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Algerian Start-up Ecosystem and Innovation Performance: "The Mediating Role of Value Co-creation"

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Abstract

This study tries to shed light on the ecosystem-building mechanisms that positively enhance innovation performance within an Algerian context, relying on the statistical analysis employed by the reliable data carefully extracted from a questionnaire.

Previous studies typically discuss the considerable importance of knowledge acquisition from outside firms boundaries, especially in today's rapidly changing environment and the wide spread use of IT tools by both people and firms that helps to create business ecosystems and help established and startups innovate and expand their markets.

The importance of ecosystems for successful start-ups innovative performance is also widely studied among modern scholars. In this study results indicate a positive and significant impact of ecosystem building on innovation performance, with a mediating effect from value co-creation.

Keywords: Ecosystem, Value co-creation, Innovation Performance, Start-ups.

JEL Classification Codes: L96, O31

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Introduction

Resource-based theory suggests that a firm's long-term competitive advantage stems from its ability to develop, utilize, and renew core resources. The firm also needs to continue developing its technological capabilities to maintain its competitive position. This is possible if it uses its high returns to innovate and fuel research and development.

Typically, strategy lead firms to secure positions in the face of competitive forces, which implied the importance of building barriers to competition. However, more recently, firms and even entire industries, such as the software industry, are experimenting with new models based on harnessing collective creativity. For many firms, one way to deal with an environment characterized by high competitive pressure - especially in high-technology products - is to cooperate with other parties in developing and introducing new products.

Recently firms are increasingly integrating strategic alliances into the core of their strategies. The increasing adoption of strategic alliances in technology has led to the creation of complex networks. In which firms and organizations cooperate to produce new products and technologies, innovation networks are of great importance, especially in sectors with rapid technological changes and a short product life cycle.

An innovative firm should not only rely heavily on research and development to develop and protect its intellectual property, but it must also generate and implement the complementary organizational and administrative innovations necessary to achieve and maintain their competitive advantage. Recent developments in information and communications technology and the global use of social media platforms have increased the need for firms to develop products and services and build business models that integrate diverse technologies and expand to include several industries. The steady growth of research and development costs and the widespread use of information and communications technology over the past decades have also contributed to confirming the ecosystem theory.

Business ecosystem theory contributes to providing a general structure for value creation, value shares and the search for new ideas in a collective cooperation environment. It also emphasizes the importance of cooperation, competition and co-evolution in the system. The goal is innovation; the ecosystem contributes to synergy through collaboration

in an open network environment and offers a new theoretical framework for innovation.

The use of mobile applications has affected a wide sector of industries and services. For example, Uber the multinational corporation based in the United States, has developed markets that work on an application on mobile phones that allows smartphone users to request a car for transportation, and drivers also use the application. The firm is active in more than 60 countries in the world, in Algeria there are similar applications such as the YASSIR and WESSELNI application for requesting taxis. In addition to other e-commerce applications in Algeria such as Jumia Algeria branch, Zawwali and others.

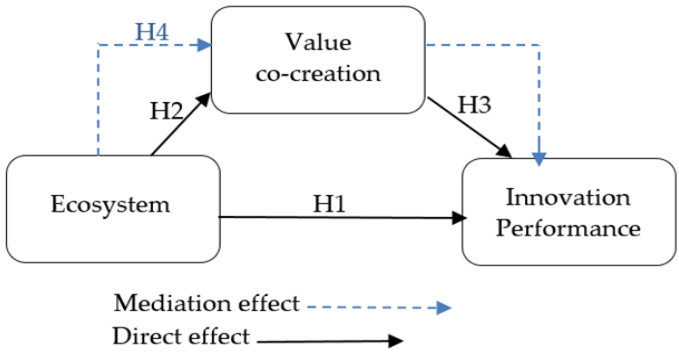
Based on the above, two research questions are addressed:

1) **Does building an ecosystem positively influence the innovation performance of the Algerian start-ups studied?**
2) **Does value co-creation play a significant role in that relationship**?

This paper attempts to shed light on the concepts of building business ecosystems and their importance in improving innovation performance. The focus was on a sample of Algerian start-ups that are working on developing applications used in services and electronic commerce on smart phones. We relied on the questionnaire list shown in the appendices, and statistical analysis was conducted using SPSS V26 software.

Based on the discussion presented, the following figure depicts the study model:

Figure N°01: Conceptual structure of the study



Firstly. Exploring Business Ecosystem and Value co-creation

Recently, firms are increasingly seeking knowledge from outside their boundaries; hence, ecosystem and value co-creation are relevant topics in management and innovation literature alike.

