

Health Digitalisation and Innovative Entrepreneurship Status. A Qualitative Exploration of Private Sector in Greece and Synthesis of Main Issues

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Abstract: This primary research aims to examine to what extent Greek health entrepreneurs, as they looking for options to grow their businesses, have realized the opportunities offered to them by the new technologies. Furthermore, to which level they have implemented innovative practices, based on the potential of digitalisation, to improve the operation of their entrepreneurial activities in providing treatment services to the citizens as well as to cooperate with other structures and other organisations. The research explores the views of the entrepreneurs on using digital practices at their services and their impact regards to the reduction of operating costs, the control of materials and the change of the patient-doctor cooperation grid. A qualitative study was conducted with semi-structured interviews in twelve healthcare companies from various regions of Greece. The selection of the sample was made with the Convenience Sampling strategy. The interviews were conducted in Greek with the owners or managers of these healthcare units and the duration was 45 minutes. The content of the semi-structured interviews was classified into three thematic categories. The first section dealt with innovative digital interventions in relation to suppliers, materials, wares, supplies and payments. The second section is concerned with innovative digital interventions compared to the public services and self-administrative authorities, insurance funds and public health structures. The third section is concerned with the innovative digital interventions in relation to the quality care of the patient, his treatment and upgrading the offered health services. The research showed that there were discrepancies in the development of innovative digital activities among the examined companies. Innovative digital interventions were developed by health enterprises, especially in the field of their internal operation and in the service of their patients. On the contrary, many digital interventions could not be completed since there has been an incompatibility with public services and public health structures where the digital transition has not progressed in the same level. Entrepreneurs who preferred traditional forms of operating and offering services to their patients, they did so by fearing that innovative digital activities required more financial capitals and new qualified staff that would surely increase their operating costs.

Keywords: healthcare enterprises, digitalisation, innovation, entrepreneurship

1. Introduction

Research interest in digital transformation of the health sector and how business models are affected has increased in recent years (Parviainen et al, 2017). Digital applications support the emergence of new types of innovation processes in healthcare (Morande et al.2020; Omachonu & Einspruch, 2010) and contribute to the upgrading and interaction among health services (Pillay, 2019). New innovative technologies can be developed through health structures while emerging new business opportunities (Belolipetskaya et al, 2020). Digital health technology also significantly improves the experience of health professionals (Wulfovich & Meyers, 2020) and transforms the offered health services (Rivas, 2020). Digital innovations in health improve the effectiveness of medical and diagnostic interventions, increase the quality of services and reduce costs (Lupton, 2013). New business models based on health digitalisation require a re-approach by those who operating in the field in relation to their existing mode of operation. The health system is characterized by the opportunities arising from increasing digitalisation (Glauner et al, 2021). When a need turns into an entrepreneurial opportunity, designing the right business model should be pursued with a persistent and open mindset (Zajicek & Meyers, 2018) while the digital transformation is a tool for the renewal of business models that helps them to increase their competitiveness (Bumann & Peter, 2019). However, there are many barriers for health enterprises as far as the implementation of innovative plans and succeeding through innovation to finally achieve their goals in the healthcare market. This is clearly changing from country to country. The factors that negatively affect the implementation of the potential of digital practices and how they will be addressed are crucial elements that the research lens must focus on. It should be traced what could be changed to improve conditions and make them friendly to digitalisation. An obstacle to entrepreneurship in the field of digital health and innovation is the complex institutional and legal framework that exists in many countries (Zajicek & Meyers, 2018) and the non-completion of the digital transition as far as other public structures and insurance organisations (Apostolopoulos

et al, 2022). Managers need to develop business strategies compatible with the current digital trends (Reis et al, 2018). Nowadays, health entrepreneurs are facing the challenge of taking advantage of the business opportunities that arise in the digital era to change the way their businesses operate until now (Van Velthoven et al, 2019). Similar challenges are faced by start-up health companies in the context of digital healthcare since the customer experience is a key goal (Wulfovich & