# Accelerating Innovation in HealthTech:

# Collaboration Strategies and Recommendations for the Transformation of the Digital Health System in Tunisia

**Policy Brief & Recommendations**
**(Translated from French)**

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## A. Introduction

The intersection of health and technology is rapidly transforming the healthcare sector worldwide, and Tunisia has the opportunity to leverage this potential to enhance its healthcare system. Innovations such as Artificial Intelligence (AI), telemedicine, and digital health services are reshaping patient care by making diagnostics more accurate and healthcare services more efficient. The discussions held during the seven panel sessions of *HealthCare Innovation*, organized at the Faculty of Medicine of Monastir[1] in early 2024, highlighted the crucial role of collaboration between HealthTech startups and both public and private healthcare institutions in driving this transformation. These discussions served as the inspiration for this policy paper.

These panels brought together a diverse range of stakeholders, including healthcare professionals, technology entrepreneurs, and academics, to explore how such collaborations could be structured to overcome existing challenges and maximize the benefits of digital health innovations.

Globally, the adoption of health technologies is accelerating, driven by the demand for more efficient care and growing expectations for personalized medical services. For instance, a 2014 McKinsey report[2] titled *"Accelerating the Digital Transformation of Businesses: A Source of Growth and Competitiveness for France"* indicated that over 75% of patients would be willing to use digital health services if these services met their expectations in terms of quality and reliability. This global trend also reflects Tunisia's potential, where there is a significant opportunity to harness these technologies to improve patient outcomes and enhance healthcare system efficiency.

However, according to *The Global Startup Ecosystem Report 2022 - MENA Insights, Rankings & Ecosystem Pages* by Startup Genome, integrating these technologies in Tunisia faces several challenges, including regulatory barriers, financial constraints, and cultural resistance[3]. By leveraging international best practices and adapting them to the local context, Tunisia can position itself as a regional leader in health innovation, especially given the significant growth of its startup ecosystem, which reached 93 certified HealthTech startups by November 2024[4].

This policy paper aims to explore the identified collaboration models, highlight the challenges of effective integration, and propose concrete strategies to address these issues. By providing a framework for policymakers, healthcare administrators, and entrepreneurs, this document seeks to foster effective collaboration between startups and healthcare institutions to enhance the efficiency and quality of Tunisia's healthcare system.

As Tunisia reaches a pivotal moment in its healthcare development, embracing innovative technologies and establishing effective collaborations will be essential to transforming its healthcare landscape.

[1] https://healthcarenovation.com/collaboration-perspectives-between-the-healthcare-sector-and-startups-towards-a-new-medical-era/

[2] https://www.mckinsey.com/fr/~/media/McKinsey/Locations/Europe%20and%20Middle%20East/France/Our%20Insights/Accelerer%20la%20mutation%20numerique%20des%20entreprises/Rapport_Accelerer_la_mutation_numerique_des_entreprises.pdf

[3] https://startupgenome.com/article/mena-insights-rankings-and-ecosystem-pages

[4] https://startup.gov.tn/index.php/fr/database

## B. Current State and Challenges of HealthTech Integration in Tunisia

Tunisia, currently undergoing a digital transformation in its healthcare sector, faces a combination of significant opportunities and challenges. Despite the global trend toward digitization, Tunisia encounters specific obstacles, such as outdated regulatory frameworks and inadequate infrastructure, which require tailored solutions and strategic interventions.

### B1. Regulatory and Financial Challenges

The HealthTech sector in Tunisia is hindered by a regulatory environment that is not conducive to the rapid advancement of technologies. Lengthy and complex approval processes for new health technologies discourage innovation and delay the implementation of solutions that could significantly improve patient care.

The establishment of the National Agency for Medicines and Health Products (ANMPS) [5] in Tunisia in 2023 and its operational rollout in 2024 could help streamline the authorization process for medical software and connected devices. Its core objective is to coordinate all stakeholders in the pharmaceutical sector, simplifying administrative procedures for investors. This simplification is expected to notably reduce processing times. However, the current challenge lies in initiating the digitalization of authorization procedures for connected hardware and software medical devices.

