

Digitalization and Innovative Entrepreneurship: Conceptual Analysis and Case Study via the Business Model Canvas

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Abstract: In a context characterized by the acceleration of technological transformations, innovation emerges as a key determinant of competitiveness and organizational performance. The spread of digital technologies, particularly the Internet of Things (IoT), cloud computing, augmented reality (AR)-virtual reality (VR) and UX/UI design..., enhances companies' adaptability by optimizing their operational processes, internal coordination, and value creation.

This article aims to explore the structuring role of digitalization in the development of start-ups, highlighting how it fosters the emergence of agile and scalable entrepreneurial models. A case study, analysed using the Business Model Canvas, empirically illustrates the impact of digital tools on the configuration and viability of a start-up's business model.

Keywords: Start-up, innovation, entrepreneurship, digitalization

JEL Classification: M13, O31, O33, Q55, L86.

ملخص: في سياق يتميز بتسارع التحولات التكنولوجية، يظهر الابتكار كمحدد رئيسي للقدرة التنافسية والأداء التنظيمي. نشر التقنيات الرقمية ، ولا سيما إنترنت الأشياء ، والحوسبة السحابية ، والواقع المعزز-الواقع الافتراضي ، وتصميم تجربة المستخدم/واجهة المستخدم.... يحسن قدرة الشركات على التكيف من خلال تحسين عملياتها التشغيلية والتنسيق الداخلي وخلق القيمة. تهدف هذه المقالة إلى استكشاف الدور الهيكلي للرقمنة في تطوير الشركات الناشئة ، وتبسيط الضوء على كيفية تعزيز ظهور نماذج ريادة الأعمال الرشيقة والقابلة للتطوير. توضح دراسة الحالة، التي تم تحليلها باستخدام لوحة نموذج الأعمال (Business Model Canvas)، بشكل تجريبي تأثير الأدوات الرقمية على تكوين وصلاحيات نموذج أعمال الشركة الناشئة. الكلمات المفتاحية: الشركات الناشئة، الابتكار، ريادة الأعمال، الرقمنة.

1. Introduction

The rise of start-ups is due to their capacity for rapid innovation, in line with the perspective of (Drucker, 1986) for whom innovation is the central engine of entrepreneurship. This ability, based on a methodical and experimental approach, characterizes agile organizations capable of transforming opportunities into value.

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This dynamic unfolds in a digitalized environment that (Castells, 2017) describes as a networked society, where information flows reshape economic interactions and amplify the role of technology in organizational competitiveness.

Accordingly the technologies for (McLuhan, 1968) transform communication modes and economic models. Each new medium reconfigures social practices and expands human capabilities, a process that is particularly visible in the innovative strategies of start-ups.

Thus, companies or groups can use digital software to distribute tasks and monitor them. In this context, digital leadership¹ plays a leading role by redefining the nature of projects, directing them more towards innovation. This process promotes a dynamic of innovation by inspiring teams through exemplarity and establishing a shared vision (Holten & Brenner, 2015).

Our problem focuses on how digitalization helps a start-up to strengthen synergies between its actors (partners, customers, etc.), to optimize its costs and to secure sustainable financing to guarantee the viability of its Business Model Canvas.

In our reflection, we will start by recalling the process of digitalization and the mobilization of teams around while highlighting the interaction between entrepreneurship, innovation and start-ups. We will review the regulatory texts governing start-ups in Algeria, we will then list the main obstacles encountered by start-up projects and then we will discuss the actions and devices put in place by the Algerian authorities to encourage the emergence of innovative start-ups.

In a context where digitalization is transforming business sectors, health is no exception. In particular, the follow-up of pregnant women requires increased attention, both medically and psychosocially. In this perspective, we present a practical case intended to illustrate the process of developing a Business Model Canvas (BMC) by the student Remache Asma (Master 2 Entrepreneurship and 5th year midwife) for a start-up dedicated to the creation of a digital platform specifically designed to support pregnant women throughout their pregnancy. For this, a survey will be carried out using a questionnaire addressed to midwives, doctors, as well as public and private clinics.

This project aims to answer crucial questions: how will the start-up be able to take advantage of the synergies between the different actors such as partners and customers? What will be the main costs associated with the development of this initiative? We state the following hypotheses: On the one hand, digitalization promotes and amplifies synergies between partners, customers and stakeholders, thereby strengthening the start-up's ability to generate and capture value. While on the other hand, digital solutions increase project visibility and credibility, supporting continuous financing and improving the viability of the

¹ It is about the strategic use of technology by a company or an individual in order to create value and achieve goals.

