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# TOWARDS A NEW PARADIGM OF “COOPETITIVENESS” IN EMERGING COUNTRIES: CASE OF THE ALGERIAN ENTREPRENEURIAL ECOSYSTEMS

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## ABSTRACT

The main aim of this paper is to propose thinking tracks of Entrepreneurial Ecosystems based on a “Quintuple Helix” approach that overcomes the competitive partitions by founding a paradigm of “coopetition” and “coopetitiveness” through the “intelligent specialization” with a strong societal and economic impact. Indeed, the dominant vision in most of emerging countries calls the relationship between Entrepreneurial Ecosystems and their actors, exclusively in terms of competitiveness aspects by reproducing identically the North-American models unlinked to the environmental dissimilarities, such as entrepreneurial culture. However, it is important to enquiring about the spatiotemporal adaptability of this model in the emerging countries contexts, particularly through its uninhibited relationship to the concepts of individual success and failure as well as the ecosystems running based mainly on private financing from business angels, crowdfunding and venture capital investors. While the creation of a startup is administratively facilitated, the uncertainties of the environment put its sustainability in a severe test. The causes are numerous, we cite among others, the difficulty of these startups to fit into a multidisciplinary working mode, hence the necessity to integrate them in the value chain of an ecosystem where they answer efficiently to mutualized and specific R&D needs. That's why we propose to identify the main barriers to open innovation as well as the catalysts enabling the creation of the integrative entrepreneurial ecosystems. By borrowing the paradigm of the city, we highlight the “urbanized” ecosystem made up of “useful” and “specialized” blocks, integrated in the value chain of this ecosystem. We will show the viability of the proposed tracks through many cases of economic, societal and academic actions undertaken in Algeria in order to setting up a favorable environment of integrative entrepreneurial ecosystems.

**Keywords:** Coopetitiveness; Coopetition; Quintuple Helix; Entrepreneurial ecosystem; Algerian entrepreneurial ecosystem; Ecosystem's Value Chain; Urbanized ecosystem; Useful blocks; Specialized blocks; Intelligent specialization; Mutualized R&D; Ambidextrous capabilities.

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## INTRODUCTION

The main aim of this paper is to propose an Entrepreneurial Ecosystems track based on a “Quintuple Helix” approach that overcomes the competitive stereotypes by founding a new paradigm of “coopetition”<sup>(1)</sup> and “coopetitiveness”<sup>(2)</sup> through the “intelligent specialization” with a strong societal and economic impact. This track breaks with the dominant vision in most of emerging countries that calls the relationship between Entrepreneurial Ecosystems and their actors, exclusively in terms of competitiveness aspects by reproducing identically the North-American models unlinked to the dissimilarities of the competitive environment, such as entrepreneurial culture. It follows the concepts et recipes published in the academic literature (mostly North-American) which often associates entrepreneurship with purely competitive aspects of business.

We will show how this approach could provide tangible answers of the economic and societal challenges through a sustainable development of the entrepreneurial ecosystems that allow startups the ability to integrate and improve their value chains. To setting up a specific entrepreneurial culture for emerging countries, the training of young entrepreneurs is an absolute requirement before and during this integration.

The 2017 annual African Economic Outlook (AEO, 2017) jointly published by the African Development Bank, the OECD Development Centre and the United Nations Development Programme, proposes a similar recommendation for promoting industrialization for African countries through innovative industrialization strategies going beyond sectoral approaches that target only manufacturing by promoting all economic sectors that have potential for high growth and employment creation. These strategies should include high-potential entrepreneurs, start-ups and SMEs that can complement the growth of large firms.

This approach is “prospective” oriented since it facilitates the wide exploration of “possible futures” to detect common development opportunities and joint actions of the ecosystem stakeholders, leading to the “intelligent specialization” with a strong societal and economic impact.

## Background

In the networking era, it’s difficult to reach the sustainable innovation within a single organization hence the requirement of complementary collaboration with other relevant organizations to continually create valuable goods and services with the right prices for customer (considered as a key networking player).

In an empirical study based on a sample of 153 European hi-tech firms, Salvetat & Le Roy (2007) showed that the practices of this type of firms were more in aggressive relations between rivals than in a coopetitive strategies.

However, they note that SMEs and technology startups that traditionally in line to competitive logics are giving way more and more to coopetition strategies. This conclusion approves our diagnosis, the result of our observations, about how it’s difficult for some hi-tech startups to fit into a multi-disciplinary way of working. The authors state that even if it’s not possible to establish the principle of coopetition within these startups, their “open watch” practices fit well into a coopetitive conception. This situation is typical of that observed by March (1991) where firms tend to concentrate either on capabilities for exploitation or exploration, while he assumes that organizations need the both capabilities: exploitation to learn through experience by refining their existing capabilities and exploration to create variety in experience through experimenting, innovating, and risk-taking.

March (1991) called for the pursuit of ambidexterity, the simultaneous creation of exploitation and exploration, and argued that

achieving ambidexterity has a positive impact on performance (Blarr, 2011). However, this idea leads to the dilemma of allocating resources to both exploitative and explorative activities (Floyd & Lane, 2000).

Establishing such a balance seems difficult as exploration and exploitation activities require substantially different, often conflicting, structures, processes, capabilities and cultures (Tushman & O'Reilly III, 1996). Exploratory units are supposed to be small and decentralized, having loose processes and an open culture, whereas exploitative units tend to be larger and rather formal and centralized, having tight processes and cultures (Benner & Tushman, 2003).

The innovation paradox often occurs only when the aggressive pursuit of operational excellence and incremental innovation crowds out the possibility of creating radical disruptive innovations (Davila & Epstein, 2014). So, a sustainable innovation paradox means that an organization can use existing resources and technologies to achieve exploitative innovation or develop new resources and opportunities to generate more exploratory innovation (Glavovic, 2013).

To obtain sustainable innovations, an organization needs to calibrate and effectively manage current business needs and be able to respond adequately to future environmental changes. Ambidexterity of an organization refers to three typologies of ambidextrous capabilities to resolve paradoxical tasks in a complex context (Zeng & al., 2017):

1. Structural ambidextrous capability that distinguishes two different businesses and reduces their conflicts to improve efficiency, but it may restrain the complementary strengths of these two businesses and increase integration costs;
2. Contextual ambidextrous capability that balances two different businesses well in an organization and reduces integration costs, but it may result in polarized developments and employees cannot be excellent at two paradoxical businesses;
3. Coordinated ambidextrous capability that is beneficial for balancing two different business strategies and reducing

conflicts, but it may overlook the balance of operational activities and encourage polarized opinions, because the top management team often has alike mindsets.

