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Innovative entrepreneurship and digital startups in a context of revolution in Information and Communication Technologies (ICT): conceptual insight, case of Algeria

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Abstract:

We are witnessing a revolution in Information and Communication Technologies (ICT). In this new paradigm, entrepreneur-innovators and startups are the drivers of entrepreneurial dynamics. Algeria has taken up the challenge of creating startups through several initiatives. The purpose of this article is to analyze the success factors of innovative entrepreneurship and digital startups in Algeria in the face of the ICT revolution. We rely on an analytical and historical approach to the concepts of ICT revolution, innovation and startups.

We also rely on an empirical approach to the problematic of startups in Algeria. The biggest challenge for Algeria is the sustainability and growth of startups. Therefore, it is appropriate to implement all the conditions for the success of these businesses, in particular by creating an ecosystem or environment favorable to innovative entrepreneurship.

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Key words: Digital revolution; startups; innovation; entrepreneurship; Algeria.

Introduction:

Developed countries have experienced three major technological revolutions, which led to the development of three industrial waves. Among these revolutions, there is Information and Communication Technologies (ICT). Digital technology is underway; it tends to radically modify economic structures, modes of organization and production, working methods, etc.

Indeed, creating added value and jobs, ICT and the digital economy make it possible to achieve major innovations, to achieve gains in productivity and competitiveness, to create new goods and services, to bring new markets, to create new types of jobs. Thus, the impact of ICT on society, the economy, organizations and businesses can be considerable.

Under these conditions, the ICT revolution focuses mainly on innovative entrepreneurship and the creation of startups, particularly in the digital field, because innovation is a very favorable field of action for young digital startups.

In Algeria, with the appearance and development of the digital economy, public authorities are increasingly encouraging the creation of startups and want to take up the challenge of the growth of this category of businesses. With this aim, several initiatives and actions have been undertaken in favor of startups and digital entrepreneurship. Furthermore, a positive and new fact in Algeria, with the appearance of ICT, we are increasingly witnessing the emergence of a new category of entrepreneurs creating startups in the field of IT and digital technology. These startup creators are dynamic, well trained, autonomous, independent and have a modern vision of their businesses. These startup creators want to assert themselves through an innovative project, in which they believe.

From there, the purpose of this article consists of answering the following central question: What are the factors of success of innovative entrepreneurship and digital startups in Algeria facing

the issues and challenges of the Information and Communication Technologies (ICT) revolution? Several additional questions need to be asked, in particular: What characterizes the current Information and Communication Technologies (ICT) revolution? How can we define and characterize innovative entrepreneurship and digital startups? What about the case of Algeria? What are the conditions for the emergence and development of startups in Algeria?

From a methodological point of view, we first adopt an analytical and historical approach relating to the concept of industrial revolution in general and that of digital revolution and ICT in particular, based on the theory of economic cycles and the theory of economic evolution (Schumpeterian theory). We also mobilize the theory of innovation, the theory of the entrepreneur, and that of startups to delimit the theoretical and semantic contours of these concepts. Finally, we address the problem of innovative entrepreneurship and startups in Algeria by counting on the various empirical data and the interviews that we carried out with managers and the various actors concerned by the development of digital startups in Algeria.

SECTION I :Emergence of the digital revolution and Information and Communication Technologies (ICT)

Industrial capitalism has experienced three great waves of technological revolutions, leading to the development of three industrial generations (Julien, Marchesnay, 1997, pp.18-24).

The three major industrial revolutions which have marked the history of developed economies are represented in **table n° 01**. In this sense, we will provide a more and less detailed analysis of the main historical facts in developed countries, since the first industrial revolution until the emergence of the digital revolution and Information and Communication Technologies (ICT)

Table n° 01: The three great industrial revolutions of developed economies

1780-1800	1840-1870	1890-1920	1945-1950-1970	1990 until today
1st R.I. Steam machine	Railway revolution	2nd R.I. Internal combustion engine, Electric motor	Scientific revolution, Physics Chemistry	3rd R.I. Electronics, IT, Revolution in Information and Communication Technologies

Source: Biales Christian: « The new economy in questions ». In https://christian-biales.fr/wp-content/uploads/2020/07/nouvelleeconomie.pdf p.47.