Business Model Canvas. This analysis will allow us to explore in depth the dynamics at work in the project and to identify the levers necessary for its success.

2. Conceptual framework

2.1. Digital culture

The digital leader must be able to promote a culture focused on innovation, experimentation and constant learning at the level of his organization. However, the status of a digital leader can fluctuate depending on the organization and its context. Usually, a digital leader is considered a crucial stakeholder in a company's digital transformation process. Understanding the status (see Table (1) of a digital leadership is important to understand how leaders can influence digital transformation and mobilize their teams around a common vision:

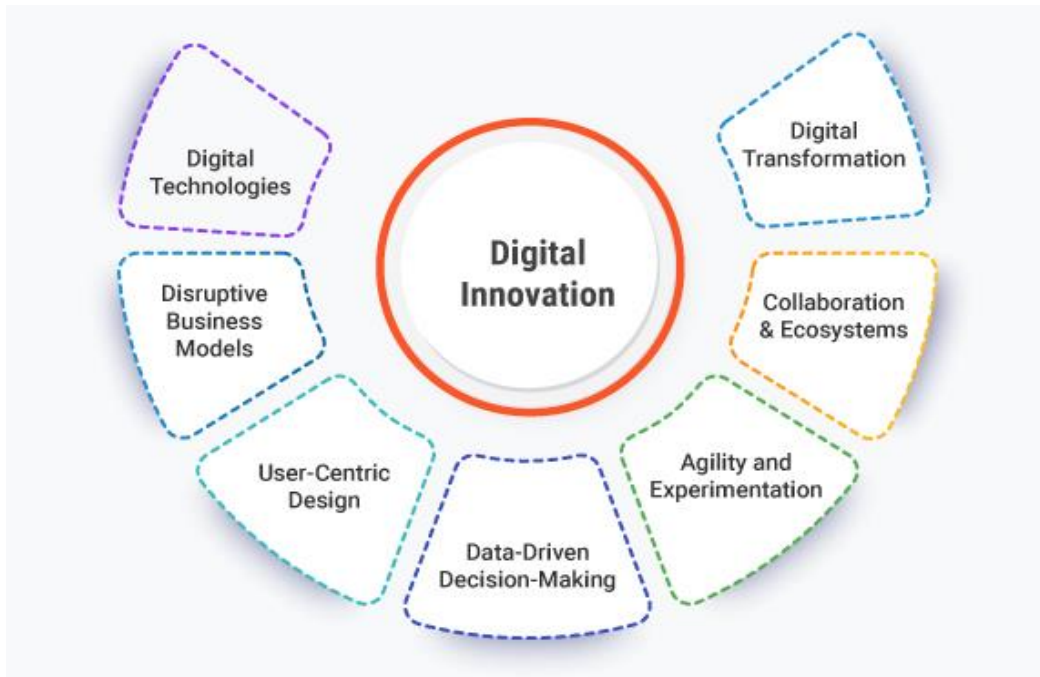
Table (1): The characteristics of the status of digital leadership

ASPECTS DU LEADERSHIP NUMERIQUE	DESCRIPTION
Strategic responsibility	The digital leader is usually in charge of developing and implementing the organization's digital strategy.
Innovation	He must remain vigilant in the face of new technologies and market trends in order to implement innovative solutions.
Change management	This leader plays an essential role in the change process, guiding teams to embrace new digital practices.
Interdisciplinary collaboration	He frequently collaborates with various departments (marketing, IT, human resources,...) in order to guarantee a coherent approach to digital transformation.
Training and development	It is also important that a digital leader ensures the training and development of digital skills within his team.

Source: Table prepared by the author.

2.2. The contribution of digital technologies to innovation

The digital age has radically changed the way we live, work and interacts. Thus digital technologies, such as Artificial Intelligence, Big data and the Internet of Things, play an essential role in innovation across different sectors. These technologies, illustrated on Figure (1, not only optimize existing processes, but also generate new opportunities and reinvent traditional business models:



Source: copied from this study (Digital innovation is defined as the process activity)

Figure (1): Digital innovation

For example, in the healthcare sector, these technologies facilitate the monitoring of patients and the analysis of medical data, paving the way for more personalized and effective treatments. Similarly, in industry, automation and robotization increase productivity while reducing costs. Indeed the advents of the Internet and new digital technologies have upset the uses and modes of operation of individuals but also of organizations (Barlatier, 2016).