From a financial perspective, the sector also suffers from insufficient funding. HealthTech startups in Tunisia face significant challenges in securing investment, as investors often hesitate to engage in a market perceived as risky due to regulatory uncertainties. More proactive government intervention is essential to attract private investment through incentives such as tax exemptions, grants, and risk-sharing mechanisms. These measures could provide the necessary financial support to develop Tunisia's emerging HealthTech ecosystem and foster the growth of startups that are crucial for healthcare innovation.

In 2024, the HealthTech Fund Tunisia[6] was launched and is managed by the investment fund United Gulf Financial Services (UGFS), with STB Bank acting as the custodian. This initiative could open new opportunities for digital health innovators, particularly in terms of seed funding allocation.

### B2. Lack of Infrastructure and Skills

The technological infrastructure required to support advanced HealthTech applications is insufficient in Tunisia, particularly in rural areas, where access to reliable internet and modern IT systems is limited. This lack of infrastructure significantly hinders the adoption of digital health services, a concern raised by several experts during the panel discussions.

There is an urgent need for government initiatives to modernize the digital infrastructure of healthcare facilities across the country, ensuring equitable access to technological advancements that can enhance healthcare delivery.

[5] https://www.teamfrance-export.fr/infos-sectorielles/27795/27795-tunisie-creation-de-lagence-nationale-des-medicaments-et-des-produits-de-sante

[6] https://www.cmf.tn/sites/default/files/pdfs/epargne/prospectus/prospectus_fa_health_tech_fund.pdf

Moreover, although Tunisia boasts a rich ecosystem in higher education for health sciences, including the four medical faculties of Monastir, Sousse, Tunis, and Sfax, the Faculty of Dental Medicine in Monastir, the Faculty of Pharmacy in Monastir, health schools, and institutes specializing in biotechnology and biomedical sciences, there remains a significant skills gap among healthcare professionals and technical staff regarding the use and maintenance of health technologies.

It is therefore essential to integrate HealthTech training into the curricula of medical, pharmacy, and nursing schools, while also providing continuous education for current healthcare professionals. Bridging this skills gap is crucial not only for the adoption of existing technologies but also for fostering an environment of continuous innovation, where healthcare professionals can effectively collaborate with technology entrepreneurs.

## B3. Insufficient Cultural and Collaborative Dynamics

It is crucial to address cultural and collaborative challenges in Tunisia's healthcare sector to successfully integrate health technologies. Several private initiatives have demonstrated that cultural resistance to adopting new technologies exists among both healthcare providers and patients. This resistance often stems from a lack of familiarity and trust in new systems, reinforced by concerns over security and the impersonal nature of digital interactions.

A concrete example of this challenge is the resistance of the Tunisian Medical Council to telemedicine practices[7] due to the absence of regulatory frameworks in 2021. This regulatory gap led to the blocking of several telemedicine platforms, triggering negative reactions from startup founders who saw their scalability increasingly constrained in the Tunisian market.

To overcome these obstacles, it is essential to implement awareness and education campaigns that clearly explain the benefits of HealthTech. These campaigns should target not only healthcare professionals but also the general public, using case studies and concrete examples to demonstrate how technology can enhance patient care and operational efficiency. For instance, showcasing the effectiveness of telemedicine in rural or underserved areas could highlight its potential to expand access to quality healthcare.

Moreover, fostering a culture of innovation within healthcare institutions is crucial. This can be encouraged by integrating technology into daily healthcare practices and supporting healthcare professionals through training and development programs. Initiatives such as innovation labs in hospitals, where staff can experiment with and familiarize themselves with new technologies, could help cultivate a more open attitude toward HealthTech solutions.

Collaboration among various stakeholders, including government agencies, healthcare providers, educational institutions, and technology entrepreneurs, is also key to advancing the HealthTech agenda. Establishing formal collaboration platforms can help align the objectives and efforts of these diverse groups.

