purposive intervention is altogether different in the evolution of technology. This position is shared by Aldrich et al., (2008) who recognize that Darwin himself suggested the idea of generalizing the core Darwinian principles to cover the evolution of social entities. But authors additionally emphasize the risk of misunderstanding, misrepresentation, generalization, analogy, or biological reductionism of their principles. However, in evolutionary biology, a few “biologically insane” species like the human species are neither other-limited nor self-limiting. Natural selection for reproductive fitness eventually enables all successful self-limiting species to overcome their self-limiting demostatic characteristics; the most competent do this immediately but the less competent either become extinct through Darwinian scarcity-extinction, persist, or take a little longer to become extinct (Meredith, 1982). The notion of devolution, in the (strict) sense of degradation, with repercussions in terms of cognitive and practical consequences is employed (Wolff et al., 1999; Atran et al., 2004).

Economists and other social scientists, therefore, have no other alternative but to leave the models of the natural sciences, whether mechanical or biological and develop their models appropriate to the systems which they investigate. One such possible approach is the notion of the techno-economic paradigm. But Freeman misses the point that even this paradigm is subject to evolve, since technology, by definition, involves innovation, so philosophically what he proposed contradicts itself.

Based on the literature review, it is proposed to explore the evolutionary perspective from 3 closely interrelated dimensions (entrepreneurship, entrepreneur, and the firm.), a novel view in the literature.

### 3.1.Dimension 1: Entrepreneurship

Veciana (1999) gives an outlook (Figure 1) on the (evolutionary in itself) diverse theoretical approaches to entrepreneurship. There, on the Meso level of analysis, it is the Evolutionary theory. Two elements appear to be missing on this table: Chaos theory (Bygrave and Hofer, 1991) and Complexity theory (Mitchell, 2009) applied in Entrepreneurship (Lichtenstein, 2000), Innovation and Technology research (Berger and Kuckertz, 2016). By definition, the Evolutionary theory should be at every level.

**Table 1. Theoretical approaches to Entrepreneurship**

Approaches Level of analysis	Economic approach	Psychological approach	Socio-cultural approach	Managerial approach
Micro (Individual level)	<ul style="list-style-type: none"> <li>• Función emprendedora como cuarto factor de producción.</li> <li>• Theory of the entrepreneurial profit.</li> </ul>	<ul style="list-style-type: none"> <li>• Traits theory</li> <li>• Psychodynamic theory</li> </ul>	<ul style="list-style-type: none"> <li>• Margination theory</li> <li>• Role theory</li> <li>• Network theory</li> </ul>	<ul style="list-style-type: none"> <li>• Leibenstein's x-efficiency theory.</li> <li>• Behavioral theory of the entrepreneur.</li> <li>• Modes of new enterprise creation.</li> <li>• Modes to become an entrepreneur.</li> </ul>
Meso (Corporate level)	Transaction cost theory		<ul style="list-style-type: none"> <li>• Network theory</li> <li>• Incubator's theory</li> <li>• Evolutionary theory</li> </ul>	<ul style="list-style-type: none"> <li>• Mode of new enterprise success and failure.</li> <li>• Corporate entrepreneurship.</li> </ul>
Macro (Global-country level)	<ul style="list-style-type: none"> <li>• Schumpeter's theory of economic development.</li> </ul>	<ul style="list-style-type: none"> <li>• Kirzner's entrepreneur theory</li> </ul>	<ul style="list-style-type: none"> <li>• Weber's theory of economic development.</li> <li>• Theory of social change</li> <li>• Population ecology theory</li> <li>• Institutional theory</li> </ul>	

Source: Veciana (1995-1999), in Veciana (2007, p. 35).

This evolutionary view is also tacit e.g. when in the entrepreneurial setting, financial intermediaries such as venture capital firms (VCs) select were to invest with, startups that might born global as a must evolutionary process both from an organizational and strategy lens (Madsen and Servais, 1997), or when a firm must apply the sustainability trend of today's economy (Moore and Maring, 2008). The naturalistic approach requires that associated understandings as to how humans react to states of uncertainty be explicitly dealt with.