Therefore, this mutation reveals an unprecedented potential in terms of innovation by generating new ways of creating (creativity, co-design ...), to finance (crowd funding,...), to organize (virtualization of organizations), to manage open innovation (communities, coproduction, ...) and to capture its value (new business models,...). However, for most companies that are still trying to navigate this new digital world, this potential remains difficult to grasp and control.

According to (Shamim, 2022) the world is undergoing rapid transformations across all industrial sectors as they move toward digitalization. These accelerated changes have generated widespread disruptions, affecting organizations globally and posing particular challenges for project managers.

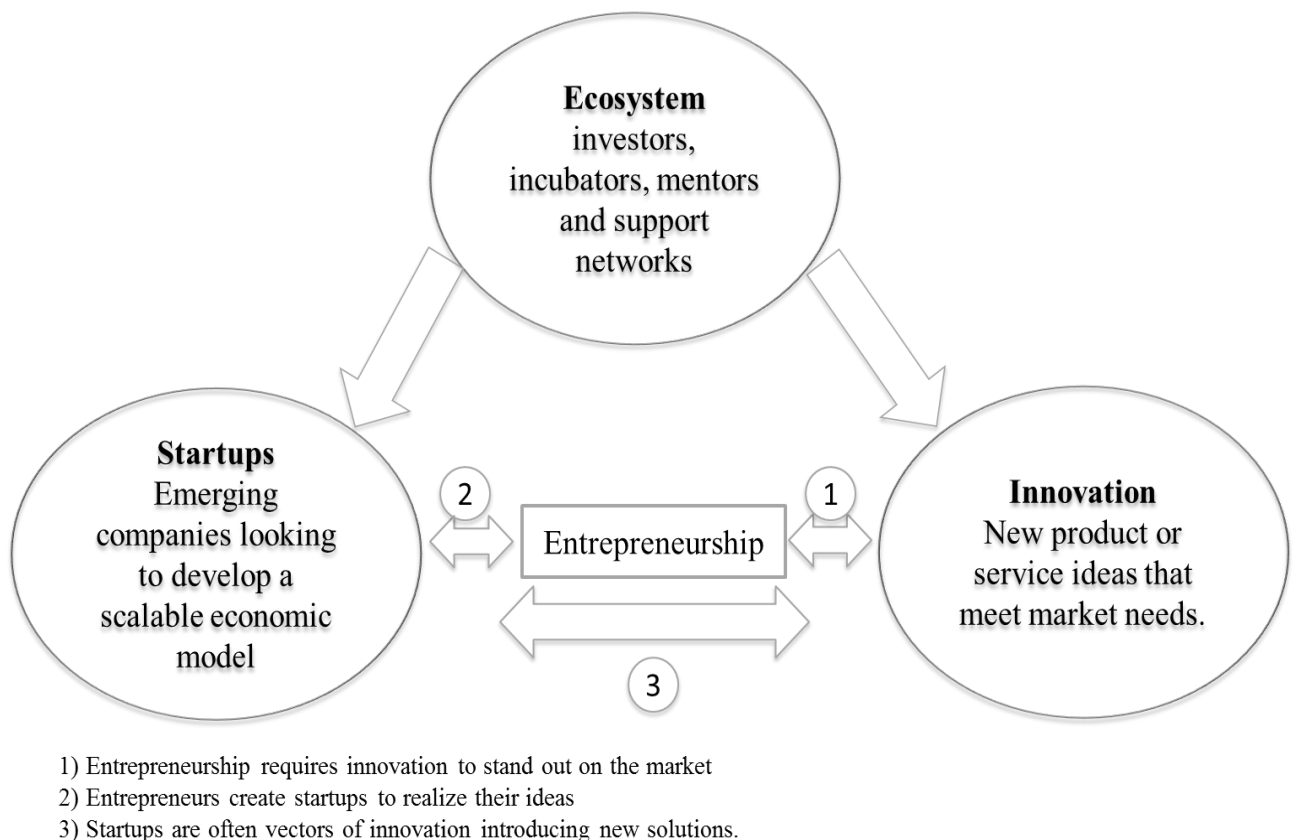
The most recent innovations (Cloud, Artificial Intelligence, Big data, Blockchain or augmented reality) are becoming increasingly important in organizations (Gastaldi &

Pascal, 2023) and are reinforcing the viral dissemination of more classic digital technologies (Internet, emails, social networks, collaborative platforms, management software packages, etc.). Digitization covers artificial intelligence, cloud computing, data analysis, 3D printing, online communities, etc.. (Hamani, Peillon, & Degeorge, 2024).