For instance, regular interdisciplinary conferences and workshops were organized in 2024 at the Faculty of Medicine of Monastir[8], bringing together key players from

[7] https://startup.gov.tn/fr/news/communique-propos-des-plateformes-de-tele-medecine

[8] https://healthcarenovation.com/celebrating-healthtech-innovation-certificates-awarded-to-

the HealthTech ecosystem. These events provide networking opportunities, foster partnerships, and facilitate idea exchange, ultimately driving innovation and integration in the sector.

These collaborative efforts should be supported by policies that incentivize participation in HealthTech initiatives. Recognizing and rewarding institutions and individuals who take proactive steps in adopting health technologies could encourage broader adoption and integration across the sector.

By addressing cultural resistance and fostering a collaborative environment, Tunisia can build an ecosystem conducive to the successful adoption and scaling of health technologies. This will not only improve healthcare outcomes but also drive innovation, positioning Tunisia as a regional leader in HealthTech.

## C. Benchmarking and Best Practices

To advance Tunisia in the HealthTech sector, it is essential to learn from global best practices and adapt successful strategies to the local context. This section will explore how other countries have addressed challenges similar to those Tunisia faces, providing a roadmap for implementation.

### C1. Public-Private Partnerships (PPP) and Investment Strategies (Singapore)

The successful integration of health technologies often relies on strong public-private partnerships (PPP). Countries like Singapore have thrived by creating an environment that encourages private investment through strategic partnerships with the public sector. These partnerships benefit from government incentives, such as tax reductions, grants, and regulatory support, which help mitigate the inherent risks of private investments.

The effectiveness of PPP models in promoting HealthTech adoption has been demonstrated in various contexts where the government acts not only as a regulator but also as a facilitator and partner.

The collaboration between SingHealth and the National Supercomputing Centre (NSCC) of Singapore[9], launched in March 2022, is a successful example of a public-private partnership (PPP). This initiative aims to develop a supercomputer at Singapore General Hospital to support advanced medical research using artificial intelligence (AI) and high-performance computing.

By partnering with NVIDIA, the project enables faster research processes and improved patient care. This example demonstrates how PPPs can drive healthcare innovation through cutting-edge technologies.

For Tunisia, establishing stronger public-private partnerships (PPPs) could accelerate the adoption of HealthTech innovations. The government could introduce more aggressive incentives to attract private investors and establish clear and simplified processes for these partnerships.

Notably, sectoral competitiveness hubs have emerged through PPP initiatives with the Tunisian Ministry of Industry. Since 2017, several sectoral competitiveness clusters have been created, such as Novation City

promising-innovators-at-monastir-medical-faculty/

[9] https://www.nscc.sg/wp-content/uploads/2022/03/SCA22-Media-Release_v2-FINAL-FULL-1-Mar-22-embargo_FOR-RELEASE-w-Factsheets_no-embargo.pdf

(Industry 4.0) [10] and Technopole Monastir - El Fejja (Textile and IT). These examples highlight how PPP-driven ecosystems can catalyze innovation and investment, providing a model that could be replicated in the HealthTech sector.

Similarly, Tunisia could adopt this model by focusing on strategic areas such as digital health records, telemedicine, and AI-driven diagnostics, where public-private collaborations could bring significant benefits to public health among public hospitals, academic institutions, pharmaceutical industries, and startups.

By leveraging international experiences and adapting these best practices to the Tunisian context, the country could enhance its HealthTech ecosystem. This approach would help overcome existing barriers to technology adoption and promote a culture of innovation and collaboration that could transform the Tunisian healthcare landscape.

## C2. Regulatory and Policy Frameworks (Germany and Canada)

Adaptive and supportive regulatory environments are crucial for fostering a dynamic HealthTech ecosystem. Leading countries in HealthTech innovation, such as Germany and Canada, have developed regulatory frameworks that swiftly accommodate the development and integration of new technologies while ensuring patient safety and data privacy.

These countries offer streamlined approval processes for digital health technologies and provide clear guidelines that facilitate innovation without compromising safety standards.

Tunisia faces significant challenges with its current regulatory frameworks, which often hinder the growth and implementation of technological solutions in healthcare. To facilitate the integration of HealthTech, Tunisia could draw inspiration from the German model, which includes specific provisions to support digital health applications. One key example is the Digital Healthcare Act (DVG) [11], which accelerates the integration of proven digital health applications into public healthcare services.