Oxley and Sampson (2004) have already highlighted this dilemma, not cooperating with competitors can save a limited know-how while depriving themselves of huge benefits such as resources and means more important acquisition of new know-how such as the open innovation projects. Moreover, Baaziz (2015) noted that in the context of a Quintuple-Helix-based ecosystem, the open innovation is encouraged by the governments through incentive deals (Baaziz, 2015; Baaziz & al., 2017).

**From this point of view, the Quintuple Helix is an appropriate framework to improve ambidextrous capabilities and resolve paradoxical tasks in a complex context.** Indeed, the firms set up collaborations with other firms and startups, public institutions, researchers, universities and individuals to find investment ideas in sustainable development, identify new technologies and develop new products and services.

They accept that others utilize ideas that they do not use, but that can lead to profitable projects (Baaziz, 2015). This situation is also encountered in the context of the circular economy where sustainable development is considered in a “Cradle to Cradle” C2C vision (Moing, 2015). Thus, far from being the sole responsibility of firms, many non-profit associations put into practice the concepts of the circular economy such as the economy of functionality, loan of equipment, recycling, etc. (CESER, 2016).

Despite the lack of accurate and acceptable indicators, Manceau et al. (2011) argue that open innovation improves the innovative capacities of firms by stimulating the economy of quantity and to promote sustainable development. This point is not often at the origin of the open innovation approach but it's undoubtedly one of the most positive effects of this practice by promoting a quick integration of skills and external know-how. The proposed system can be improved by a targeted approach of open innovation combined with the concept of smart specialization of firms within an

ecosystem, a territory or partner territories belonging to the same region. This cooperative logic can be generalized from the local level to a more global level.

While the Triple Helix focuses on the process of knowledge production and innovation in the context of the knowledge economy, including public private partnerships (Etzkowitz, 2002; 2008) and the Quadruple Helix concerns more specifically the knowledge society and the democracy of knowledge (Carayannis & Cambell, 2009; 2010), the Quintuple Helix go beyond to reach the natural environment of society, considering the socio-ecological transition of society (Carayannis & Campbell, 2010; Carayannis & al., 2012) as defined by the European Community in 2009 as a major challenge for the future roadmap for development (Carayannis & Rakhmatullin, 2014).

According Carayannis & Campbell (2010), the Quintuple Helix is a model which grasps and specializes on the sum of the societal interactions and the academic exchanges in a state to promote and visualize a cooperation system of knowledge, know-how, and innovation for more sustainable development.

The Quintuple Helix Model is interdisciplinary and transdisciplinary at the same time: the complexity of the five-helix structure implies that a full analytical understanding of all helices requires the continuous involvement of the whole disciplinary spectrum, ranging from the natural sciences to the social sciences and humanities (Carayannis & Campbell, 2010; Carayannis & al., 2012). Thus, the goal of the Helix-Conception is accomplished through the resource of knowledge which produces additional value for society to lead in the field of sustainable development.

Carayannis & al. (2012) claim that the Quintuple Helix allows to visualize the collective interactions as well as the exchanges of

knowledge in a state (nation-state) by means of the following five subsystems:

1. The education system: is defined by reference to higher educational systems (academia, universities, schools and research centers). In this helix, the necessary human capital (students, teachers, scientists/researchers, academic entrepreneurs, etc.) of a state, participate in the creation and dissemination of knowledge;

2. The economic subsystem is defined by reference to firms, industries, services and banks. This helix focuses the on economic capital (entrepreneurship, machines, products, technology, finance, etc.) of state;

3. The natural environment is decisive for a sustainable development and provides people with a natural capital (plants, variety of animals, biodiversity, water resources, etc.);

4. The media-based and culture-based public refers to the values and culture of the citizens but also to the media. It integrates and combines two forms of capital. On the one hand, social capital (values, traditions, culture, etc.) and on the other hand, information and media capital (press, television, communication, Internet, social networks, etc.);

5. The political system is also of crucial importance because it formulates the will where to the state is heading toward in the present and future, thereby also defining, organizing as well as administering the general conditions of the state. Therefore, this helix characterizes the political and legal capital (visions, policies, ideas, plans, laws, politicians, etc.).

The Quintuple Helix also describes what sustainable development could bring and imply for eco-innovation and eco-entrepreneurship, now and in the future (Carayannis & Campbell, 2010).

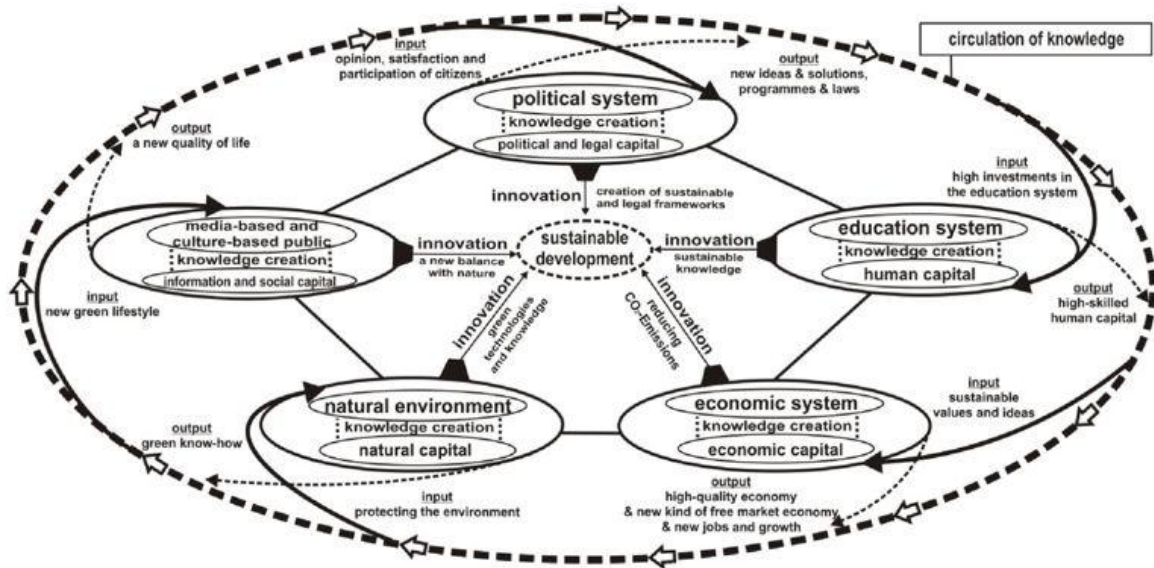


Figure 1. The Quintuple Helix model and its functions (Carayannis & al., 2012).

**Assessment of the entrepreneurship context in emerging countries**  
**What's about the thorny issue of the innovation funding?**

*It is important to enquiring about the spatiotemporal adaptability of the North-American models of the Entrepreneurial Ecosystems in the emerging countries contexts, particularly through its uninhibited relationship to the concepts of individual success and failure*

*as well as the ecosystems running based mainly on private financing from business angels, crowdfunding and venture capital investors.*

According to the PitchBook-NVCA Venture Monitor, startup funding reached a record decade-long high in 2017, with \$84.2 billion (Statista, 2018). These colossal “high risk” financings granted simply based on innovative ideas and guided by a competitive advantage logic in a target market (Baaziz & al., 2017).