It is widely believed that the digital revolution and start-ups are linked. The start-ups are frequently at the forefront of technological innovation and take advantage of digital advances to design new goods and services (Yahiaoui, Aït Fella, & Mermet, 2024).

2.3. Synergy between entrepreneurship and innovation: engine of economic growth

Entrepreneurship is the framework in which start-ups operate, and innovation is the essential element that allows these start-ups to develop and succeed. Together, they form a dynamic ecosystem that propels economic and social progress. Entrepreneurship, start-ups and innovation are interconnected and mutually reinforcing. Entrepreneurship refers to the creation and management of a company, usually with the aim of satisfying a market need or solving a problem. We better understand the interconnection that exists between Entrepreneurship, Innovation and Start-ups through the following **Erreur ! Source du renvoi introuvable.**



Source: Figure designed by the author.

Figure (2): The interconnection between Entrepreneurship, Innovation and Startups

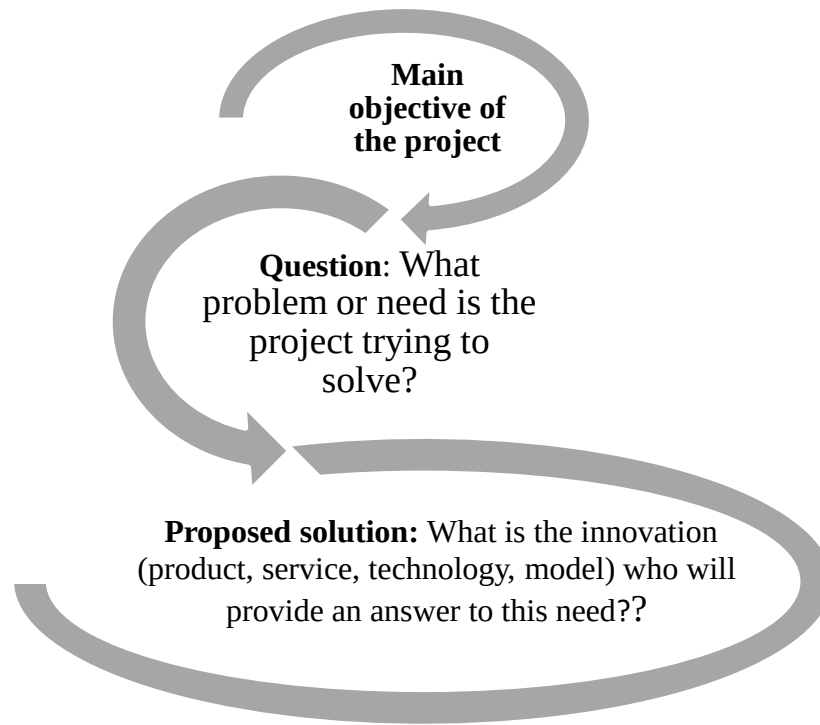
2.4. The rise of Start-ups: innovations and opportunities

In general, start-ups are early-stage companies, often technology-oriented, which aim for rapid growth by offering innovative solutions. The word "Start-ups" comes from English (Englebert & de Larauze, 2021) language in which it means "company that starts". It is officially translated into French as "young growth". The globally agreed definition is that of a young, innovative and fast-growing company. The Larousse (Start-up) la defines the start-up as a young innovative company with a high growth potential, often in the technology sector, and which seeks to impose itself on the market quickly. This young company is distinguished by the following characteristics:

- Young: Start-ups are usually young companies, often in the start-up phase.
- Innovative: They are characterized by their ability to develop original products, services or business models.
- Growth: Their goal is to grow quickly and expand into the market.
- Technology: They are often associated with new technologies, but not always.