Similarly, adopting elements of Canada's strategy, which focuses on balancing innovation with public health protection, could be beneficial. This includes modernizing regulations governing clinical trials for innovative products[12], ensuring a more adaptive and forward-thinking regulatory environment for HealthTech advancements in Tunisia.

The legislative process in Tunisia is often perceived as lengthy and complex, involving two parliamentary chambers after approval by the Council of Ministers, which slows down the adoption of digital health laws.

To accelerate these initiatives, it is essential to start with the General Directorate of Health within the Tunisian Ministry of Health, making it more adaptable to the rapid pace of technological innovations.

[10] https://www.webmanagercenter.com/2018/04/20/418884/le-pole-de-competitivite-de-sousse-devient-novation-city-avec-plus-dambition/

[11] https://www.marketopportunities.fi/home/2024/germany-is-expanding-its-digital-health-sector?type=business-opportunity&industry=health-and-wellbeing

[12] https://www.canada.ca/fr/sante-canada/organisation/a-propos-sante-canada/activites-responsabilites/strategies-initiatives/modernisation-reglementation-aliments-produits-sante.html

## C3. Education and Skills Development (Finland and South Korea)

For HealthTech to be effectively integrated into healthcare systems, it is essential that the workforce is equipped with the necessary skills and knowledge. Countries with thriving HealthTech ecosystems, such as Finland and South Korea, emphasize education and skills development as key components of their strategy.

These countries have integrated HealthTech education into the curricula of medical schools and nursing programs, ensuring that future healthcare professionals are familiar with digital tools. Additionally, they offer continuous training programs to keep health professionals up to date with the latest technological advancements, ensuring effective adoption and utilization of digital health solutions.

Finland offers cutting-edge academic programs in biomedical sciences and engineering. For example, Tampere University provides a Master of Science in Biomedical Technology[13], covering areas such as biomaterials, tissue engineering, and biomedical engineering. This program equips students with the skills needed to tackle challenges in biomedical sciences and healthcare, with a strong emphasis on innovation and applied research.

In South Korea, HealthTech skills development is supported by continuous training programs for healthcare professionals, implemented by institutions such as the Korea Health Industry Development Institute (KHIDI) [14].

These training programs help practitioners become familiar with technologies such as telemedicine, artificial intelligence, and electronic health data management. Additionally, public-private partnerships play a crucial role in facilitating the integration of ICT in healthcare, ensuring that professionals quickly adapt to emerging health technologies.

In Tunisia, it is imperative to update educational programs to include training on health technologies. This could involve revising existing curricula to incorporate courses on digital health, data management, and cybersecurity, adapted to the needs of healthcare professionals. Additionally, establishing partnerships with technology companies and academic institutions could provide practical training and exposure to the latest innovations in HealthTech.

Two inspiring examples were observed in 2023 and 2024 at the Faculty of Pharmacy of Monastir, which integrated the teaching of artificial intelligence applied to health for fifth-year students, and at the Faculty of Medicine of Monastir, which created an optional track, "Information Technology and Entrepreneurship," available at all levels of the second cycle. These examples highlight the importance of integrating HealthTech education into Tunisia's academic system, ensuring that future professionals are equipped for technological advancements in healthcare.

Continuous training should also be made accessible to all healthcare workers to bridge the skills gap. This is exemplified by the platform developed under the SAHA project[15], implemented by the National Authority for Evaluation and Accreditation in Health (INEAS), The Center for International Private Enterprise (CIPE), the IT Center of the Ministry of Health (CIMS), and the Ministry of Health in Tunisia.

[13] https://www.studentum.fr/etudes-biomedicales/finlande?utm_source=chatgpt.com

[14] https://www.fr.dialog-health.com/systeme-sante-coree-du-sud

[15] https://formation.ineas.tn/

Two dental medicine startups, Dentameet[16] and Dentistup[17], have launched training programs through online platforms and frequent webinars for dentists in Maghreb countries.