To build his theory of cycles, Schumpeter relied on the work of Juglar, which is based on that of Kondratieff (each Kondratieff is made up of six Juglars). But, while Juglar bases the dynamics of cycles on investment, Schumpeter replaces it with entrepreneurs. According to Schumpeter, the entrepreneur is the engine of « creative destruction». The crisis is therefore a normal, necessary, temporary and inevitable phenomenon. Schumpeter attributes to technical progress a relatively important role in the mechanism of crises. It is a sign of adaptation of the system to change (Boutillier, Uzinidis, 2013, p.30).

First Requirement: The first two industrial revolutions

Paragraph 1: The first industrial revolution

We believe that the great inventions were born in 1780 and began to really bear fruit, because they led to the production and marketing of innovative machines, more productive and more profitable than the previous ones.

In so-called regulation theories, we distinguish two phases in an industrial generation: « extensive » and « intensive »:

The extensive phase corresponds to the years 1780-1820. New processes and products are developed, involving heavy investments in the sector of production goods and intermediate products. The production of cast iron and steel, textile products, etc.

The second intensive phase goes from 1820 to 1880. It marks the search for the exploitation of «generic technologies » for the production of products aimed at the consumer goods sector. The improvement of transport, its speed, its flow, the reduction of its costs were determining elements of this expansion of markets (Verley, 2013, p.17).

English industry is the most progressive in the world, followed later around 1860 by France.

In short, this revolution combines the following elements:

-The driving industries: textiles, iron and steel.

-Energy: coal.

-Transport: rail transport (railways), steam locomotive (1829).

- Communications: the telegraph (1791).

-The typical entrepreneur : John Davison Rockefeller (1839-1937).

Paragraph 2: The second industrial revolution

This industrial revolution begins with a technological revolution, which will induce what the economist Joseph Schumpeter will call in the 1930s, « innovation clusters » or the phenomenon of creative destruction that is inherent to industrial capitalism.

Major inventions, providing generic technologies that branch into product and/or process innovations :

-The transformation of the steel industry: more resistant and lower cost.

-The exploitation of electrical energy: accumulators, electric lighting, refrigerator, electric elevator, etc.

-The development of the internal combustion engine, with applications for automobiles and aeronautics.

-The discoveries of chemical principles in Germany, leading to the chemistry of artificial dyes and organic chemistry.

-The development of food products based on the principle of food preservation.

After the Second World War, industrialized countries entered the intensive phase of the second industrial revolution, or the « Society of Abundance » according to Kenneth Galbraith.

In this framework, growth is based on demand for individual consumer goods, industrialized on a large scale. Jean Fourastié, French economist, popularized the expression « Trente Glorieuse » (1945-1975), to summarize this period of very strong growth.

To sum up, this revolution combines the following elements:

-Driving industries: automobile. Chemistry, household appliances, detergents, etc.

- Energy: oil and gas (fossil fuels).

-Transport: concrete highways.

- Communications: landline telephone, television, radio.

-The entrepreneur – type: Henry FORD (1863-1947).

After 1975, the difficulties of the industrial system called into question the driving force of the second industrial revolution.

Second Requirement: The third industrial revolution in Information and Communication Technologies (ICT)

Paragraph 1:General overview of the digital and ICT revolution

During the Second World War, several technological revolutions took shape, which would dominate industrial capitalism after 1975: The transition from electricity to electronics, nuclear power, new organic chemistry, jet propulsion of aeronautical vehicles, etc. But the standard example of the product of the third industrial revolution is undoubtedly

Information and Communication Technologies (ICT). Indeed, computing is stabilizing in a series of generations of increasingly powerful computers during the extensive phase.

From 1975, the computer will gradually be conceived as an individual consumer product (P.C.), leading to a radical modification in this intensive phase of exploitation of generic technology, of the structure of the global ICT industry.

The ICT revolution bases its growth on scientific and technical advances in the fields of electronics, computing and telecommunications.

The ICT sector brings together « companies that produce goods and services supporting the process of digitalization of the economy, that is to say the transformation of information used or provided into digital information (computing, telecommunications, electronics) » (Gublin Guerrero, 2015, pp.2-3.).

The transversal nature of the digital economy impacts all sectors of activity, it is at the origin of new innovative sectors and has made the existence of other sectors which is dependent on it. It consists of :

-The ICT sector: hardware and software components and IT services, telecommunications.