Entrepreneurship is in constant evolution (Landström, 2020), expanding constantly its domain and edges (Su, 2020; Kantis and Federico, 2020). As entrepreneurship is being seen more and more like a multidimensional construct (Montiel and Rodriguez, 2017), even more, wide views are being explored from multiple angles, e.g. from an evolutionary perspective.

This contrast with the Punctuated Equilibrium Paradigm conceptualizing change as an alternation between long periods when stable infrastructures permit only incremental adaptations, and brief periods of revolutionary upheaval. Gersick (1991) compares models from six domains-adult, group, and organizational development, history of science, biological evolution, and physical science to explicate the punctuated equilibrium paradigm and show its broad applicability for organizational studies, juxtaposed to generate new research questions about a revolutionary change in organizational settings: how it is triggered, how systems function during such periods, and how it concludes. But evolution never ends.

### **3.2. Dimension 2: The Entrepreneur**

Breslin (2008) reviews the evolutionary approach to the study of entrepreneurship at both the population level (population ecology of organizations) and the organizational level (strategic choice).

Breslin states that the strategic choice has developed over the years from a generalized focus on entrepreneurial traits to approaches that focus strongly on process and context, including entrepreneurial cognition and learning. While entrepreneurship research has been focused on the level of the entrepreneur and the start-up, research using an evolutionary approach to develop a firm-level theory of new venture creation has been limited. Therefore, while the evolutionary approach has been used to examine organizations in general at the strategic choice level, future research should focus on applying the approach to examine small business (family business and involvement) adaptation and learning.

Also, Breslin mentions that the evolutionary approach offers more than both the cognition-based and learning-based approaches because it allows for multi-level analyses of the new venture creation process, encompassing both the population ecology (population level) and strategic choice (organizational level) perspective, and the resultant interactions between both hierarchies. By definition, a multidimensional view acts as a synergy (like chaos and complex theories), both from the 3 (and other) approaches, giving valuable insight into the whole evolutionary process.

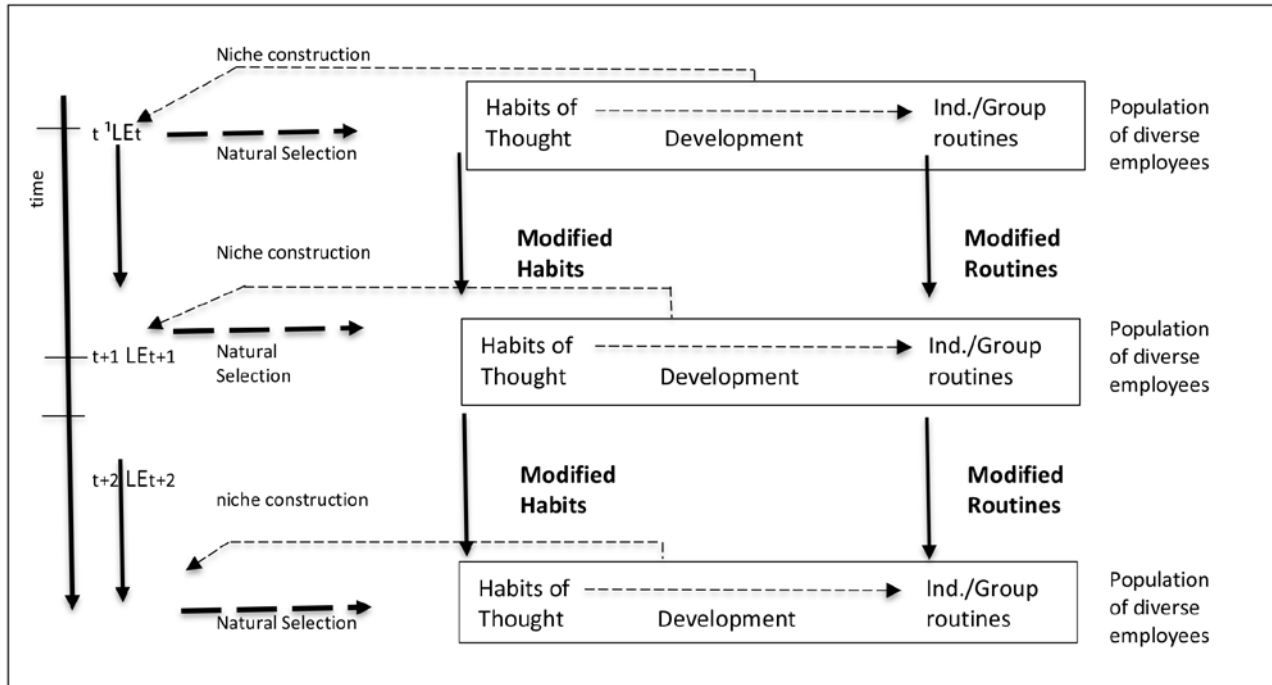
While population ecology and strategic choice offer interesting perspectives on entrepreneurship, there are limitations associated with each. Breslin states that population ecologists are largely silent on the role of individual action, focusing on the selection process under an organization survive in a market, while strategic choice approaches are silent on the role of population evolution.