In the start-up space, innovation plays a key role, it is the engine that allows entrepreneurs to stand out on the market. By developing new ideas, products or services, start-ups can offer unique solutions that meet unmet needs or improve existing solutions. This not only creates value for customers, but also contributes to economic dynamics by fostering competition and stimulating growth. The vision of an innovative project embodies the long-term objective and ambition of the initiative. It establishes the general direction as well as the *raison d'être* of the project, focusing on its values, its impact and the results to be achieved. This vision is usually a source of inspiration and motivation, acting as a common thread for all participants. The essential elements that constitute the overall vision of a project are shown in ²:

² We will see that the practical case corresponds precisely to the steps described in this diagram.



Source: Figure designed by the author.

Figure (3): Global vision of the project that guides the entire approach

The interdependence between start-ups and innovations is often noticed, indeed start-ups by definition are emerging companies generally oriented towards technology, aiming for rapid growth by offering innovative solutions. Innovation offers entrepreneurs the opportunity to distinguish themselves in the market. Also by designing new ideas, products or services, start-ups have the ability to propose distinctive solutions that fill unmet needs or perfect already existing solutions.

Indeed, it not only generates value for consumers, but also contributes to economic dynamics by encouraging competition and propelling growth. Often considered as catalysts for innovation, start-ups occupy an essential place in this dynamic. The latter are often distinguished by their flexibility, their ability to test and quickly change direction according to market feedback.

3. The Legal and Regulatory Framework in Algeria

The legal and regulatory framework governing start-ups in Algeria consists of a set of laws and regulations designed to support the emergence and growth of this dynamic sector. By establishing an environment conducive to investment and innovation, these provisions

provide crucial support to entrepreneurs, making administrative procedures easier and granting them access to various benefits:

- Law No. 16-03 of June 22, 2016: This law lays the foundations of the legal framework supporting investment and provides tax and customs advantages for new businesses. It also aims to simplify administrative procedures through a one-stop shop³.
- Law No. 19-04 of December 23, 2019: This law officially recognizes start-ups as a key economic sector in Algeria. It grants them a specific status with tax and customs exemptions, as well as a favourable framework for innovation-driven investments⁴.
- Executive Decree No. 17-10 of January 21, 2017: It establishes an interministerial committee to support start-ups, responsible for coordinating government actions related to financing, support, and incubation⁵.
- Executive Decree No. 15-231 of July 20, 2015: This decree governs the creation and operation of business incubators in Algeria, playing a key role in supporting start-ups during their early stages⁶.
- Decree No. 20-254 of September 15, 2020: It defines the conditions for obtaining the “Start-up” or “Innovative Project” label, enabling young companies to benefit from numerous advantages⁷.
- Decree of April 28, 2021: It specifies the procedures for accessing tax exemptions and financial incentives available to start-ups⁸.
- Finance Law 2021 (Articles 86–87): It introduces new tax exemption measures for start-ups and innovative projects⁹.
- Finance Law 2023: This law strengthens tax incentives for investments in start-ups, with the aim of encouraging their growth and competitiveness¹⁰.

In addition to these specific texts, start-ups in Algeria must also comply with other general legislative frameworks, such as:

- The commercial companies law, which governs the creation and management of businesses.
- The personal data protection law, essential for start-ups operating in digital and technological sectors.
- The intellectual property law, which protects entrepreneurs’ innovations and creations.

³ <https://www.droit-afrique.com/uploads/Algérie-Loi-2016-09-promotion-investissement.pdf>

⁴ République Algérienne Démocratique et Populaire 2019-Loi n°19-04 du 23 décembre 2019 relative à la création des startups. JORA : <https://www.joredp.dz/FTP/JF-Français/2019/F2019082.pdf>

⁵ RADP 2017-Décret exécutif n°17-10 du 21 janvier 2017 portant création d’un comité interministériel de soutien aux startups. JORA : <https://www.joradp.dz/FTP/JO-F>

⁶ RADP 2017-Décret exécutif n°17-10 du 21 janvier 2017 portant création d’un comité interministériel de soutien aux startups. JORA : <https://www.joradp.dz/FTP/JO-F>

⁷ RADP 2020-Décret exécutif n°20-254 du 15 septembre 2020 portant création du comité de labélisation des « Startup », des « Projets innovants » et des « Incubateurs ».

⁸ RADP 2021-Décret exécutif n°21-170 du 28 avril 2021 fixant les conditions et les modalités d’octroi des avantages fiscaux accordés aux entreprises disposant du label « Startup » ou du label « Incubateur ».