-User sectors such as: agriculture, distribution, health, automobiles, transport, tourism, banks, etc.

-Sectors with high digital content, the latter could not exist without these technologies such as: e-commerce, video games, online music, online services (Gublin Guerrero, 2015, pp.2-3.).

Paragraph 2: Specificities of the ICT revolution

It is possible to highlight some specificities of the ICT revolution:

-Inventions are spreading at a faster rate today than yesterday. It took 46 years for a quarter of American households

to be connected to electricity (invented in 1873); 55 years for the automobile (1886), and 7 years only for the Internet (1991).

-ICTs are developing according to the new tornado model. Several technologies such as computing, telecommunications, audiovisual and robotics are converging towards the same technical standard, that is to say digital.

-While previous industrial revolutions primarily concerned one sector of activity, the ICT revolution has the property of being transversal and spreading to all sectors of the economy.

-We see a convergence of various new technologies among themselves, more particularly, the convergence between ICT, biotechnologies and nanotechnologies (Biales, 2020, pp.51-52.).

Basically, this revolution combines the following elements:

- Driving industries: ICT sector and user sectors.

-Energy: renewable energies (solar energy, wind energy, hydraulic energy, biomass, geothermal energy, tidal energy (tidal energy).

-Transport: information highways (optical fibers), 5G networks, transition to plug-in electric or fuel cell vehicles (Rifkin, 2012, p.100).

- Communications: cell phones, smartphones, Internet network.

-The typical entrepreneur: Steve Case (founder of AOL), Jeff Bezos (founder of Amazon), Steve Jobs (Apple), Mark Zuckerberg (founder of Facebook-Meta), Travis Kalanick (UBER), Elon Musk (Tesla, Twitter, SpaceX). These are the famous creators of digital startups.

SECTION II: Innovation, innovative entrepreneurship and startups

Innovation occupies a leading place in the creation and growth of startups. Thus, before delimiting the field of startups, it is very useful to look at the notion of innovation.

First Requirement: The concept of innovation and its classifications

We successively address some basic elements on the meaning of innovation, its classifications and its link with entrepreneurship.

Paragraph 1: Definition of innovation

In what follows, we present three definitions of innovation (Hermel, Louyat, 2008.p.3.). For Grand Larousse, innovation is: « the entire process that takes place from the birth of an idea to its materialization (launch of a product), including market research and the development of the prototype and the first stages of production ».

For Peter Drucker, innovation: « It is the design and creation of something new, still unknown and non-existent, in such a way as to establish new economic contributions from the combination of old, already known and existing elements , by giving them a new economic dimension ».

The Organization for Economic Co-operation and Development (OECD) defines innovation as « the implementation of a new or significantly improved product (good or service) or process, a new marketing method or a new organizational method in business practices, workplace organization or external relations».

You should know that an invention is a technical solution to a technical problem, while innovation is the art of transforming knowledge into wealth. Innovations are intended to be commercialized.

Paragraph 2: Types of innovations

A .Types of innovation according to their nature

In the different innovations by nature, it is appropriate to retain the following typology: (https://www.institutreindus.fr/wp-

content/uploads/2017/11/6-Ouvrage-Chap-1.pdf, consulted on 17/ 02/2024).

-Product innovation: for a product (a good or a service), the novelty or improvement may relate to the technology which is used or to its functional characteristics. In other words, it is not useful to bring a new technological element to innovate. Therefore, combining existing technologies to offer new applications can give rise to innovation which can even be radical.

-Process innovation: it is based on the introduction of new methods or the significant improvement of existing methods in the production or distribution activities of the firm. These methods may concern technical, hardware or software means. This type of innovation can also extend to the firm's support activities; such as purchasing, accounting and maintenance, etc.

-Marketing innovation: it is linked to the implementation of a new method changing in a remarkable way the design or packaging of products, their placement at the point of sale, their mode of promotion or their pricing. For example, a change in the shape of the product, without modification of the technological or functional characteristics; the introduction of online sales in a firm, etc.