This process can be applied, e.g., to learning, where Breslin and Jones (2012) present an evolutionary perspective on entrepreneurial learning, accounting for fundamental ecological processes by focusing on the development of key knowledge components within nascent and growing small businesses, and organizational evolution, multi-level co-evolutionary perspectives that capture hidden ecological processes within the idea processes, such as niche-construction (Figure 2), a multi-level struggle for survival, where the managerial capabilities on the top management team must change (evolution) in new ventures, evaluating changing firm needs (high & low growth, strategic diversification), the capability to adapt (team experience, functional diversity), and



the ability to execute change (manager & CEO ownership, board independence, VC involvement, (Boeker & Wiltbank, 2005).

**Figure 1. The process of niche construction**



Source: Breslin and Jones (2012, p. 300), adapted from Jones (2006).

Entrepreneurial competencies (Rasmussen et al., 2011) where they build upon the evolutionary perspective considering the creation and early growth of four university spin-offs within the UK and Norway, identifying three competencies of opportunity refinement, leveraging, and championing that appeared crucial for the ventures to gain credibility, although selected competencies were inherent within the academic founders, the specific competencies for venture creation had to be developed or acquired. Even in failure (Amankwah-Amoah et al., 2018), an entrepreneur must evolve to achieve success in the future (e.g. to learn to be resilient).

A new venture creation that might be the result of the testosterone level (White et al., 2006).

Consistent with evolutionary psychological theory, the biological (testosterone level) effect upon behavior (new venture creation) they found is partially mediated by the psychological (risk propensity).

### 3.3. Dimension 3: Firms

Campbell's seminal contributions, especially for organization theory, was his selection model based upon the analogy between "natural selection in biological evolution and the selective propagation of cultural forms" (Campbell, 1965, p. 26). Campbell used aspects of his selection theory to explain vision (1956a), problem-solving (1956b), creative thought (1960), and socio-cultural evolution (1965, 1979). Then he proposed two antinomies that coexist in organizations: (1) obedience to cultural routines, norms, and habits versus creativity/experimentation and play/make-believe; and (2) altruism versus egoism. From the standpoint of the present paper, both constantly in tension, but also if managed well, can become a competitive advantage.

Entrepreneurial business conceptions have important coordinative and motivating functions in the firm (Witt, 1998). The repeated personal interaction allows for the diffusion of nonverbal tacit knowledge through observational learning and the imitation of role models. A shared business conception provides meaning to the firms' routines, thus facilitating the coordinated transfer and adaptation of routines within the firm. Understanding and identifying with the firm's objectives add to firm member's intrinsic motivation and helps keep opportunistic behavior in check (Witt, 1998).

According to Bergstrom (2002) group selection sustains cooperative behavior. Forces that support this behavior include associative matching in groups, group longevity, and punishment-based group norms. (And most evolve in time so that this business conception remains meaningful for its members, and market competitive).

Being firms worldwide the vast majority family structured, the key to the firm's dimension is what Hodgson (2013) explains from the Darwinian focus, the terms 'evolution' and 'coevolution', widely used in organization studies but often rarely defined an unclear whether they refer to single entities or populations. For example, he states that in the debate over the roles of individual adaptation and competitive selection, the 'selectionist' position of Hannan and Freeman (1989), which emphasizes the role of selection and stress the limits of individual firm adaptability, is often described as 'Darwinian' whereas opposing views that emphasize adaptability are described as 'Lamarckian'. Scholars have shown that the core Darwinian principle, resulting from abstract ontological commonality rather than an analogy, apply to social evolution, to help understand the evolution of organizations.