1. Business ecosystem and innovation

Moore coined the term business ecosystem, which spreads across a variety of industries, through which firms work together to combine their capabilities to develop products or services, and they make alliances or remain in competition to respond to customer needs and develop innovations (Moore, 1993). An ecosystem has been defined as a complex network of firms and organizations that cooperate and compete, thus creating mutually interactive and synergistic relationships (Choi et al., 2019), a firm ecosystem refers to the community of organizations, entities, and individuals that influence the firm and its customers and suppliers.

Literature distinguishes between multiple types of ecosystems related to innovation and business. For example, there are ecosystems specific to a particular industry, cross-sector ecosystems, knowledge ecosystems, regional clusters, and other forms. Networks specific to one industry or one region can be considered clusters. Each form has different ways, methods, and stages of development.

In order to obtain revenues from innovation, many firms seek to remain a leader in technology for their industry, and that could be by being the first to introduce innovations to the market. However, the realization of an effective innovation by a firm is usually determined by other innovators in its environment, and the economic success of a particular innovation typically requires accompanying changes in the environment of firms; these external changes require innovation from other actors and embed the company in an ecosystem of interconnected innovations (Adner and Kapoor, 2010). Many factors make firms engage in an innovation ecosystem, like their market needs, strategic intents, and goals, in addition to their maturity. Overall, being a member of or otherwise orchestrating an ecosystem is helpful and beneficial for the firm and all parties involved. Ecosystems comprise many parties that support and cooperate with each other, thus developing all the systems (Fasnacht, 2018).

The deterioration of Nokia's share in the smartphone market after its renewed strategy in 2011 is considered a rare event in business history. The collapse of one of the industry leaders in terms of market share and

profitability within a few years. At almost the same time, the dominance of new entrants to smartphone market the android from Google and Apple was confirmed. The explanation for this dramatic change in market structure is related to the business ecosystem.

Success factors of competing business ecosystems owned by Google and Apple contributed to a series of events that led to changing the structure of the smartphone industry. However, it is difficult to determine these success factors, and management literature does not provide a comprehensive and accurate description of this field of research. What has been clearly confirmed is that success in ecosystems is linked to building platforms (Van Alstyne et al., 2016, Winter et al., 2018).

An innovation ecosystem can be defined as shared arrangements that typically allow firms to synthesize their individual offerings into an articulate framework presented to markets. Thanks to IT tools and platforms that have intensely reduced organization costs, innovation ecosystems have become an essential element of the growth strategy of firms in a vast range of industries (Adner, 2006). Ecosystem theory shows that the firm's belonging to a good ecosystem by using appropriate strategies is among the basic success factors, and managing the external network is one of the new roles of the central firm.

The network or ecosystem, is usually managed by one firm, or in some cases, two firms, when companies develop a radical innovation. These central firms or industry shapers generate cross-border activities for two fundamental goals: in the first place, they design the entire process, starting from the idea or business model and how to create, deliver, and capture value; and secondly, they must ensure they have influence on the resource allocation decisions of other companies in the network (Chesbrough et al., 2006)

The making of strategy in an innovation ecosystem must be done in an iterative manner because there are so many factors and parties involved. When a firm develops a vision for a product or service in a particular market and the offering, expectations are set for successful performance. The risks of implementing the plan to achieve that product or service are assessed and identified, which are interdependence risks (with complementary innovators), initiative risks (core project management), and integration risks (Adner, 2006)

Bogers et al. considers that ecosystem strategies and the ability to manage or own complementary innovation resources are more important

to competitive advantage than other classical strategic considerations. For example, Toyota formed the e-Palette Alliance, which is a software and hardware support ecosystem to develop a prototype self-drive vehicle designed for multiple purposes at the same time (e.g., logistics, delivery, and travel). This alliance included five organizations: Uber, Amazon, DiDi, Mazda, Pizza Hut, and Toyota use an open platform to deliver their services by plug-and-play (Bogers et al., 2019)

To build their innovation Ecosystem firms work to formulate or develop a complex external network "aimed at creating products or services." They are obliged to manage the network by creating cross-border activities and laying down effective plans for selecting partners. These firms have to share their capabilities, systems, or information with partners. New technologies have to be introduced to increase the capacity of the network infrastructure. The central firm provides support mechanisms for new products or services to encourage the innovations of other parties, and it relies on a central management system to control value creation. Finally, a network-wide value-sharing scheme has been developed for all parties involved (Paulus et al., 2016)

Based on the above we hypothesize:

H1) Ecosystem has a positive and significant influence on the innovation performance of Algerian startups.