-Organizational innovation: it is based on a change in company practices, in the organization of the workplace or in the way in which external relations are managed. In old models of innovation, organizational change was seen as a reaction to technical progress. Now, organizational innovation is considered as a prerequisite for technological innovation (OECD, 2005). Examples of organizational innovation include: employee training, distribution of responsibilities, structuring of management decision-making, the integration of partners or clients into the firm's processes (**see following table**).

Table n° 02: Types of innovation according to their nature

Type of innovation	Signification	Dimensions
Product (a good or a service)	Introduction of new features or significant improvement of existing features	Technological, Functional (use)
Process (production or distribution)	Introduction of new methods or significant improvement of existing methods	Technical, Hardware, Software
Marketing	Introduction of new methods involving significant changes	Placement, Promotion, Pricing, Design and Packaging
Organisation	Introduction of new methods	Company practices, Workplace organization, External relations

Source : established by the author, January 2024.

B. Classification of innovations according to their degree

Innovations can be radical (disruptive) or incremental (continuous). They can be distinguished on two dimensions: their proportion of new technologies and the degree of differentiation provided in response to consumer expectations compared to the existing offer (**Cf . Table n°03**).

Table n° 03: Types of innovation according to their degree

		Degree of differentiation in the response to consumer expectations	
		Low	High
Degree novelty technologies Incorporated	Low	**Incremental Innovation**	**Breakup of the Market**
	High	**Technological Breakup**	**Radical Innovation**

Source: Developing a new product (Methods and tools), D. Gotteland and

C. Haon, Pearson Education, Paris, 2005, p.2. Quoted by Hermel Laurant, Louyat Gérard: « Innovation in services », Afnor Editions, Collections Stratégie et Organization, Paris, 2008.p.19.

Examples:

-Incremental innovation: minor change to an existing product (laptop versus desktop).

-Radical innovation: new technology and new application (cellular telephone, Internet network).

-Market disruption: not linked to technological progress, but providing a considerable benefit to consumers (Easy-Jet).

-Technological Breakthrough: almost identical functionalities, but use of a technological advance beneficial to consumers (iPod compared to the Walkman, flat screen compared to a cathode ray screen).

Experience shows that radical innovations are rare. Several studies carried out on new references sold in major retailers have revealed that only 3% of them represented responses to truly new needs. A question here arises: at what level of innovation can we speak of a startup?

Paragraph 3: Innovation and entrepreneurship

In the theory of economic evolution, which has become an essential reference, Schumpeter develops an original analysis of capitalism whose undisputed actor is the entrepreneur. The Schumpeterian entrepreneur is part of a historical dynamic, in perpetual evolution. Schumpeter makes the entrepreneur the figurehead of capitalism. Placing itself within an evolutionary dynamic, the figure of the Schumpeterian entrepreneur is not clearly fixed. Thus, Schumpeter links entrepreneurial innovation and the cyclical evolution of capitalism by distinguishing between pioneering or revolutionary entrepreneurs and imitators.

To this end, Schumpeter paints the portrait of an entrepreneur quick to take on challenges, rejecting routine to go against the established economic order. The entrepreneur is the economic agent who innovates. The entrepreneur is the engine of « creative destruction ». In this context, it is the entrepreneur who keeps the capitalist machine moving by developing new objects of consumption, new methods of production and transport, new markets, new types of industrial organization (Boutillier, Uzinidis, 2013, p.31).

In other words, the entrepreneur is a sort of hero of capitalist dynamics and creative destruction, to the extent that he is capable of creating new productive combinations: new products (goods or services), new markets, new materials and new forms of organization. Entrepreneurship and innovation are then almost synonymous (Ben Slimane, M'heni, 2018, p.5.).

Following the development of large capitalist structures, it is found that large oligopolistic companies predominate innovation processes. Innovation takes place in R&D laboratories within the framework of a managerial organization. This is closed innovation. In this case, innovation is independent of entrepreneurship.

With the revolution in Information and Communication Technologies and digital technology, a new approach to innovation is adopted. In this case, the entrepreneur, creator and startup manager become actors in the innovation process.

Based on this, we adopt the following definition of innovative entrepreneurship: it is an activity and a process which consists of designing, producing and marketing innovations of a diverse nature, presenting interesting prospects for creating added value on a given market.

Second Requirement: The notion of startup

High tech company, high technology company, advanced technology company, high tech firm, knowledge - based firm, new technology - based firm (NTBF) in English, are some of the most commonly terms used to name startups. We present in what follows the meaning, particularities and characteristics of this type of company.