⁹ <https://lentrepreneuralgerien.com/informations-generales/item/114-resume-de-la-loi-de-finance-2021>

¹⁰ <https://www.aps.dz/economie/149237-loi-de-finance-2023-appui-a-l-investissement-et-a-la-croissance>

3.1. The main obstacles to the development of start-ups in Algeria

a) Access to financing:

- A large number of start-ups in Algeria face difficulties in securing the necessary funding for their launch and development.
- Local banks remain hesitant to support innovative projects due to perceived risks.
- Sometimes, complex administrative procedures hinder access to government grants and investment funds.

b) Standards and administrative complexity:

- The legislative context surrounding start-ups is constantly changing, which can create uncertainties for entrepreneurs.
- Lengthy and complex administrative procedures often pose a barrier to the growth of young companies.
- Some regulations may appear to contradict or be inappropriate for the specific requirements of start-ups.

c) Insufficient specialized skills:

- Many entrepreneurs struggle with financial management, digital marketing, fundraising, or seeking financing.
- Managing a start-up requires skills in innovation, business management, and marketing.

3.2. A Promising Ecosystem for Start-ups in Algeria

Despite these obstacles, Algeria represents a particularly conducive environment for the emergence of innovative start-ups. The country benefits from a rapidly expanding domestic market, characterized by a growing demand for digital services and technological solutions. In addition, there are real export opportunities, particularly towards neighbouring countries and rapidly growing African markets. Government initiatives, such as incubators and tax incentives, energize the entrepreneurial environment. This fosters the emergence of young talent in digital and engineering fields, conducive to ambitious projects.

4. Practical case: Start up creation project

A Master's thesis in Entrepreneurship that we supervised during the 2024-2025 academic year had the theme: Start-up Creation; it was publicly defended by the student Remache Asma, who is simultaneously pursuing studies in midwifery and is currently in her 5th year of a 5-year program. Therefore, we summarize the various aspects and the main results of this study:

4.1. Presentation of the Start-up Project

The project is titled: "Creating a Start-up: Hamli - Digital Platform for Pregnant Women". With the rapid development of digital technologies and the widespread use of smartphones, mobile applications have become essential tools across many sectors, particularly in

healthcare. They offer new ways to improve access to information, support medical monitoring, and raise public awareness on specific health topics.

In this context, *Hamli*, an application specifically designed for pregnant women, stands out by combining technological innovation, health, and entrepreneurship. By simplifying access to medical information and enhancing pregnancy monitoring, this startup aims to support both expectant mothers and maternal health professionals, especially midwives.

Digital is an opportunity for deepening customer relationships and managing quality. It aggregates data, hence information (on behavior, visits, sales channels, interests...) (Lahchame & Djilali, 2021).

4.2. Objectives and Distinctive Features of the “Hamli” Startup Project

- Among the objectives pursued by this study are:
Assessing the potential impact of the *Hamli* application on pregnancy monitoring and midwifery practice.
- Defining a viable economic model to ensure the project’s long-term sustainability as a startup.

The “Hamli” startup project is built upon several key characteristics that make it a promising and dynamic initiative:

- a) Innovation: At the heart of “Hamli” lies an innovative approach aimed at solving existing problems or improving services through creative and technological solutions.
- b) Incubation and Experimentation: The project promotes an incubative environment where ideas can be tested, refined, and strengthened.
- c) High Uncertainty: Like any startup, “Hamli” operates in a context of high uncertainty, requiring strong adaptability and a clear vision to navigate emerging challenges.
- d) Scalability: The business model of “Hamli” is designed to be scalable, allowing for rapid growth and expansion.
- e) External Financing: To support its development, “Hamli” seeks external funding through investors, grants, or strategic partnerships that can accelerate its growth trajectory.
- f) Flexible Structure: The organizational structure of “Hamli” is intentionally flexible, enabling agility and responsiveness—both essential for adapting to market shifts and customer needs.

These features give “Hamli” significant potential to thrive within the competitive start-up landscape.

4.3. A Comprehensive Approach to Evaluating Innovation in Maternal e-Health

As part of this study, the student undertook research on the role of start-ups and entrepreneurship in transforming the maternal health sector. This area has become

increasingly important due to the significant public health challenges it represents, especially in developing countries where pregnancy monitoring remains a challenge. According to the World Health Organization (WHO), regular prenatal monitoring significantly reduces the risks of complications for both the mother and the child.

However, many pregnant women face difficulties in accessing medical information and health services, whether due to geographical, economic, or cultural constraints.