Initiatives such as workshops, seminars, and online courses focusing on the practical application of health technologies in clinical settings are essential for a successful transition to a digitized healthcare system.

## C4. Technological Infrastructure and Data Management (Estonia)

A robust technological infrastructure is essential for the successful deployment and scaling of HealthTech solutions. Countries like Estonia have made significant investments in digital health infrastructure.

Estonia, for example, has implemented one of the most advanced digital healthcare systems in the world[18], where electronic health records (EHRs) are accessible to authorized healthcare providers nationwide. This system is built on a national digital infrastructure that prioritizes security, data integrity, and user accessibility.

The country has established a national digital health system where all citizens have an electronic health record (EHR) accessible to healthcare professionals, improving continuity of care and reducing medical errors. This system is supported by a blockchain infrastructure to ensure data security and patient confidentiality. Additionally, Estonia utilizes advanced technologies such as telemedicine, allowing patients to consult doctors remotely. The integration of ICT in healthcare has enabled Estonia to build a more efficient and transparent healthcare system.

For Tunisia, improving technological infrastructure is crucial to support HealthTech adoption. This includes not only upgrading hardware and software in healthcare facilities but also ensuring that these systems are interconnected and interoperable. Investments by the IT Center of the Ministry of Health (CIMS) should focus on expanding high-speed internet access across all regions, including rural and underserved areas, to guarantee equitable access to digital health services.

Despite the CIMS initiatives[19] in supporting health digitization within public healthcare institutions, collaborations with Tunisian startups and applications in the private sector remain limited.

Moreover, the implementation of standardized data management protocols is essential to ensure security, confidentiality, and the effective use of health data. Tunisia, through the National Authority for the Protection of Personal Data (INPDP) [20], should develop a data governance framework that fosters innovation while aligning with international best practices. This approach would ensure patient data security and facilitate the integration of HealthTech solutions across different healthcare systems.

[16] https://dentameet.tn/
[17] https://dentistup.tn/
[18] https://e-estonia.com/solutions/e-health/e-health-records/
[19] http://www.cims.tn/programme-national-de-soutien-a-la-sante-numerique/
[20] https://www.inpdp.tn/

## D. Recommendations for the Integration of Health Technologies in Tunisia

Tunisia is at a critical juncture for making significant advancements in the healthcare sector through technology. It is therefore essential to implement strategic recommendations tailored to the Tunisian context.

The following strategies aim to overcome the identified challenges and effectively leverage the potential of health technologies.

### D1. Fostering a Culture of Innovation

Encouraging a culture of innovation within the healthcare sector is crucial for the acceptance and integration of new technologies. Tunisia should initiate and support programs to promote HealthTech innovation, such as hackathons, startup challenges, and awards for excellence in health solutions, particularly within the pharmaceutical industries and hospitals. These programs will stimulate creative problem-solving and generate viable solutions tailored to the needs of Tunisia's healthcare system.

Additionally, creating a startup-friendly environment through mentorship programs, open innovation initiatives, funding opportunities, and networking events can help cultivate a dynamic HealthTech innovation ecosystem. By fostering a culture that values and invests in creativity, Tunisia can drive continuous improvements in health technologies, ultimately enhancing patient care and increasing system efficiency.

### D2. Developing Education and Training in HealthTech

To fully leverage the benefits of HealthTech, Tunisia must expand educational programs and training in digital health skills. This should begin at the fundamental level by integrating health technology modules into the curricula of medical, dental, and pharmacy faculties, as well as health schools, biotechnology institutions, and biomedical engineering programs. Continuous training programs should also be established to keep healthcare professionals informed about the latest technologies and best practices.

Partnerships with universities, private technology companies, and startup incubators can provide practical training opportunities such as internships and workshops. These educational efforts will ensure that healthcare professionals are equipped to adopt and innovate with health technologies, accelerating the modernization of Tunisia's healthcare system.

The initiatives of SMARTLAB at the Faculty of Medicine of Monastir and FABLAB at the National Engineering School of Monastir can serve as inspiration for other institutions in the fields of pharmacy and biotechnology.