Paragraph 1: Meaning and particularities of startups

A startup or « young growth» describes « a young innovative company (innovative project) generally in the high technology sector which is in the start-up phase and which presents significant growth potential. The term comes from the English start (to start) and up (to show the growth potential) ».

In this respect, according to several observers, we can emerge from the new technological paradigm in progress, three sectors of high technology, mainly: Information and Communication Technologies (ICT) and digital, biotechnologies and nanotechnology. But it seems that ICTs are characterized by a greater degree of maturity, their innovations are more radical and their impacts on society, the economy, organizations and businesses are more tangible.

Under these conditions, the digital startups that are the subject of our research combine the specificities of the following situations: acceptance of uncertainty and risk, speed of execution and entrepreneurial spirit.

Furthermore, startups share common characteristics with several types of traditional businesses. However, they are at the intersection of three circles (Bernasconi Michel, Monsted Mette, 2000, pp. XIV-XV):

- First, the youth phase of these firms.

-Then, they are part of innovative companies (Marty, 2002, p.4.). Of course, innovation is not the preserve of technology. Innovation is very present in services.

-They ultimately have the characteristics of small businesses. The specificity of small size is relevant, particularly in the management mode and access to resources (Boissin, Grazzini, Tarillon, 2019, p.21.). Nevertheless, for a startup that is more oriented towards growth, it should not only be a transitional phase (Lasch, Le Roy, Yami, 2005, p.37.).

The particularities of startups are due to the uncertainty in which they develop, the lack of resources and risk-taking. Under these conditions, the appropriate models are rather the learning and discovery models. Strategies are not linear, but made up of adaptive pathways. Development that follows strong growth and organizational methods are constantly evolving.

As such, one of the great strengths of American startups is their growth management capabilities, their know-how to lead a startup to the rank of a global company in a few years. This is based on the experience accumulated in innovative entrepreneurship.

Finally, the survival and growth of digital startups are very delicate issues, to the extent that « the five-year survival rate of these companies is only 38.7%, while it is 46.3% in low-innovative sectors and 51% in medium-high technology sectors » (Lasch, Le Roy, Yami, 2005, p.37.).

Paragraph 2:Characteristics of startups

The extraordinary entrepreneurial dynamism of a large number of startups is the key to the development of Information and

Communication Technologies and the growth of the digital economy. As such, the characteristics that are specific to startups have been described by different authors, such as Cooper, Albert and Mougenot, these are in particular the following (Bernasconi, Monsted, 2000, p.3.):

-They belong to very unstable sectors of activity, in particular because of the speed and scale of technological developments.

-They have higher Research and Development (R&D) expenses than the national average.

-They often live in close contact with scientific circles.

-They have a high proportion of highly qualified staff.

-Their products or services have high added value and generally have a short lifespan.

-By innovating on the market, they disrupt the previous balance, thus contributing to modifying demand and often creating a new market.

-Generally aimed at a limited number of customers, they will have to conquer an international, even global market.

-They often require high investments in marketing and distribution.

-They have specific financial needs (Hege, 2001, p.291.), both from the point of view of financial engineering and of the actors: venture capital (Dubocage, 2006, p.9.), Business Angels, financing participatory or crowdfunding, FinTech, etc.

-They often require high investments which are a function of three factors, namely: the cost of implementing the know-how used (R&D, production, marketing-sales), the time of immobilization of these resources to create a profitable economic activity and hazards.

In short, creating a startup is a very high-risk situation. Indeed, a startup operating in an unstable environment necessarily lives with a high degree of uncertainty.

SECTION II: Digital startups in Algeria

Based on empirical data and interviews that we carried out with those responsible for promoting startups in Algeria, we

evaluate in this paragraph the first results concerning the Algerian experience in terms of creation and development of startups after having examined the various initiatives in this area.

First Requirement: Algeria's initiatives in favor of startups

In what follows, we will examine Algeria's general initiatives in favor of innovative entrepreneurship and startups and those of the Algerian university in the same direction.

Paragraph 1: Initiatives in favor of the general ecosystem startup

The ecosystem set up in Algeria for the creation and development of startups reflects the desire of public authorities in this area in order to stimulate economic growth, by progressing in the digitization of the national economy.