By bringing together the dimensions of entrepreneurship, start-ups, pregnant women, and the role of midwives, this project aims to demonstrate that “Hamli” can be an innovative project that combines social impact and economic viability.

Thus, the study is based on a multidisciplinary approach combining:

- A documentary research, based on scientific studies, data on health start-ups, and reports on female entrepreneurship.
- A field survey among pregnant women and midwives to identify their needs and expectations.
- A feasibility study, integrating the financial, technological, and regulatory aspects of developing a start-up in e-health.
- A comparative analysis, drawing inspiration from other successful initiatives worldwide.
- A questionnaire was sent to midwives working in private clinics and public institutions. This questionnaire made it possible to generate results, create tables, and draw graphs.

5. The BMC - Business Model Canvas

By highlighting a market study, the student prepared a BMC as follows:

5.1.BMC: Key Partners - Key Activities - Value Propositions - Customer Relationship

Key Partners	Key Activities	Value Propositions	Customer Relationship
• Clinics and hospitals. • Midwives and gynecologists. • Commercial brands for mothers and	• Development and updating of the application. • Creation of educational content. • Community management.	• Comprehensive platform for pregnancy tracking. • Personalized advice. • Quick access to online medical consultations via video chat or call. • Support community for mothers.	• Personalized notifications. • Assistance via chatbot. • Free educational content.

babies.		• Medical training.	• Feedback system.
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5.2. BMC: Customer Segments - Key Resources – Channels

Customer segments	Key Resources	Channels
• Pregnant women • Young mothers • Healthcare professionals (midwives and gynecologists)	• Application developers. • Specialized content (articles, videos).	• Mobile application (iOS/Android). • Website. • Social media.

5.3. BMC: Cost Structure-Source of Income

Cost structure	Source of income
• Development and maintenance of the application, simple version: 300000 to 600000 DA. • Legality & legal protection : 40000 DA. • User Interface (UI-UX) Visual Design: 100000, 200000 DA. • Hosting (back-end) database: 5000 to 15000 DA. • Marketing & user acquisition: 20000 to 50000 DA. • Content creation: video 30000 DA. Estimated total: 800000 DA to 2000000 DA.	• Payment for each consultation: 500 DA (Agreement with the participating midwives; percentage of 40% at each consultation) • Monthly subscription: 5000 DA quarter 10000DA (Pack: prenatal exercise guide - perineal reduction - personalized calendar) 50 subscribers X 2000 DA = 100000 DA • Face-to-face workshops for the preparation for the birth (2500 DA for each session).

The "Hamli" mobile application is designed to accompany pregnant women throughout their pregnancy by providing them with reliable information, medical reminders and personalized follow-up. Its objective is to improve the pregnancy experience by facilitating the management of prenatal follow-up and by offering continuous support to expectant mothers. The application stands out for its intuitive interface and accessibility, allowing users to easily access information and features adapted to their profile. The project was divided into these three important components, each dealing with a particular aspect:

- Social impact: Improvement of medical follow-up of pregnancies.
- Business model: Combination of subscriptions and partnerships.

- Technological innovation: Integrated telemedicine platform.

The "Hamli" project represents an innovative solution responding to a real need in the field of maternal health in Algeria.

6. Conclusion

In conclusion, the development of innovative projects is a dynamic and complex process, marked by both challenges and opportunities. In this context, digitalization plays a fundamental role by facilitating access to resources and information that were once difficult to obtain, thereby stimulating the emergence of new start-ups. These start-ups, often agile and responsive, rely on digital tools to quickly test their concepts and adapt to market demands. Moreover, digitalization promotes the creation of networks bringing together entrepreneurs and investors, enabling a synergy that further strengthens innovation and competitiveness within the entrepreneurial ecosystem.

Despite the challenges encountered, Algeria is emerging as a fertile ground for the development of innovative start-ups. Moreover, the country benefits from natural resources and expertise that can be leveraged internationally, opening the door to export opportunities to neighbouring countries and rapidly expanding African markets. Government initiatives, such as the creation of incubators, innovation support programs, and incentive-based tax measures, actively support young enterprises.

Perspectives and Recommendations:

- Promote the emergence of young talents trained in the fields of digital technology and engineering to create a pool of skills favourable to the creation of ambitious projects.
- Strengthen the progressive opening of the country to international partnerships to offer start-ups expanded access to financing networks, mentoring and scientific collaboration.

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