So the different views have emerged, a naturalistic approach to the Theory of the Firm, where the role of cooperation and cultural evolution has been explored (Cordes et al., 2008), where they postulate that one reason firms exist is because they are suitable organizations within which cooperative production systems based on human social predispositions can evolve, and how an entrepreneur – given these predispositions – can shape human behavior within a firm, since humans lived in tribal scale social systems based on significant amounts of intra- and even intergroup cooperation for centuries, so firms rest upon the social psychology originally evolved for tribal life, but modern organizations have functions rather different from ancient tribes, leading to friction between our social predispositions and organization goals, proposing that firms that manage to reduce this friction will tend to function better.

In this line, Grabher and Stark (1997) examine the innovative character, born of necessity, wherein post-socialist settings actors are restructuring by redefining and recombining resources, not conceiving these recombinations as accidental aberrations, but more of an evolutionary potential, where the actual unit of entrepreneurship is not the isolated individual personality but the social networks (tribal system) that link firms and the actors within them, giving the context where the scarce of capital and government/ecosystem support. Networks that are key to startups, since, from a longitudinal perspective, Schutjens and Stam (2003) describe the evolution of networks during the first three years after start-up and puts forward explanations of the nature of networks of young firms after that period.

Family firms are under constant evolution as a research field (Bird et al., 2002). Zellweger and Sieger (2012), when they apply entrepreneurial orientation (EO) in the context of long-lived family firms, showing that a permanently high level of each of the five EO dimensions is not a necessary condition for long-term success. Rather, they claim that the level of EO is dynamically adapted over time, implying then that this construct must have an evolution, rather than just keep growing.

This evolutionary perspective can be also applied on the evolution on firm-size (and organizations in general, such as universities; Montiel and Rodriguez, 2017), where recent research suggests that firms founded by individuals with pre-founding experience in the same or similar industries (related PFE) tend to survive longer than other *de novo* entrants (Roberts et al., 2011) or when the firm growth and a reflexive point is reached where a decision must be made to keep the founding team or bring in a more experienced one, with a diverse background.

Concerning the evolution of family business, Gersik et al., (1997) propose the Three-Dimensional Development Model. The model considers the evolution independent but interconnected of three subsystems: ownership, family, and enterprise. This consideration is a great contribution to the general theory of systems (Von Bertalanffy, 1940). According to the evolution model, the ownership developmental dimension is composed of three stages: controlling-owner; sibling partnership and, cousin consortium. The family developmental dimension is composed of four stages: young business family; entering the business; working together; and, passing the baton. Finally, the business developmental dimension is composed of three stages: start-up; expansion/formalization; and, maturity. In this model, every family business, according to its characteristics finds a stage of each subsystem. In evolution, the family business will go through known critical periods and challenges.

Breslin (2008) on the entrepreneurial transitions, explore factors influencing founder departure, using entrepreneurship and life cycle theories of the firm, since new ventures may outgrow the managerial capabilities of their founding teams, point where the founders may be replaced by professional managers (a departure also from the structural inertia, organizational change, Hannan and Freeman, 1984). Also, there is a growing interest in apply evolutionary psychology into the family business stream, where Nicholson (2008) propose that will have a unique contribution to that field, outlining the Darwinian framework and its implications to an analysis of kinship dynamics, ownership identity, intergenerational transmission, wildcard inheritance as central to understanding the roots of cooperation and conflict in the family firm.

In this kind of firm, succession is a key obstacle to its viability. From the evolutionary economics approach, Kansikas and Kuhmonen (2008) analyze family business continuity from founder generation to the 2nd generation. Family business succession and evolutionary thinking in organizational and economic change are reviewed and combined to provide insights to understand the nature of family business succession. Operation of the key evolutionary forces—the variation, selection, retention, and struggle—in family business succession are illustrated.