2. Value creation in ecosystem

Ecosystems help firms to create value that no single one of them can achieve alone. Small enterprises can achieve success by building a business ecosystem that allows knowledge sharing, encourages the development of individuals, and establishes trust among participants (Chesbrough et al., 2014), this new concept contributes to adopting a new way of looking at the structure and interaction between firms. The analysis shifts from the product level to the system level and helps in visualizing and understanding the phenomenon as a whole.

The digital economy has shifted value creation methods and tools as it makes firms able to lead new forms of value creation mechanisms as they are networked, meaning that value is created by one firm, a large number of partners and numerous customers. The value network represents the context in which a firm creates a product or service, solves problems, purchases inputs, interacts with competitors and seeks profit.

The value network or the value that spans corporate and industry boundaries can be illustrated by the common example of the iPhone smartphone, where Apple plays the role of the focal organization and offers its partners a platform for creating value (iPad, iPod, or iPhone) in addition to a marketplace (iTunes) for allocating value. This platform has created hundreds of startups looking for the development and marketing of applications to consumers around the world. Apple platform startups help to develop a plethora of innovative applications, resulting in global access to the functionality of new Apple products; these innovations enable Apple to develop and shape its ecosystem (Zahra and Nambisan, 2011). Regarding value creation in ecosystems, a group of management literature discusses the concept of a value set, or "value constellation." This term was used for the first time in 1993 to describe renewable value creation from multiple parties, such as suppliers, partners, customers, and alliances. This constellation of organizations is organized to create value in new forms (Normann and Ramirez, 1993). One or central organization creates the value constellation through merging and acquisitions, technology licensing, alliances, joint investments, contracting and other types of relationships.

The secret of value creation lies in building the best possible adjustment between the organization's relationships with the various actors and the knowledge it possesses. Value creation is not limited to adding value in sequential steps, but rather extends to reinventing value by reshaping the roles and relationships between actors in the value creation system. A constellation's competitive advantage extends beyond the resources of its participants and includes how the constellation is gathered, organized, and managed (Chesbrough et al., 2006)

Fasnacht proposed the term dynamic value constellation as a mediator of value through a constellation of parties involved in an ecosystem in which they interact, coordinate, and collaborate with each other. Therefore, organizations in ecosystems should not focus only on adding value to their branches but must also reinvent, distribute, or spread value. If an organization interacts within an ecosystem, all included firms should co-create value (Fasnacht, 2018)

Based on the above we hypothesize:

H2) Ecosystem has a positive and significant influence on value co-creation of Algerian startups.

3. Value co-creation and innovation

The concept of value co-creation should be addressed as a prelude to understanding the innovation practices applied recently (Prahalad and Krishnan, 2008). Value is created when entities jointly seek to improve or enhance each other's capabilities and put them in situations and environments that are beneficial to all parties. These entities are collections of resources, including individuals, technologies, firms, and information.

Value creation will be shared between the firm and their customers as good communications that make customers able to create a decent experience with the firm are a new source of competitive advantage, eBay has taken advanced phases in this field, allowing its main customers, those who are experienced buyers and sellers, to participate in the creation of their systems. The firm has created a model experience platform that is easy to use and in which the business processes are transparent because users helped create these processes. Every three months, eBay conducts an equivalent to 175 changes, most of which are derived from user suggestions. The quality of the business processes and underlying infrastructure (social and technical) is critical to the success of eBay (Prahalad and Krishnan, 2008)

The concept of co-creating value with customers or consumers has been discussed intensely recently, as organizations more and more realize that IT tools and social media technologies make consumers more linked, up-to-date, and active in terms of product and service information. Hence, they are an important source of efficiency that must be leveraged to add value to their products and services. Even though many large companies have a good reputation for mobilizing large crowds in their value creation systems, few of them turn crowdsourcing missions into successful platforms with strong applications. Literature has focused on examining ways that enable firms to co-create value with external parties, basically by using advanced web tools like social media platforms and technologies to acquire, develop, and create knowledge and useful outcomes (Abbate et al., 2019, Zhang et al., 2020)

Consumers or users are now contributing to the process of value creation in industry through inspection, examination, and assessment of their communication and dialogue with each other. That helps to provide an alternative perspective and source of information; they do not rely entirely on advertisements and communications with the organization and can choose the organization they want to deal with based on their own perspective (Prahalad and Ramaswamy, 2004)