The signal is first given by the creation of a ministry dedicated to the knowledge economy and startups. Indeed, the department of the knowledge economy and startups, which was merged with that of micro-enterprises in September 2022, is promoted to the rank of a ministry in its own right.

Subsequently, appropriate regulations were put in place to supervise the Information and Communication Technologies (ICT) sector and support the creation of startups. This is how a national committee for the labeling of startups, innovative projects and incubators was created by executive decree n° 20-254 of September 15, 2020 establishing its creation and operation.

The launch of the first public fund intended for startups « Algerian Startup Fund » (ASF), a public venture capital company owned by six banks and with capital of 1.2 billion DA (6.4 million euros) and the creation of the Algerian Innovation Fund, in collaboration with foreign investment funds.

In this context, the ministry created the high innovation council, responsible for labeling startups and incubators likely to benefit from funds. Companies with the « Startup label » can access several advantages. To obtain the « Startup label », the ministry, which is delegated to the Prime Minister responsible for the knowledge economy and startups, has introduced four objective standards making it possible to establish the innovative nature of the company's activity (https://www.aps.dz/economie/139387-startup-les-nouvelles-normes-pour-l-ouverture-du-label-startup-devoilees, consulted on 16/12/2023.):

-The standards consisting of expenditure on research and development (if the company spends 15% of its turnover on research and development),

-The quality of the founding members (if half of the members of the founding staff hold a doctorate or more).

-An intellectual property (if the company obtains a patent for invention or a program registered at the national or international level).

-The last standard is to present a prototype. Indeed, the applicant for the label can present at least one prototype of the submitted innovation, specifying that this prototype can take several forms like an electronic platform in final version or in demonstration version.

In addition to the granting of tax advantages such as exemption from taxes for four renewable years or the reduction in customs duties and VAT, the « Startup label » grants the support of the delegated ministry, with the possibility of obtaining financing, coverage of costs linked to invention patents and intellectual property, a financial support program, procedures linked to the export of digital services..

The legal supervision of Crowdfunding operations by the Stock Market Operations Supervisory Commission (COSOB) is intended to provide a response to the financing needs that is specific to this type of high-risk business.

Furthermore, the establishment of infrastructures which is dedicated to digital technology such as technopoles or the Sidi Abdellah cyber park, is also supposed to strengthen the startup ecosystem in Algeria.

The promulgation of the law on the self-employed, which grants entrepreneurs eligible for this status tax advantages, with a preferential tax regime at the rate of 5% reduced to 0.5% in the 2024 finance law, as well as social coverage.

The creation of the Scientific Council on Artificial Intelligence, composed of Algerian experts and researchers which is established inside and outside the country.

The organization of the first two editions of the African Startup Conference (2022 and 2023) in Algeria, giving rise to the adoption of a roadmap for the revitalization of the startup ecosystem in Africa, as well as the adoption of the first declaration of Algiers (2022) for the development of startups in the continent by the African Union (https://al24news.com/fr/algerie-les-startups-une-evolution-fulgurante-dun-secteur-promising/, consulted on 02/01/2024).

Paragraph 2: Specific initiatives in favor of university startup ecosystem

Innovation, a concept that distinguishes startups from so-called traditional companies, can find its natural environment in university. It is required to promote the results of scientific research by transforming them into marketable innovative ideas. This is how a strategy was put in place for the higher education and scientific research sector with the aim of promoting innovative entrepreneurship.

The strategy of the higher education sector is based on interministerial decree n° 1275 of september 20, 2022 relating to the startup diploma and innovative projects diploma. The latter allows students with innovative ideas to prepare a « startup

diploma » or « innovative project diploma », in order to benefit from a label and access the advantages attached to these labels.

In order to support this approach initiated by order n° 1275, a certain number of interfaces have been set up within all higher education establishments: incubators, technology support center and innovation (CATI), business-university liaison office (BLEU), university entrepreneurship development center (CDE), artificial intelligence houses, etc.

The incubators are supposed to support students carrying innovative projects/startups through a battery of training courses on Design thinking, Business Model Canneva (BMC), financial study, market studies, etc, in addition to ensuring the financing of prototypes concerning incubated projects and the payment of patent filing costs at the national and international levels. The protection of innovative ideas is ensured by the CATI, while the necessary networking for project leaders is the responsibility of the BLEU.