Regarding variation, the authors are a concern for understanding the importance of having enough diversity within the family firm, since this diversity of routines and competencies comprises the pool of variation from which to select when the environment changes. With regards to selection, there is a concern for understanding the risk of selection bias easily rooted in the family firm culture because of family relations, emotions, and values, including decisions on who will succeed and who will own the firm in the future.

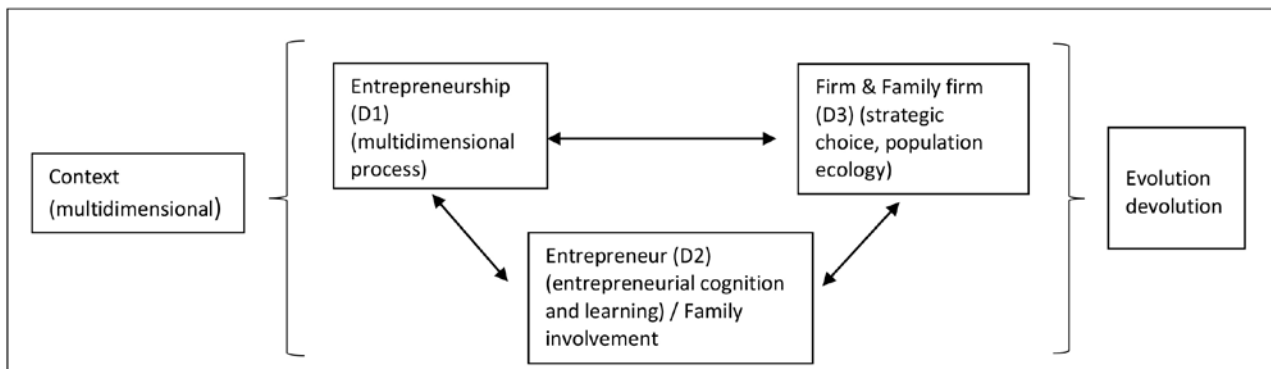
#### 4. Findings: Proposed Model

Figure 3 is the proposed model, which follows Whetten (1989) advice on what constitutes a theoretical contribution. The model includes factors logically considered as part of the explanation of the evolutionary perspective, following the comprehensiveness (i.e., are all relevant factors included?) criteria for judging the extent to which



we have included the “right” factors. Also, it states how are they related (operationally, using “arrows” to connect the “boxes”, explicitly delineating patterns, introduces causality (in the model an iterative and back and forth constant relationship between all its elements). Next, the model, based on the literature review, shows the underlying psychological, economic, or social dynamics (multidimensional context), factors in the social and economic environments that alter and put pressure into the model to evolution/devolution that justify the selection of factors and the proposed causal relationships, its logic.

**Figure 2. An exploratory framework on EEF, from an evolutionary systemic multidimensional perspective**



Source: Own elaboration

This initial model has the purpose to integrate past discussions and findings into a more cohesive view, so a starting point might be made to see how this evolutionary perspective impacts the basic elements of an economic system viewed from the entrepreneurship angle. Following Whetten, the purpose of a theoretical paper should be to alter research practice. Our model incorporates other elements apart from the strategic choice and population ecology ones suggested by Breslin (2008) into this evolutionary perspective, starting with a more systemic view of it by incorporating the multidimensional emphasis on both context and entrepreneurship as a process (and as a theoretically construct), also, adding family involvement into a key factor that influences the evolution of the entrepreneur; family firms, in which there is plenty of literature on how they differ from those non-family firms, and how they are managed differently because of their different context, thus affecting its operation and adaptation (evolution), or even devolution (i.d., when a company refuses to growth, preferring not to take the risks involved with, a choice to keep a small operation instead and not sacrificing personal or family time).

Under the model, a systemic view, more integrated, multidimensional approach, is proposed, to empirically analyze the evolutionary perspective in the elements that constitute it, opening debates on how evolution plays in each element and between them.

## 5. Conclusions and discusión

There are obvious differences between biological and human social evolution in terms of the latter's ideational dimension, reliance on artificial selection, and need to incorporate notions of social power as a force in artificial selection and inheritance, to name only a few. Both biological and human social evolution share an increasing-

ly well-articulated foundation of generalized evolutionism, which is neither purely Darwinian nor purely Lamarckian.