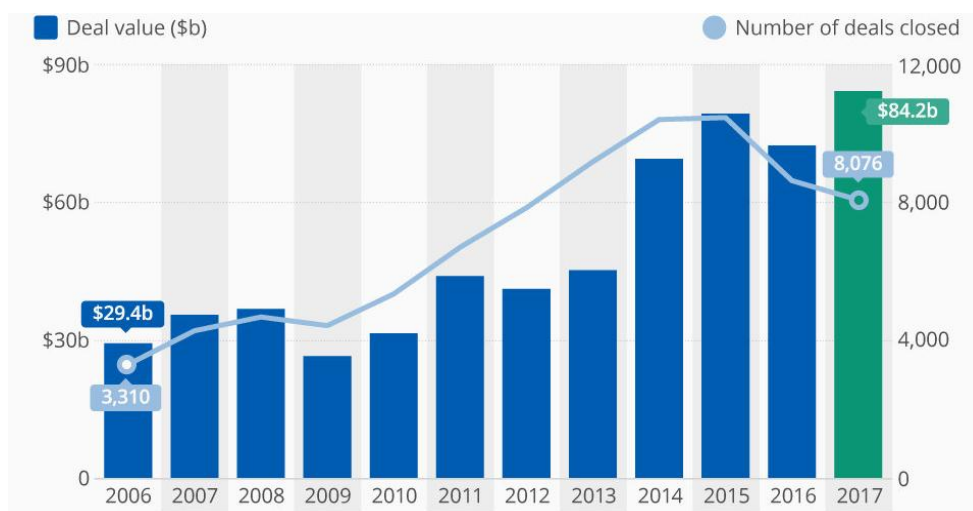


Figure 2. Venture Capital Funding Climbs to Decade High in 2017 (Statista, 2018).



On the other hand, the US government maintains this entrepreneurial mindset by defining an advantageous legal framework, especially through laws such as "Entrepreneur Access to Capital Act" in 2011 and "Jumpstart Our Business Startups Act" in 2012. This sustained entrepreneurial culture encourages the growth of innovative startups as it considers an entrepreneurial failure as a significant experience that allows the entrepreneurs to raise more funds for their future projects.

This is not the case in the emerging countries where failure is often considered as a shame. In many emerging countries such as Algeria, a decision leading to bad results is not just a "wrong management" but may be qualified as an "economic crime" considering the Algerian laws. Therefore, no margin of error is granted to the undertaken entrepreneurial risk to Entrepreneurs who prefer status quo than to take a decision that drag them to court or even jail (Baaziz & Quoniam, 2014).

### **Exploring tracks to build integrative Entrepreneurial Ecosystems**

While the creation of a startup is administratively facilitated, the uncertainties of the environment put its sustainability to a severe trial. The causes are numerous, we cite among others, the difficulty of these startups to fit into a multidisciplinary working mode, hence the necessity to integrate them in the value chain of an ecosystem where they answer efficiently to specific R&D needs.

*Given these socio-cultural, the American model of entrepreneurship, cannot be a reference to build a contextualized ecosystem without making significant efforts on one of the following two tracks:*

1. *Perform a "cultural mutation" in entrepreneurial practices;*
2. *Adapt entrepreneurial practices to the context through an "environmental change".*

Beyond the hypothetical results, the cultural mutation turns risky and costly. Indeed, the financing of entrepreneurship projects in the Algerian (and emerging countries) context mainly depend on bank loans that require prior guarantees, a target market with high potential

and unsustainable investment returns. These draconian conditions rarely fit with the requirements of sustainable development and the entrepreneurial environment.

The environmental change requires a strong institutional regulation that helps the emergence of ecosystems and ensures the arbitration of conflicts that may arise between the ecosystem partners during exchanges. Track that we privilege in this research without losing sight of the possibility of evolution of culture and entrepreneurial practices.

Pursuing these two tracks at the same time in the sustainability-based ecosystem building process can be likened to organizational ambidexterity as defined by Adler et al. (1999). It's also a process of exploitation and exploration in the sense of March (1991) because the two tracks offer us two different learning ways between which firms share their attention and their resources.

Exploitation refers to the learning pathway that leads to cultural mutation in entrepreneurial practices. It's mainly based on the theoretical learning and imitation of existing models.

The exploration refers to the critical adaptations that must be made by the actors during the ecosystem building based on Quintuple Helix approach to positively influence the environment. It's based on the action learning and adaptation by creating new rules.

### **Discussion**

Most of emerging countries has developed the real willpower to promote entrepreneurship, which has adopted development strategies for small and medium-sized enterprises (SMEs) and incubator programs. Nevertheless, the implementation of these strategies and programs remains insufficient.

Several reasons have contributed to widening the gap between the political will and the achievement on the ground as is the case in Algeria.

### Restrictive barriers to entrepreneurship

Algeria is a developing country whose economic structure is poorly diversified and dominated by the hydrocarbons sector, which represents 95.2% of country's exports in 2016. The falling of oil prices gives rise to new challenges for the Algerian authorities in terms of structural reforms that will diversify the economy and promote the private sector through the adoption of a new Investment Act in July 2016, a new Customs Act in December 2016 and a Public-Private Partnerships Act currently being drafted (OBG, 2017). However, these efforts have not allowed the expected boost to improve the business environment. Indeed, several global rankings castigate the business climate in Algeria. The rankings 2018 of the Global Entrepreneurship Institute <sup>(3)</sup> gives it a GEDI score of 24.7% and puts it in 80th place out of 138 countries. The rankings Doing Business

2018 of the World Bank (2018) puts Algeria in 166th place out of 199 countries in terms of ease of setting up new business or startups. According AEO (2017), the non-hydrocarbons industry accounted for no more than 5% of GDP in 2016 compared with 35% at the end of the 1980s. While the SME environment is hostile in Algeria, Aliouat (2013) notes that many of them show prodigious ingenuity to develop effective strategic resources and successful dynamic capabilities. Indeed, the SMEs that achieve positive results in such hostile environments are precisely those that develop appropriate ecosystem management models outside of traditional management models. Bouazza & al. (2015) identify two types of restrictive barriers to entrepreneurship from this hostile environment. We summarized the most important external and internal barriers in the mind-maps (Figures 3 & 4).

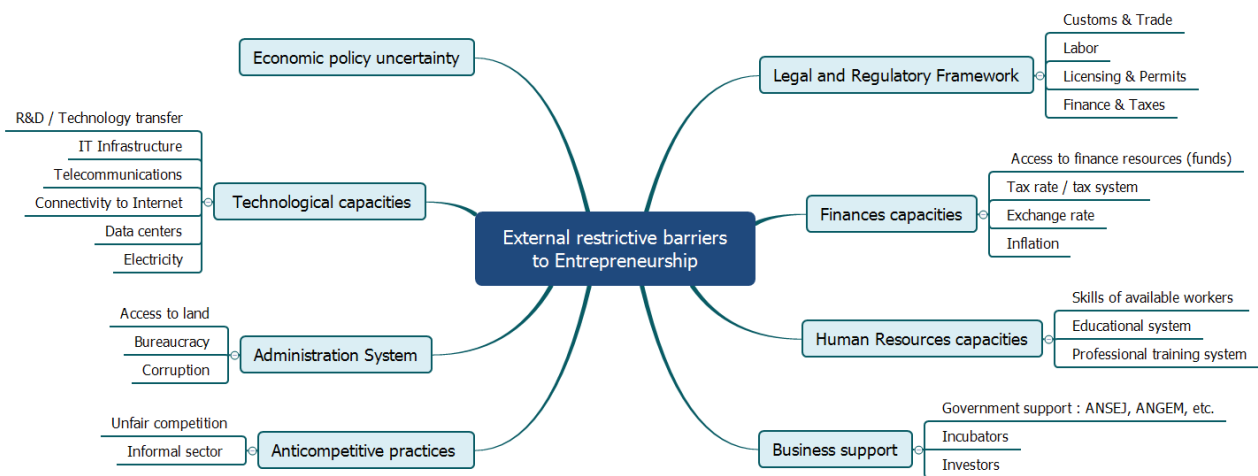


Figure 3. External barriers restrictive barriers to entrepreneurship  
Synthesized by the author from the work of Bouazza & al. (2015).



Figure 4. Internal barriers restrictive barriers to entrepreneurship  
Synthesized by the author from the work of Bouazza & al. (2015)

## External barriers restrictive barriers to entrepreneurship

The external restrictive barriers to entrepreneurship refers to the exogenous constraints faced by entrepreneurs during the creation of their business. Many studies (World Bank, 2003; Bouazza & al., 2015; Baaziz, 2015; World Bank, 2018) conducted within the framework of investment climate assessments in Algeria, have highlighted some barriers more than others.

- **Legal and Regulatory Framework**

The Algerian government have made significant efforts to improve the business climate and to substitute the hydrocarbon-dependent economic model with a new model less dependent, through many legal and regulatory reforms such as:

1. Adoption of the Law No. 16-09 on the promotion of investment dated August 3, 2016 (the Investment Act);
2. Adoption of the Law No. 17-02 on the development of SMEs dated January 10, 2017. This new legislation aims to encourage the creation of new SMEs, and to improve both their competitiveness and export capacity;
3. Softening of the preemption rights;
4. Adoption of new measure providing a currency risk heading instrument will protect the Algerian enterprises against the currency risks, such as fluctuation of the exchange rate (see Table 1) and the inflation effects that can have thoughtful consequences for a firm's results.

Official Exchange rates DZD/US\$ & DZD/€	Unit	2011	2012	2013	2014	2015	2016	2017	To March 2018
Average exchange rate DZD / US\$	DZD / US\$	72,85	77,55	79,38	80,56	100,4 6	109,4 7	110,9 6	114,0 7
Exchange rate at the end of period	DZD / US\$	76,06	78,10	78,15	87,90	107,1 3	110,5 3	114,9 3	114,0 8
Average exchange rate DZD / €	DZD / €	102,2 2	102,1 6	105,4 4	106,9 1	111,4 4	121,1 8	125,3 2	140,1 8
Exchange rate at the end of period	DZD / €	106,5 3	102,9 5	106,8 9	107,0 5	117,0 6	116,3 7	137,4 9	140,5 5

Table 1. Fluctuation of exchange rate of main currencies between 2011 to March 2018 (Source : Bank of Algeria)  
Link viewed on 06/25/2018 @ <http://www.mf.gov.dz/article/48/Zoom-sur-les-Chiffres-/155/Taux-de-Change.html>

The Algerian legal framework is progressively being more attuned to the requirement of a market economy. However, there is limited trust within the business community in the impartiality of the judicial system. It is still widely seen as slow, inefficient and costly because the major issues of corruption and governance.

- **Finances capacities**

While accessing finance has always been an obstacle for Algerian SMEs, the significant drop of liquidity in the banking sector has made

it more challenging and costly. Access to credit, including short-term working capital finance, is difficult and time consuming. Leasing, factoring, venture capital and export financing instruments are poor developed. State-owned banks are bureaucratic, not business-friendly and lack modern payment and information systems. Their staff is poorly qualified in project risk and return assessment. They also have little incentive to take responsibilities or manage risk as well as explicit or implicit constraints imposed by their State shareholder. Decision processes in the



public banks are also complex and highly centralized.

Electronic payment is almost non-existent in Algeria, despite the existence of the Society for the Automation of Interbank Transactions and Monetics (SATIM), which gathers in its interbank network, public and private banks as well as Algeria Post. Nevertheless, some banks offer basic e-payment services to pay electricity, water or phones bills.

The banking rate in Algeria is low at around 33%. The reasons are numerous: tax evasion, avoiding control, fraudulent operations, black boxes reserved for bribes, etc. According Baaziz (2015), Entrepreneurs are forced to carry cash in bags or worse, in garbage bags called “chkara”<sup>4</sup> that circulate more easily and faster than a bank transfer that, until recent dates, required one month at least.

The SME compartment of the local stock market has been open since 2012 but has yet to see its first listing. According OBG (2017), this could become a viable alternative source of financing for high-potential SMEs. The governance and financing framework envisaged under Law No. 17-02 will provide more access to finance. The Algerian tax system is structured through six tax codes: (1) direct taxes and related taxes; (2) taxes on sales, which is mainly dedicated to value-added tax (VAT); (3) indirect taxes; (4) registration duties; (5) stamp duties and (6) fiscal procedures code that governs relationship between the tax department and taxpayers and litigation procedures.

- **Human Resources capacities**

According Bouazza & al. (2015), human resources in Algeria are weak in terms of market research, marketing strategies, innovation, and financial management.

Labor force participation is low, especially for women. In 2017, the unemployment has been persistently high (12%) and the unemployment rates are especially high for youth with 28% and for women with 20.7% (IFM, 2018).

Given the obsolescence of the educational programs and its isolation far from the economic sphere, the Algerian educational system,

through its universities and professional training centers, no longer meets the needs of firms, hence the need for a professional post-training scenario in most cases of recruiting a new graduate. According to several studies (UNCTAD, 2004; World bank 2003; OBG, 2017), firms need training in Leadership, Entrepreneurship, Business administration, Customer services, Marketing, Sales, R&D management, Project management and Information technology. However, we note that the needs of firms in Project management, R&D management and IT seem less important.

- **Business support**

The public institutions in emerging countries remains the main provider of funds for entrepreneurs in the form of repayable credits. In Algeria, the funding provided to young people through ANSEJ framework since its creation in 1996 to 2017 amounts to about \$ 10 billion and has created 367 980 Startups (AF, 2017). The funds granted in 21 years of existence of ANSEJ represent barely 12% of the funds raised during a 2017 year by US startups. However, this difference is not related to the number of startups created but rather to the inadequacies of funding. ANSEJ is a National (Algerian) Agency of Youth Employment Support created in 1996 to carry startups and small enterprises projects. ANSEJ is completed by two other minor frameworks: (1) National Unemployment Insurance Fund (CNAC) is intended for people who have lost their job. (2) National Agency for Microcredit Management (ANGEM) is intended to support craft activities.

The entrepreneurship in Algeria is encouraged through two major schemes:

1. Public support through several frameworks including ANSEJ for the creation of self-employment activities and startups targets young job-seekers, workers who have lost their jobs and people without or with low incomes.

2. An investor support system targets larges firms and strong established SMEs that gives them advantages and facilities through the National Agency for Investment Development (ANDI), the

National Investment Council (CNI) and the National Agency for SME Development (ANDPME).

In this paper, we are interested only in the first scheme. Indeed, while the creation of a startup is administratively facilitated, the uncertainties of the environment put its

sustainability into a severe test. The causes are numerous, we cite among others, the difficulty of these startups to fit into a multidisciplinary working mode, hence the necessity to integrate them in the value chain of an ecosystem where they answer efficiently to specific R&D needs.

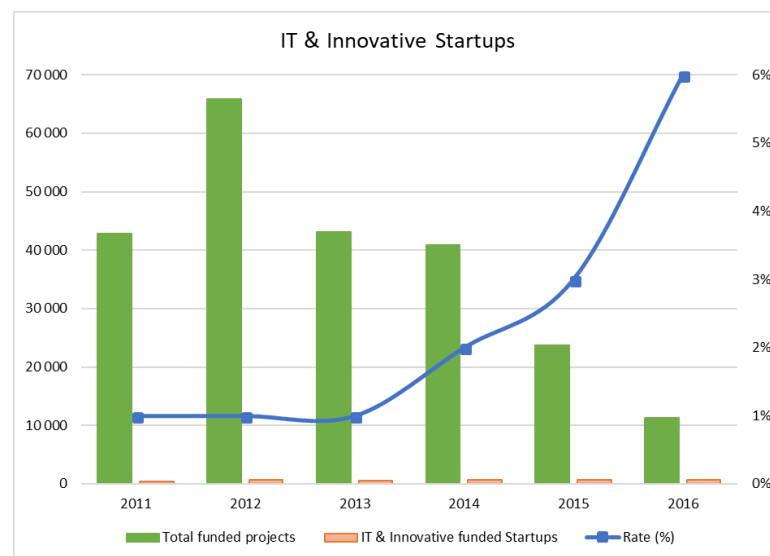


Figure 5. IT & Innovative Startups funded under the ANSEJ framework between 2011 and 2016 (Data source: ANSEJ).

It is legitimate to ask the question that innovation does not seem to be at the core of economy that is still based on hydrocarbon revenue and not on the creation of new wealth. Entrepreneurs and innovators bear almost all the risks inherent to the project of technological startups.

The innovative startups funded under the ANSEJ framework barely reach 6% in 2016 and 3% cumulative of all projects funded since the creation of this institutional framework in 2010.

Although the upward trend is favorable to the innovative startups, it should be noted that startups are less and less funded by this institution as shown in the Figure 5.

The question of gender is increasingly raised in emerging countries and Algeria is no exception to the rule.

The parity is almost ensured in the education system, in the labor market where, at the equivalent position, women receive the same wage treatment as men. It's also imposed

by law in the political sphere concerning the elective institutions.

Despite this apparent parity, we find very few women in the top management of firms but also in the entrepreneurial sphere. This situation is typically a gender segregation case. Di Méo (2011) indicates that gender segregation refers to the "invisible walls" that women bypass daily after incorporating the prohibited area boundaries of public space (Raibaud, 2015).

Indeed, women's projects funded under the ANSEJ, although they are increasing, represent only 14% of the projects funded in 2016 and 10% cumulative of all projects funded since the creation of this institutional framework in 2010.

We will make the same remark as the innovative projects, although the upward trend is favorable to the women's projects, it should be noted that startups are less and less funded by this institution as shown in the **Figure 6**.

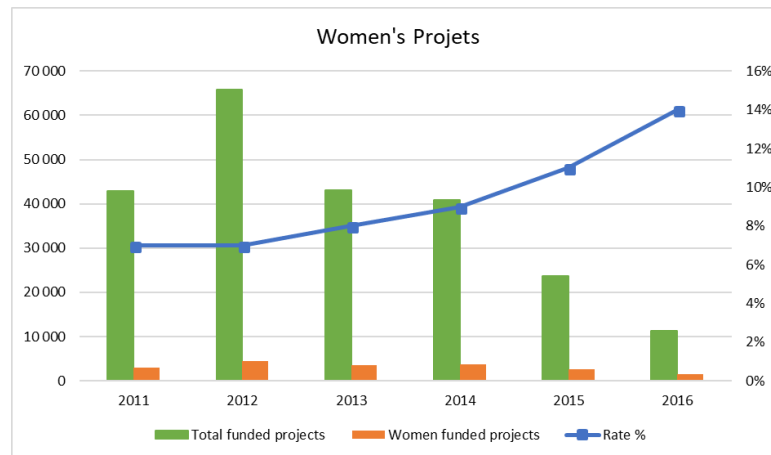


Figure 6. Women’s projects funded under the ANSEJ framework between 2011 and 2016 (Data source: ANSEJ).

- **Anticompetitive practices & unfair competition from the informal sector**

Unfair competition from firms operating in the informal sector is a serious challenge affecting both SMEs and large firms. This sector, which doesn’t pay taxes or social security contributions, denotes the “laissez-faire” attitude of the authorities who prefer to buy social peace.

According to the various Bulletins of SMEs published by the Ministry of Industry and Mines (MIM, 2018), the informal sector share is estimated between 45-50 percent of GDP. Moreover, it’s the main informal employer of young, especially young women. It is understood that these illegal workers are without any social security.

- **Administration System**

The Algerian SMEs face serious difficulties in administrative procedures to deal with the requirements of regulations, such as costly and timely procedures to obtain licenses and permits, register property, and move collateral (Bouazza & al., 2015).

The issue of access to industrial land is often mentioned by entrepreneurs as a major constraint to business development. There is a large unsatisfied demand for industrial land. At the same time, around half of equipped land is unused, either because it belongs to bankrupt public enterprises or because private owners are holding on to them to speculate. The market is

not unified, with a large price differential between public and private-owned land that raises speculation and corruption. The land issue is extremely complex where many vested interests are at work to curb the reforms.

Algerian SMEs identify corruption as a heavy challenge compared to large firms. The Administrative barriers are so many factors favoring corruption, hence the need for reforms to make the single window more functional and to dematerialize several procedures.

- **Technological capacities**

According to the Post and Telecommunications Regulatory Authority (ARPT, 2016), the internet penetration rate of Algeria is 71.2% on 2016. This has contributed to the digitization of the most of Algerian firms. The mobile market is shared between three operators: (1) Mobilis / Algérie Télécom Mobile (ATM) subsidiary of the state-owned firm Algérie Télécom; (2) Djezzy / Optimum Télécom Algérie (OTA) subsidiary of VEON former VimpelCom and (3) Ooredoo / Wataniya Télécom Algérie (WTA). The mobile penetration rate is 113.4% on 2016. The three networks co-exist GSM, 3G and 4G. Sidi Abdellah Technopark was launched in 2004. It provides an environment for innovative firms to develop their businesses. Managed by the National Agency for the Promotion and Development of Technological Parcs (ANPT), the Sidi Abdellah project provide development platforms, expertise and support to the startups to grow their product offerings.

### Internal barriers restrictive barriers to entrepreneurship

The internal restrictive barriers to entrepreneurship refers to the endogenous constraints faced by entrepreneurs during the creation of their business. Bouazza & al. (2015) summarized these constraints into four groups:

1. Entrepreneurial capacities including lake of training, lake of entrepreneurial skills and lake of entrepreneurship culture;

2. Managerial capacities including lake of training, lake of managerial skills and lake of collaborative working;
3. Marketing capacities including lake of training, lake of marketing skills;
4. Technological capacities including lake of training, lake of technological skills and lake of R&D and innovative project management.

*Until recently, engineering schools focus their courses on purely techniques fields and didn't provide tools to manage innovative project to their future engineers. The faculties of human sciences and business schools remain divided into classical courses leading to official functions in institutions or executives in firms.*

*We tried our first experience at the National High Business School (ENSM) in 2015/2016 with the first master's degree in strategic management. The enrollment was opened to fresh graduate engineers. This experience was a great success since all graduates of the first-class have found a job or started their own business. With this great experience, we decided for 2018/2019 to launch another first master's degree in entrepreneurship and project management to strengthen entrepreneurship culture and develop entrepreneurial skills among students.*

### The implementation of Quintuple Helix for the development of entrepreneurial ecosystems

This exploratory quest for useful concepts has led us to question a holistic approach called "Quintuple Helix" (Carayannis et al., 2012) that gives a "cooperative" dimension to the ecosystems and guides it towards a sustainable development sense able to bring tangible solutions for the economical, ecological and societal challenges. It allows organizations and firms to go beyond their perimeters to act (and interact) across their ecosystems with their suppliers, distributors, customers, regulators and all stakeholders who are not directly under their control but that can have decisive ecological and societal consequences.

The firm is no longer in a competitive approach with its competitors but integrated in a work of co-construction of a cooperative ecosystem through a "smart specialization" with high societal and economic impact for the sustainable mutualization of resources and benefits by avoiding unnecessary investments in similar activities within the same territory and

between different partner territories. This involves broad stakeholder participation through the Quintuple Helix approach and more reliable definition of innovation prioritization mechanisms at the territorial level, which significantly reduces economic, social and ecological bills.

Talking about a cooperative ecosystem of innovation, comes down to defining the roles and describing the solidarity relations between all the stakeholders involved in this ecosystem, in other words, between the five branches of the Quintuple Helix:

1. Policy makers of sustainable innovation: embodied by the government, public authorities and/or local authorities which set the Legal and Regulatory Framework and the main guidelines for sustainable development as well as the conditions on which sustainable innovation can be developed;
2. Sponsors of sustainable innovation: embodied by the economic firms which support the R&D activities;
3. Producers of sustainable innovation: embodied by universities and their

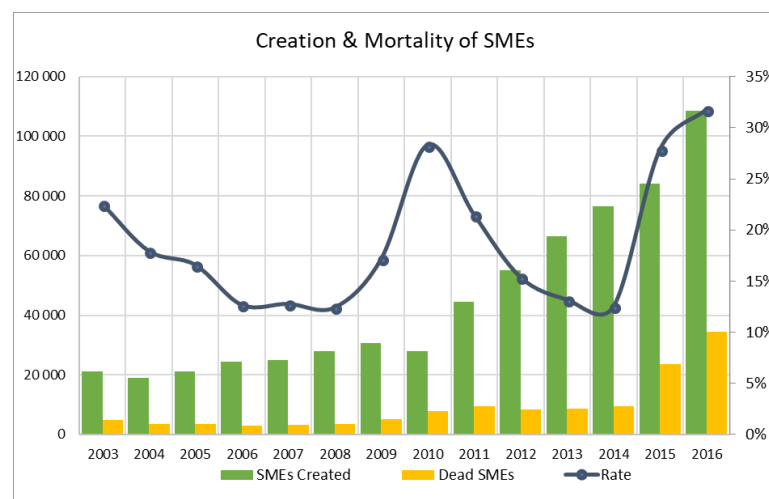
incubators that produce innovations, invent, build, sell or integrate R&D activities;

4. End-users of sustainable innovation: incarnated by civil society who express their cultural, citizen and societal values as well as their needs and concerns;

5. Environments impacted by sustainable innovation: In reciprocal relation, natural environments impact society on socio-ecological aspects and the effects of global warming. In recent years, new processes of strategies consolidation with regional/territorial vocation have emerged: Governance, Industry, University, Civil Society, Natural Environment, etc. These processes stimulate regional innovation and strength economic systems of territories through the Quintuple Helix model that combines knowledge, know-how, as well as the natural environment system into a single holistic framework. The Quintuple Helix model can be used as a transdisciplinary and interdisciplinary analysis framework for sustainable development and social ecology. The complexity of the model implies that a full analytical understanding of all helices requires the continuous involvement of the whole disciplinary spectrum, ranging from the engineering and natural sciences to the social and humanities sciences (Carayannis & Campbell, 2010) where the need of mediation

role between the experts from different fields and with their partner interlocutors contributing to the same innovative project (Baaziz, 2015).

This makes it possible to establish strong transversal junctions between “hard-technologies” and “soft-technologies” (Jin, 2005). On the other hand, to ensure that these junctions have a positive influence on innovation processes that address the issues of sustainable development through the systematic use of open sources of information including patent databases and big data. Starting from this definition, the Quintuple Helix is an innovation model allowing to bring tangible answers by analysis of the economical and societal challenges that constitute the sustainable development through the social inclusion, the education, employment, city, industry, energy, water, agriculture, food safety, domestic and industrial waste treatment as well as the fight against climate change. In a such ecosystem, research efforts and the interests of creators should be oriented, anticipating major developments by providing communication tools and scientific mediation to identify barriers to open innovation and support a targeted policy of shared R&D. In this context, there is a direct link between this approach and the development of a responsible and organized circular economy.



**Figure 7.** Evolution of SMEs creation vs. SMEs mortality between 2003 and 2016  
(Data source: Ministry of Industry and Mines)

Bulletins PME N° 04 (2003) to N° 31 (2017) @ <http://www.mdipi.gov.dz/?Bulletin-de-veille-statistique>



Despite all the legal arsenal deployed, the sustainability deficit of SMEs (in particular startups) is obvious. The causes of this sustainability deficit are numerous. They essentially boil down to the deficiency of ecosystems able to catalyze synergies between its various stakeholders and among others, the difficulty of integrating into a multidisciplinary way of working. Indeed, entrepreneurs are often obsessed with their inventions and technological innovations, they often work solo (and silo) which makes them away from market expectations. The support actions are certainly needed to mitigate the mortality rate of startups but not enough to contain it. Indeed, the mortality rate of Algerian SMEs reached 31.76% in 2016, its highest level in the last fourteen years as shown in the Figure 7.

At this level, we can anticipate many ways to stem the lack of sustainability of startups by delegating some of the mutualized R&D to specialized startups or by encouraging the emergence of startups “on demand” that meet the specific needs of the ecosystem stakeholders, emanating from the state, territories, local authorities or large firms.

The specifications compliance will be the main “access ticket” to the necessary funding to the development of these “integrated startups” as a full stakeholder of the ecosystem.

The issues at the core sustainable development will find cooperative and innovative solutions necessarily environmental-friendly, such as the waste circulation (reverse logistics) or making complementarity offers between several partners of the same ecosystem. The logical consequence of this integration is a fair value added and therefore the right price for the end-user (also considered as an ecosystem player).

By borrowing the paradigm of the city, “urbanized” ecosystem is made up of “useful” and “specialized” blocks. Each block is integrated in the value chain of the ecosystem. The choice of horizontal or vertical integration of the block will depend on the context and the needs of the ecosystem. Hence, the need to identify barriers to open innovation and support a targeted policy of mutualized R&D.

We call “vertical integration” in the context of the Quintuple Helix ecosystem, when this ecosystem tries through one or more of its stakeholders, to grasp the full process (end-to-end) of its products or services.

When several stakeholders in the same ecosystem are involved in a given process, this vertical integration is necessarily cooperative. The benefit of a such integration resides in the ability to make skills synergies, to manufacture more easily innovative products (through mutualized R&D), to master costs by mutualizing means and resources, to put the right price of products and services available to all other stakeholders in the ecosystem, etc.

We call “horizontal integration” in the context of the Quintuple Helix ecosystem, when an extremely wide range of goods and services are produced from a common basis (strong mutualization of means and resources) by various stakeholders belonging to the same ecosystem.

Smart specialization invites us to consider the following requirements:

- Investments should not be made exclusively for short-term speculative financial reasons, but in the context of developing sustainable partnerships and solvent future markets;

- Investments must include training ecosystem actors as well as startups with high integration potential;

- The labor division must follow the principles of smart specialization and complementarity in a win-win strategy and not only in a strategy of comparative or competitive benefits.

The Horizon 2020 European program for financing and supporting research and innovation projects is a timely framework for setting up projects based on the principles of the Quintuple Helix and Smart Specialization and thus to achieve European area of research and innovation. This program consists of three complementary priorities: (1) Scientific Excellence; (2) Industrial leadership and (3) Societal challenges.

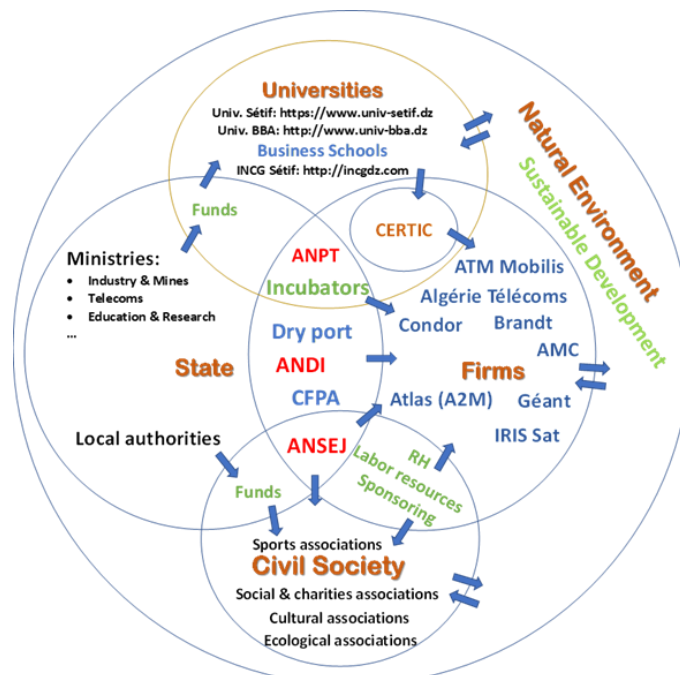
Moreover, Algeria is part of “5TOI\_4EWAS” one of the H2020 projects through its National Institute of Agronomic Research of Algeria (INRAA) and the National Agency for the Valorization of the Results of Research and Technological Development (ANVREDET).

The 5TOI\_4EWAS project focus on Targeted Open Innovation in energy, water and agriculture societal challenges through a balanced innovation-friendly ecosystem in the Southern Mediterranean Neighborhood based on Quintuple Helix and NEXUS approach. The project will enhance and support regional smart specialization and development by increasing research capacity, effective mobility of young innovators/researchers and shared knowledge to improve their participation in the EU research area. It will contribute to the establishment of favorable and stable conditions for international cooperation and the set-up of a Common Knowledge and Innovation Space of specialization in the Southern Mediterranean Neighborhood for a real socio-economic impact, based on co-ownership and mutual benefits (CORDIS, 2017).

The Quintuple Helix approach is also characterized by its “prospective dimension” as it facilitates the broad exploration of “possible futures” to detect development opportunities and to inform common actions of stakeholders of the ecosystem. This prospective dimension is currently reinforced by the development of “clean technologies” which develop among other things, through collaboration between firms in a context where they can be in partial or total “coopetition”. It can also inform us about

the risks that can negatively impact the sustainable development, such as the urban segregation (Theys, 2002) associated to the poor territories in resources and unable to develop such ecosystems. Hence the regulatory role of the State to arbitrate equitably and to reduce the gaps between the rich territories (situated on the coastal zones and the petroliferous zones of Algeria) and the poor territories (situated on the highlands and the southern desert of Algeria).