Value co-creation is the joint creation and development of value with stakeholding parties and is approved and implemented through deals on platforms. These platforms are provided virtually from ecosystems of capabilities, updated and inserted in multiple areas of knowledge and increase of wealth and well-being (Ramaswamy and Ozcan, 2014)

Recently, innovation literature has tended to include variables from the external environment such as users, manufacturers, and suppliers. E.g Chesbrough's model of open innovation that highlights the firm's strategy and structural features when innovation becomes a more distributed activity across a wide range of different actors. Where the innovation process is shared and achieved by creating links between firms, collaboration becomes necessary and vital to help discover and leverage individuals, innovative ideas, communities, and other collaborative resources (Chesbrough, 2007)

Liu et al. propose to synthesize open innovation and crowdsourcing through the term crowd-source based open innovation; It is a process by which the firm organizes users to participate in open innovation tasks through the use of external sources on Web 2.0 platforms to achieve joint value creation (Liu et al., 2018). Web 2.0 technology represents a vision or proposal for the second generation of Internet services such as social media platforms, Wikis, etc., and various other communication applications.

Based on online cooperation and sharing between users and the creation of interfaces that allow reading, writing, and interaction, which leads to the creation of value through the participation of a very large number of users, Web 2.0 technology allows the creation of a network of the organization’s customers who are enthusiastic about its offerings. Patroni et al. examined how one of the biggest stores in the world used consumer interactions that could be found on social media for the creation of new product or service, and succeed in make it a capability, despite these conversations, have been created purposefully for innovation activities or not (Patroni et al., 2022)

Web 2.0 applications help to provide great opportunity for innovation, as they allow firms to exploit brilliant ideas to their advantage and keep pace with the diverse knowledge in the world. Innovation has shifted from closed internal processes to being done in ecosystems. Based on this new strategy, firms should include users in the innovation process, which contributes to the acquisition of knowledge in a cost-effective manner, which constitutes modern applications on innovation like the open innovation.

Digital platforms can be described as virtual environments in which unrelated entities (specialists, users, R&D laboratories, universities, etc.) participate in information transfer and combination procedures. Digital convergence imposes a greater degree of interconnectedness and participation in platforms. A small number of firms gain control over value chain activities in the era of digital convergence.

Based on the above we hypothesize:

H3) Value co-creation has a positive and significant influence on the innovation performance of Algerian startups.

4. Value co-creation and innovation in start-ups

Start-ups are firms in their initial stage of growth, typically concentrating on introducing high-tech products and services, rather than following the strategies designed for large, multinational firms, startup companies need to build a clear brand vision and develop creative and innovative activities that take into consideration of their unique characteristics. Generally, they obliged to search for external partner or larger counterparts firms in different processes of the development and commercialization of their ideas or technologies, the survival and growth of start-ups need the opening up of the innovation process (Usman and Vanhaverbeke, 2017) and the co-creation of value with their customers and parties involved like other SMEs (Ghezzi et al., 2022)

The practical use of technological tools like social media platforms and applications is acknowledged as an effective tool for startups. These platforms and applications help entrepreneurs to identify changes and opportunities and starting a business successfully. Social media considered to be beneficial to start-ups and it has a significant positive impact on start-ups innovation outcomes, also according to Tajpour and Hosseini social media use mediate the relationship between the entrepreneurial intention which include (knowledge sharing, reputation and social relations) and the performance of digital start-ups (Tajpour and Hosseini, 2021). Kim and Choi studied the mechanisms of creating value with users and aimed to analyze the advantageous use of social media and value co-creation for startup companies. It identified past interaction with users, their positive attitude, and their ability to share and express themselves as success factors in co-creating value with users for an effective social media platform strategy for start-ups (Kim and Choi, 2019)

Based on the discussion above we hypothesize:

H4) Value co-creation mediates the relationship between ecosystem and innovation performance of Algerian startups.

Secondly. Results and discussion

The case study targets Algerian start-ups that are mostly active in high-tech industries, applications and web developers, and some e-commerce start-ups in Algiers. A total of 325 questionnaires were distributed, resulting in a total of 219 valid questionnaires. We use a five-point Likert scale to measure the items, with the lowest score being 1 and the highest score being 5. The scales of (Paulus et al., 2016)have been implemented for the measurement of Ecosystem building strategies, and for the value co-creation mechanism, we basically focus on the social media platforms that enable start-ups to co-create value with their customers, given the fact that these start-ups use less costly channels for the development of innovation (Zhang et al., 2020). Finally, the innovation performance items index have been adopted from (García-Granero et al., 2015)