Organizations cannot be in a state of hysteresis. We have offered a brief review of the advances made toward an integrated evolutionary study of entrepreneurship, entrepreneur, and firms, concentrating more on their actions and the outcomes, but not forgetting the evolution that studies on the entrepreneur itself are always growing and making discoveries. In that sense, a better understanding of it can make a huge difference.

An integrated view of the context, process, and outcomes of entrepreneurial activities requires more complex empirical tests. Years ago, testing hypotheses in our field was relatively easy. Entrepreneurial success “depended” on relatively simple and static variables. Complexity was minimized.

Following an evolutionary approach (and the later trend, complexity studies), the next step in entrepreneurial research should be integrative mixed-methods, so a deep and better understanding of this social fact can be achieved. Additionally, integrative mixed methods with areas of evolutionary research, such as with evolutionary anthropology and evolutionary psychology. Because it migrates to business schools, institutes of innovation studies, and elsewhere, it is also needed to adopt a similar perspective.

In the same perspective based on game-theoretic models of gene-culture evolution, the dual-inheritance theory can help to explain the mechanism behind the heritability of behaviors involving knowledge, beliefs, and interactions with other individuals. Despite this entrepreneurial activity, even if heritable, will be highly contingent on environmental forces.

## References

- Aldrich, H., & Martinez, M. (2007). Many are Called, but Few are Chosen: An Evolutionary Perspective for the Study of Entrepreneurship. In Álvaro Cuervo, Domingo Ribeiro, Salvador Roig (Eds.), *Entrepreneurship, Concepts, Theory, and Perspective* (pp. 293-312). Wiley.
- Aldrich, H.E., Hodgson, G.M., Hull, D.L., Knudsen, T., Møkyr, J., & Vanberg, V.J. (2008). In defense of generalized Darwinism. *Journal of Evolutionary Economics*, 18(5), 577-596. <https://doi.org/10.1007/s00191-008-0110-z>
- Amankwah-Amoah, J., Boso, N., & Antwi-Agyei, I. (2018). The Effects of Business Failure Experience on Successive Entrepreneurial Engagements: An Evolutionary Phase Model. *Group & Organization Management*, 43(4), 648-682. <https://doi.org/10.1177/1059601116643447>
- Atran, S., Medin, D., & Ross, N. (2004). Evolution and devolution of knowledge: A tale of two biologies. *Journal of the Royal Anthropological Institute*, 10(2), 395-420. <https://doi.org/10.1111/j.1467-9655.2004.00195.x>
- Berger, E., & Kuckertz, A. (2016). *Complexity in Entrepreneurship, Innovation and Technology Research, Applications of Emergent and Neglected Methods*. Springer.
- Bergstrom, T.C. (2002). Evolution of social behavior: individual and group selection. *Journal of Economic Perspectives*, 16(2), 67-88. <https://doi.org/10.1257/0895330027265>
- Bird, B., Welsch, H., Astrachan, J.H., & Pistrui, D. (2002). Family Business Research: The Evolution of an Academic Field. *Family Business Review*, 15(4), 337-350. <https://doi.org/10.1111/j.1741-6248.2002.00337.x>
- Breslin, D. (2008). A review of the evolutionary approach to the study of entrepreneurship. *International Journal of Management Reviews*, 10(4), 399-423. [doi:10.1111/j.1468-2370.2008.00234.x](https://doi.org/10.1111/j.1468-2370.2008.00234.x)
- Breslin, D., & Jones, C. (2012). The evolution of entrepreneurial learning. *International Journal of Organizational Analysis*, 20(3), 294-308.
- Boeker, W., & Wiltbank, R. (2005). New Venture Evolution and Managerial Capabilities. *Organiza-*