Yet the poverty of the regions in resources is not a fatality. Indeed, despite the poverty of the eastern highlands of Algeria (mainly the two provinces of Sétif and Bordj Bou Arreridj), the private investors ingenuity has turned them into a new Silicon Valley through joint ventures with the most important South Korean and Chinese manufacturers in the fields of high-tech home appliance and electronics. This region has also become the hub of the agri-food industry. It represents one of the rare Algerian models that fights against the “economic depression”.



**Figure 8.** Embryo of an emerging ecosystem in the Eastern Highlands of Algeria (Provinces of Sétif and Bordj Bou Arreridj)

*The figure 8 show a map of the emerging ecosystem in the Eastern Highlands of Algeria (Provinces of Sétif and Bordj Bou Arreridj) with different relations (informational, functional and/or financial flows) between the five branches of the Quintuple Helix. It's mainly focusing (by simplification) on the cluster of high-tech firms. However, it should be noted that there are other clusters (not represented in the firms' sphere) such as agri-food cluster, drinks cluster, etc.*

*It is obvious that this ecosystem is far from being a perfect example of inclusive ecosystems, but it has the merit of existing and therefore evolving towards an urbanization of which it undeniably lacks. This gap is mainly since it doesn't yet (or sufficiently) include high-potential startups as key provider of innovation and mutualized R&D. Indeed, most of the firms prefer to invest in the development of internal R&D, hence the lack of ambidextrous capabilities.*

Some initiatives go in this direction with the mission of disseminating urbanized ecosystems and evolving ambidextrous capabilities of their firms. This is the case of the Cluster of Operational Excellence, a citizens' initiative launched by a Think Tank "CLEO", which is currently associate state institutions (ANDI, ANDPME and ANSEJ), provincial chambers of commerce and industry (CCI of Algiers, Médea, Chelif, Tizi Ouzou, Sétif and Bordj Bouareridj) as well as the most of their affiliated firms, Business Schools (ENSM and INCG) and consulting partnerships.

## Conclusion

The creation of regional ecosystems within the framework of the Quintuple Helix, undeniably promote innovation and the consideration of sustainable development in economic development that is a fundamental issue for the years to come. This type of ecosystem cannot be assimilated to the existing ecosystems that focus their economic visions on the competitiveness of the expected results.

In this case, it will be necessary to design a creative ecosystem that goes beyond the competition aspects and financial profitability, in order to encourage multidisciplinary networking, act in upstream to meet both local and global needs, strongly involve civil society as a key player in the ecosystem through the media that boost research and open innovation, etc. It is at this price that we can develop a "new social cohesion", not necessarily based on the pursuit of profit, quite the contrary, on the satisfaction of the citizen through the solution of local problems with a strong social implication.

We have presented here some possible orientations of mediation of the Quintuple Helix framework in the service of sustainable development of cooperative ecosystems and integrative of high potential startups. They are not limiting, but they nevertheless provide a useful canvas for thinking.

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## Acronyms:

ANDI: Agence Nationale de Développement de l'Investissement (National Agency for Investment Development) is a governmental institution that aims to promote, support and facilitate investments. Website: <http://www.andi.dz/index.php/en/>

ANDPME: Agence Nationale de Développement de la PME (National Agency for SME Development) has for mission to implement the national policy of SMEs development. Website: <http://www.andpme.org.dz/index.php/en/>

ANGEM: Agence Nationale de gestion du Micro-crédit (National Agency for Microcredit Management) is intended to support craft

activities.  
Website: <https://www.angem.dz/en/home.php>

ANPT: Agence Nationale de Promotion et de Développement des Parcs Technologiques (National Agency for the Promotion and Development of Technological Parks). Website: <http://anpt.dz>

ANSEJ: Agence Nationale de Soutien à l'Emploi des Jeunes (National Agency of Youth Employment Support) is created in 1996 to carry startups and small enterprises projects. Website: <https://www.ansej.org.dz/index.php/fr/presentation-de-l-ansej/presentation-du-l-ansej>

ANVREDET: Agence Nationale de Valorisation des résultats de la Recherche et du Développement Technologique (National Agency for the Valorisation of the results of Research and Technological Development) plays a strategic role in the support it offers as a partner with organizations such as ANSEJ, ANGEM, CNAC, ANDPME and ANDI. It's also connected to the Algerian universities through the setting up of incubators. Website: <https://www.anvredet.org.dz>

CERTIC : Centre d'Études et de Recherche des Télécommunications et des Technologies de l'Information et de la Communication (Center for Studies and Research of Telecommunications and Information and Communication Technologies) is based in the Province of Bordj Bou Arreridj, It's in charge of the realization of scientific research programs and technological development of telecommunications and information and communication technologies. Website: <http://www.certic.dz>

CFPA: Centres de Formation Professionnelle et d'Apprentissage (Professional Training and Apprenticeship Centers).

CNAC: Caisse Nationale d'Assurance Chomage (National Unemployment Insurance Fund) is intended for people who have lost their job. Website: <https://www.cnac.dz>

CNI: The action of the National Investment Council (CNI) concerns the strategic investment decisions and evaluates investment projects having a major interest for the national economy. Website: <http://www.mdipi.gov.dz/?Conseil-National-de-l>

ENSM: Ecole Nationale Supérieure de Management (National Higher School of Management). Website: <http://www.ensm.dz>

INRAA: Institut National de la Recherche Agronomique en Algérie (National Institute of Agronomic Research in Algeria) is a research center whose roles is (1) to develop and execute research programs within its area of expertise; (2) to coordinate at the national level, in collaboration with sectoral and intersectoral structures, agricultural research activities; (3) to participate in the establishment of training and development plans for the purposes of research and (4) to promote research results and ensure their dissemination and use in collaboration with the institutions concerned. Website: <http://www.inraa.dz>

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<sup>1</sup> By overcoming competitive stereotypes, we mean to foster cooepetition wherever it's possible and that there is a common interest in doing so. In the Quintuple Helix approach, each branch encourages and/or encouraged to go in this direction. We do have in mind, that cooepetition in some fields does not exclude competition in others.

<sup>2</sup> To our knowledge, the notion of cooepetitiveness doesn't exist in any literature. By analogy with competitiveness, we define cooepetitiveness by the capacity of an ecosystem to establish cooepetitive relations between its numerous actors.

<sup>3</sup> The Global Entrepreneurship and Development Institute. Link viewed on 06/22/2018 @ <http://thegedi.org/countries/Algeria>

<sup>4</sup> "Chkara" is a term in the Algerian dialect meaning "garbage bag". It sometimes refers to ill-gotten wealth or even corruption when the money from these dubious transactions is transported in garbage bags!