Other interfaces and platforms are also expected to play their role, such as the DGRSDT's IBTIKAR platform, which allows the pooling of research center equipment for the benefit of project leaders. The startup.dz platform supports project leaders in their requests for labels, patents, etc.

Second Requirement :First results of the Algerian experience in terms of creation and development of startups

The ecosystem is defined by the interconnection of the actors who form it, given the embryonic nature of the Algerian experience, the latter must be strengthened to ensure expected results.

Thus, it is premature to give an exhaustive estimate of the sector of startups and innovative entrepreneurship in Algeria since the initiatives and actions undertaken in this area are very recent. Indeed, since 2022, this sector has been considered, in particular by a dazzling evolution thanks to support measures and

legislative texts which have boosted entrepreneurship based on knowledge and innovation.

As such, in 2023, according to a website specializing in the ranking of startups and startup ecosystems in the world « Startup Ranking », Algeria was in second place in Africa after Nigeria, third place in Africa is Egypt, while South Africa is in fourth place. At the global level, Algeria is ranked in 18th place with 799 startups (https://www.startupranking.com/countries, consulted on 16/12/2023). At the start of 2024, Algeria is still ranked second in Africa after Nigeria. Globally, it is ranked 18th with 814 startups (https://www.startupranking.com/countries, consulted on 12/02/2024).

The number of active incubators on the national territory has increased from 14 to 60 over the last three years.

Algerian consumers are beginning to increasingly adopt electronic payment technologies. We are also witnessing the emergence of a category of entrepreneurs creating startups.

Thus, in terms of results, the potential for creation and development of startups in Algeria is recognized (StartupBlink), and the possibilities of improving the ranking of the latter in terms of startup creation exist. However, the assessment of the Algerian startup ecosystem should be done over a slightly longer period.

Regarding universities, according to the National Commission for Coordination, Monitoring of Innovation and University Incubators (CNCSIIU), in 2023, the national committee for the labeling of startups, innovative projects and incubators awarded 12 startup labels and 405 innovative project labels on a national scale. The obvious observation is to recognize that the university ecosystem is satisfactory when it comes to generating innovative projects. The idea is to see how to transform these innovative projects into marketable ideas, that is to say, innovative entrepreneurship and digital startups?

Third Requirement: The Problem of financing innovative entrepreneurship and digital startups in Algeria

The question of financing startups in Algeria is very delicate, taking into account the particularity of the innovation process and the entrepreneurial dynamics in digital startups, the importance of the risk characterizing the latter, etc.

Risk-taking is a central element in the financing problem of digital startups. Therefore, alternative financing methods such as venture capital companies (SCR), FinTech and crowdfunding should be encouraged, to the extent that the Algerian financial system is still dominated by banking intermediation. Crowdfunding methods are alternatives adopted in innovative environments such as Silicon Valley and Route 128 in the USA. Due to the importance of the positive signal sent about the project, venture capital provides credibility and reassures other investors about the solidity of the project. While crowdfunding investors constitute « proof» that a large community is interested in the project.

Regarding the Algerian Startups Fund (ASF), you should know that it has the capacity to inject 24 billion DA into the financing of startups in Algeria. This fund has invested in 22 areas including 6 FinTech and 5 AgriTech (data collected from the Director General of the ASF, 04/04/2024). In addition to financing, the ASF also offers services such as the implementation of startup valuation methods, training of students to prepare them to intervene in the financial market, etc.

Forth Requirement: The conditions for success of innovative entrepreneurship and digital startups in Algeria

Innovative is both the action of innovating and the result of this action. Thus, innovative entrepreneurship should be considered as a process. Therefore, the creation of startups in Algeria is a necessary condition, but not sufficient. Above all, we

will have to think about the survival, sustainability and growth of these companies, particularly through a certain number of conditions for success which we summarize in the following:

-The concept of startup must be contextualized in space and time. Consequently, taking into account the specificities of emerging countries such as Algeria is a sine qua non condition for the development and success of such a model which must be part of a new entrepreneurial paradigm.