tion Science, 16(2), 123-133. <https://bit.ly/3kth6F3>

- Bygrave, W., & Hofer, C. (1991). Theorizing about Entrepreneurship. *Entrepreneurship, Theory and Practice*, 16(2), 13-22. <https://doi.org/10.1177/104225879201600203>
- Campbell, D.T. (1956a). Perception as Substitute Trial and Error. *Psychological Review*, 63(5), 330-42.
- Campbell, D.T. (1956b). Adaptive Behavior from Random Response. *Behavioral Science*, 1(2), 105-110.
- Campbell, D.T. (1960). Blind Variation and Selective Retention in Creative Thought as in Other Knowledge Processes. *Psychological Review*, 67(6), 380-400.
- Campbell, D.T. (1965). Variation and Selective Retention in Socio-Cultural Evolution. In H.R. Barringer, G.I. Blankstein & R.W. Mack (Eds.), *Social Change in Developing Areas: A Reinterpretation of Evolutionary Theory*. Schenkman.
- Campbell, D.T. (1979). A tribal model of the social system vehicle carrying scientific knowledge. *Knowledge: Creation, Diffusion, Utilization*, 1(1), 181-201.
- Carlsson, B., Braunerhjelm, P., McKelvey, M., Olofsson, C., Persson, L., & Ylinenpa, H. (2013). The evolving domain of entrepreneurship research. *Small Business Economics*, 41, 913-930. <http://doi.org/10.1007/s11187-013-9503-y>
- Cordes, C., Richerson, P.J., McElreath, R., & Strimling, P. (2008). A naturalistic approach to the theory of the firm: the role of cooperation and cultural evolution. *Papers on economics and evolution. Journal of Economic Behavior & Organization*, 68(1), 125-139.
- Freeman C. (1991). Innovation, Changes of Techno-Economic Paradigm and Biological Analogies in Economics. *Revue Économique*, 42(2), 211-232. <https://bit.ly/31EKoYF>
- Grabher, G., & Stark, D. (1997). Organizing Diversity: Evolutionary Theory, Network Analysis and Post socialism, *Regional Studies*, 31(5), 533-544. <http://doi.org/10.1080/00343409750132315>
- Gersick, C.J. (1991). Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium. *The Academy of Management Review*, 16(1), 10-36. <https://bit.ly/2XNyXMY>
- Gersick, K.E., Davis, J.A., McCollum, M., & Lansberg, I. (1997). *Generation to generation: Life cycles of the family business*. Harvard Business Press. <https://doi.org/10.5860/choice.34-4568>
- Hannan, M.T., & Freeman, J. (1984). Structural Inertia and Organizational Change, *American Sociological Review*, 49(2), 149-164.
- Hannan, M.T., & Freeman, J. (1989) *Organizational Ecology*. Harvard University Press.
- Hodgson, G.M. (2013). Understanding Organizational Evolution: Toward a Research Agenda using Generalized Darwinism. *Organization Studies*, 34(7), 973-992. <http://doi.org/10.1177/0170840613485855>
- Jackson, D. J. (2011). *What is an Innovation Ecosystem*, National Science Foundation, Arlington, VA. 1-11. <https://bit.ly/2PKyoz7>
- Kantis, H., & Federico, J. (2020). A dynamic model of entrepreneurial ecosystems evolution. *Journal of Evolutionary Studies in Business*, 5(1), 182-220.
- Kansikas, J., & Kuhmonen, T. (2008). Family Business Succession: Evolutionary Economics Approach. *Journal of Enterprising Culture*, 16(3), 279-298.
- Landström, H. (2020). The Evolution of Entrepreneurship as a Scholarly Field. *Foundations and Trends® in Entrepreneurship*, 16(2), 65-243. <http://doi.org/10.1561/03000000083>
- Lichtenstein, B.B. (2000). Emergence as a process of self-organizing. New assumptions and insights from the study of non-linear dynamic systems. *Journal of Organizational Change Management*, 13(6), 526-544. <https://bit.ly/2YSUaFV>
- Madsen, T.K., & Servais, P. (1997). The Internationalization of Born Globals: an Evolutionary Process? *International Business Review*, 6(6), 561-583. [https://doi.org/10.1016/S0969-5931\(97\)00032-2](https://doi.org/10.1016/S0969-5931(97)00032-2)
- Malecki, E. J. (2011). Connecting local entrepreneurial ecosystems to global innovation networks: Open innovation, double networks and knowledge integration, *International Journal of Entrepreneurship and Innovation Management*, 14(1), 36-59. <http://doi.org/10.1504/ijeim.2011.040821>
- Metcalf, J. S. (2006). *Entrepreneurship: An evolutionary perspective*. In *The Oxford Handbook of Entrepreneurship*. <http://doi.org/10.1093/oxfordhnb/9780199546992.003.0003>