Table N°01 Reliability Statistics

Variable	**No of items**	**Cronbach's Alpha**
Ecosystem	8	.872
Innovation performance	6	.917
Value co-creation	5	.836

Table N°02 Correlation Matrix of the Latent variables

	Inovatpr	**Ecosyte**	**Valcre**
Inovatpr	**1.000**		
Ecosyte	**.737**	**1.000**	
Valcre	**.326**	**.431**	**1.000**

Note: Inovatpr = innovation performance, Ecosyte = ecosystem, Valcre = value co-creation

As shown in Table 1, all three used variables indicate a good reliability score above 0.8. and from Table 2, the correlations between the main variables in the sample are positive and related to each other. These are suitable for the hypotheses that are mentioned below.

Depending on a simple mediation analysis conducted using ordinary least squares analysis by bootstrapping with 5000 samples, which was run via the PROCESS macro in SPSS, evidence appears to support the hypothesis that co-creation of value with customers mediates positively and significantly the relationship between the building of an ecosystem and innovation performance.

Table N°03 Results of mediation analysis

	M (value co-creation)				**Y (innovation performance)**			
	B	**SE**	**p**	**β**	**B**	**SE**	**p**	**β**
X(ecosystem)	.6841	.7062	.0001	.4319	.2507	.0696	.0001	.4719
M(value co-creation)	-	-	-	-	.1270	.0945	.0000	.1722
	$R^2 = .1865$				$R^2 = .5353$			
	F(1,217) = 75.7624, p<0.001				F(2,216) = 124.4838, p<0.001			

Results shown in table 3 indicate that there is a positive and significant influence of ecosystem on the innovation performance, (b = 0.6841, se = 0.7062, p<0.001); therefore, the following hypothesis proved:

H1) Ecosystem has a positive and significant influence on the innovation performance of Algerian startups.

For the effect of ecosystem on value co-creation (b = 0.122, se = 2.028, p<0.001), thus, the following hypothesis has been attested:

H2) Ecosystem has a positive and significant influence on value co-creation of Algerian startups.

(b = 0.2507, se = 0.0679, p<0.001), so the following hypothesis proved:

H3) Value co-creation has a positive and significant influence on the innovation performance of Algerian startups.

Based on (b = 0.1270, se = 0.0945, p<0.001), the following hypothesis has been attested:

H4) Value co-creation mediates the relationship between ecosystem and innovation performance of Algerian startups.

Conclusion

This study tries to shed light on the impact and the tools of the ecosystem on the innovation performance of start-ups within the Algerian market. The results indicate a positive influence of building an ecosystem on innovation performance. The co-creation process, as knowledge and idea sources, is likely to positively mediate that relationship.

Algerian start-ups should emphasize more the ability to scan the market for the identification of technological opportunities by developing a business ecosystem via the use of social media platforms and the use of a large amount of valuable information to transform it into business and concepts.

As with most studies, this one is subject to limitations, which opens up opportunities for future research. Firstly, despite the measures employed in ecosystem theory and value co-creation in social media platforms, there is no identification of the most effective tools that could help Algerian start-ups in the innovation processes; hence, future studies should explore these issues. Secondly, the generalization of the results is limited to Algerian start-ups, which are active in the high-tech industry.

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Annexes

Variable	Item					
Value co-creation Zhang et) (al., 2020	Our start-up usually posts new product development messages on social media.					
	We have effective social media pages for our start-up and its customers for mutually developing processes.					
	Our start-up and its customers are able to interact and communicate about new ideas or concepts on social media.					
	We gained a lot of valuable information about new products and services on social media.					
	We consider interactions with our customers on social media as a valuable source of innovative information.					

Please assesse your start-up innovation performance over the last three years with regard to the following items: 1 very low- 5 very high

variable	item					
Innovation Performance García-Granero et) (al., 2015	Market share development					
	Expand to new markets					
	Adaptation to changes in product/service					
	Ability to reduce product/services costs					
	Amount of the time for development of innovative project					
	Rate of innovation per year					

					item	variable
					We aim to formulate or form a complex external network "designed to creating products or services."	**Ecosystem** (Paulus et al., 2016)
					Our start-up manage the network by creating cross-border activities.	
					We manage to lay down effective plans for selecting partners.	
					We share our capabilities, systems, or information with partners	
					New technologies have to be introduced to increase the capacity of the network infrastructure.	

					The central firm or start-up provides support mechanisms for new products or services to encourage the innovations of other parties.	
					We have a central management system to control value creation within the network.	
					A network-wide value-sharing scheme has been developed for all parties involved.	