### D3. Simplifying Regulatory Processes

Tunisia must reform its regulatory framework to better support the rapid evolution of health technologies. It is necessary to establish a transparent, fast, and predictable approval process for new HealthTech products. Implementing a "fast-track" system for technologies addressing urgent healthcare needs could significantly reduce time-to-market, fostering innovation and ensuring quicker access to beneficial technologies.

Additionally, the creation of a "HealthTech Regulatory Sandbox" within the National Agency for Medicines and Health Products, in collaboration with academic institutions, would allow startups and developers to test and refine their innovations in a controlled environment under regulatory supervision.

This model has already proven effective in the Startup Act, the Self-Entrepreneur Law (currently in development), and the Finance Tech Sandbox within the Central Bank of Tunisia, promoting innovation while ensuring compliance with standards.

## D4. Investing in Technological Infrastructure

Improving technological infrastructure is crucial to support HealthTech applications. Investment should focus on expanding high-speed internet access in underserved areas to ensure equitable access to digital health services. Additionally, the government must invest in secure and reliable IT systems for healthcare facilities to support the adoption of electronic health records (EHRs) and telemedicine.

Public funding can be directed toward infrastructure improvements, with additional support from international donors and development banks. It is essential that all healthcare providers, regardless of their location, have access to the necessary technological tools to enable uniform integration of HealthTech solutions across the country.

The choice between cloud-based solutions and local networks such as LoRaWAN[21], as well as the management of medical information data, should also be thoroughly analyzed and discussed to ensure optimal data security and system efficiency.

## D5. Standardizing Data Management Protocols

Establishing standardized data management protocols is essential to ensure the security, confidentiality, and effective use of health data in Tunisia. The government should develop a data governance framework aligned with international best practices, such as the General Data Protection Regulation (GDPR). This framework should cover all aspects of data management, including collection, storage, access, and sharing, to ensure the protection and responsible use of patient information.

The implementation of these standards will strengthen trust in digital health systems, encouraging healthcare providers and patients to adopt new technologies. Additionally, a unified approach to data management will improve interoperability between different healthcare systems, facilitating better-coordinated care and enhancing health outcomes.

## D6. Strengthening Public-Private Partnerships (PPP)

Strengthening public-private partnerships (PPP) is essential to boost innovation and accelerate the adoption of health technologies in Tunisia. The government should create incentives for private investment in HealthTech, such as tax exemptions, grants, and co-financing opportunities. Additionally, establishing clear guidelines for these partnerships will attract both national and international investors.

The creation of dedicated HealthTech technology parks, similar to the seven regional clusters in France[22], (such as EUROBIOMED in Marseille, BIOVALLEY in Strasbourg, and MEDICEN in Paris), could serve as innovation hubs. These parks would bring together startups, research centers, and healthcare providers in one location, facilitating collaboration and the rapid development of new technologies.

[21] https://www.sciencedirect.com/science/article/pii/S2542660524000660

[22] https://biotechinfo.fr/article/les-sept-poles-de-competitivite-en-sante-francais-se-constituent-en-reseau/

The Monastir Health pole, a project currently under development and led by the Governorate of Monastir, should be managed as a Joint-Stock Company (SA) to ensure better governance and efficiency. This cluster should focus on emerging technologies and open itself to the world of innovation, reinforcing Tunisia's position as a regional HealthTech leader.

## D7. Creating Innovation Hubs and Clusters Dedicated to HealthTech

To accelerate the development and implementation of health technologies, Tunisia should establish dedicated innovation hubs across the country. These entities would serve as incubators and accelerators for HealthTech startups, providing them with essential resources, mentorship, and access to a network of industry and academic experts.

These hubs should be strategically located near medical schools and public healthcare institutions to facilitate collaboration and enable clinical environments for the scientific evaluation and clinical validation of both hardware and software prototypes developed by Tunisian and international startups.

The government and international cooperation agencies have a responsibility to support these clusters by providing funding, regulatory assistance, and facilitating collaborations between academic institutions, healthcare providers, and private sector stakeholders. These dynamic clusters will serve as innovation hubs, transforming creative ideas into practical health solutions that can be integrated into both national and international healthcare systems.