- Meredith, A. (1982). Devolution. *Journal of Theoretical Biology*, 96(1), 49-65. [http://doi.org/10.1016/0022-5193\(81\)90155-2](http://doi.org/10.1016/0022-5193(81)90155-2)
- Mitchell, M. (2009). *Complexity: A Guided Tour*. Oxford University Press.
- Montiel, O., & Rodríguez, C. (2017a). *Emprendimiento Hoy. Multidimensionalidad, Cambio E Innovación*. Universidad Autónoma de Ciudad Juárez.
- Montiel, O., & Rodríguez, C. (2017b). Would I do it again? Revisiting the implementation of the entrepreneurship paradigm in a University in Mexico. *Retos, Revista de Ciencias de la Administración y Economía*, 7(14), 147-165. <https://doi.org/10.17163/ret.n14.2017.08>
- Moore, B.S., & Manring, S.L. (2009). Strategy development in small and medium-sized enterprises for sustainability and increased value creation, *Journal of Cleaner Production*, 17(2), 276-282. <http://doi.org/10.1016/j.jclepro.2008.06.004>
- Nicholson, N. (2008). Evolutionary Psychology and Family Business: A New Synthesis for Theory, Research, and Practice. *Family Business Review*, 21(1), 103-118. <http://doi.org/10.1111/j.1741-6248.2007.00111.x>
- Rasmussen, E., Mosey, S., & Wright, M. (2011). The Evolution of Entrepreneurial Competencies: A Longitudinal Study of University Spin-Off Venture Emergence. *Journal of Management Studies*, 48(6), 1314-1345. <http://doi.org/10.1111/j.1467-6486.2010.00995.x>
- Roberts, P.W., Klepper, S., & Hayward, S. (2011). Founder backgrounds and the evolution of firm size. *Industrial and Corporate Change*, 20(6), 1515-1538. Oxford University Press.
- Schutjens, V., & Stam, E. (2003). The Evolution and Nature of Young Firm Networks: a Longitudinal Perspective, *Small Business Economics*, 21(2), 115-134.
- Su, Z. (2020). The co-evolution of institutions and entrepreneurship. *Asia Pacific Journal of Management*. <http://doi.org/10.1007/s10490-019-09703-y>
- Veciana, J.M. (2007). Entrepreneurship as a Scientific Research Programme. In Álvaro Cuervo, Domingo Ribeiro, Salvador Roig (Eds.), *Entrepreneurship, Concepts, Theory and Perspective* (pp. 23-72). Wiley.
- Von Bertalanffy, L. (1940). Der Organismus als physikalisches System betrachtet. *Naturwissenschaften*, 28(33), 521-531. <http://doi.org/10.1007/bf01497764>
- Whetten, D.A. (1989). What Constitutes A Theoretical Contribution? *Academy of Management Review*, 14(4), 490-495. <http://doi.org/10.2307/258554>
- White, R.E, Thornhill, S., & Hampson, E. (2006). Entrepreneurs and evolutionary biology: The relationship between testosterone and new venture creation, *Organizational Behavior and Human Decision Processes*, 100(1), 21-34. <http://doi.org/10.1016/j.obhdp.2005.11.001>.
- Witt, U. (1998). Imagination and leadership. the neglected dimension of an evolutionary theory of the firm, *Journal of Economic Behavior and Organization*, 35(2), 161-177. [http://doi.org/10.1016/s0167-2681\(98\)00058-4](http://doi.org/10.1016/s0167-2681(98)00058-4)
- Wolff, P., Medin, D.L., & Pankratz, C. (1999). Evolution and devolution of folkbiological knowledge. *Cognition*, 73(2), 177-204. [http://doi.org/10.1016/S0010-0277\(99\)00051-7](http://doi.org/10.1016/S0010-0277(99)00051-7)
- Zellweger, T., & Sieger, P. (2012). Entrepreneurial orientation in long-lived family firms. *Small Business Economics*, 38(1), 67-84. <http://doi.org/10.1007/s11187-010-9267-6>