-Innovative entrepreneurship which is at the heart of digital startups needs to be rethought, by situating it, revisiting the Schumpeterian approach and not confusing innovation with novelty and/or imitation. This will make it possible to insert Algeria into the global value chain and into the international division of labor in light of the ever-increasing developments of the ICT and digital revolution or the third industrial revolution.

-The establishment of a public policy dedicated to innovative entrepreneurship, digital startups and the knowledge economy requires clarification of the institutional levels which are responsible for: the definition of the overall vision, adapted financing and territorial specificity (Célérier, Arfaoui, p.43.).

-We should not be satisfied exclusively with a proactive approach in the creation and development of digital startups, but rather encourage the emergence of spontaneous innovative environments dedicated to innovative entrepreneurship and digital startups.

-Incubators should not be exclusively public and academic. We should initiate an innovative dynamic within environments that have predispositions through the identification of latent needs and the involvement of private donors and success stories.

-The capacity building of future digital entrepreneurs must be accompanied by a logic of establishing a digital ecosystem adapted to innovative ideas.

-Strengthening the mechanisms for selecting innovative projects and startups in the awarding of labels through concrete incentives during launch, which will reduce the failure rate.

-Remove a certain number of logistical obstacles linked to the use of Information and Communication Technologies (ICT), such as very high speed Internet (5G) and the improvement of interconnection networks. Indeed, the growth of startups is dependent on the development of ICT.

-Big data and the development of platforms dedicated to startups require the strengthening of cyber security (Benyahia, 2018, p.21.).

-The emergence of digital startups is closely linked to the development of online commerce and electronic payments.

-Putting the human factor at the heart of the creation and growth of startups, because innovative entrepreneurship is first and foremost a culture and a state of mind.

-Encourage and launch training offers in areas related to digital startups (e-commerce, digital marketing, FinTechs, etc.).

-The management of digital startups shifts us towards a profound reconfiguration of their organizational structures, due to the development of digital technology (Meyssonnier, 2015, p.33.).

-Look into reforms of the financial system by giving a role to the financial markets, the only ones which are capable of capturing private venture capital and reviewing a certain number of laws, in particular the 2006 law relating to private equity companies to make them more dynamic and distance themselves from traditional bank financing.

-Dynamization of the financial market so that it plays its role of mobilizing savings oriented towards risk-taking.

-The problem of financing startups must be resolved by the development of financial innovations going beyond the products offered by traditional financing: venture capital companies, participatory funds, crownfunding, business angels, FinTech, etc.

-Promote innovation in the financial field by directing it towards financial startups designated by Fintechs, in order to open the doors to new methods of financing startups and financial services, with an expected impact in terms of improvement in the financial inclusion rate of populations.

Conclusion:

To conclude, it is easy to see that we are witnessing a new economy around Information and Communication Technologies (ICT) and the digital economy. Under these conditions, entrepreneurs creating digital startups have a big role to play in the technological and organizational innovations underway.

As such, the concepts of innovative entrepreneurship and digital startups are very complex, which suggests a contextualized approach and not a simplistic vision. Furthermore, the creation of digital startups is a necessary condition, but not sufficient, because the biggest challenge is the survival, sustainability and growth of these companies, hence the importance of the innovative environment and the entrepreneurial ecosystem.

For Algeria, several initiatives have been launched in favor of the creation of startups. For example, universities have been involved in establishing the university-startup diploma and the university-patent of invention diploma, or even the creation of the status of the student-entrepreneur and the student-entrepreneur diploma. However, the real challenge remains the evaluation of the proven or expected effects of these companies on the microeconomic and macroeconomic levels, notably through the creation of added value and the creation of jobs, not to mention their contribution to the diversification of the national economy in order to give Algeria an appreciable place within the framework of the international division of labor induced by the ICT revolution.

In short, according to our response, the success of the various initiatives in favor of the promotion of digital startups in Algeria requires the implementation of a certain number of conditions, such as: implementing a global, coordinated policy and well thought out when it comes to innovation; establish a regulatory framework adapted to startups and innovative entrepreneurship; develop viable and competitive startup incubators and technology parks; attract large foreign companies in the ICT sector; stimulate the creation of financial institutions dedicated to financing startups; promote the content and software industries; develop online commerce and electronic payments; train in the professions of high technology; creating bridges between universities and businesses; network startups, etc.

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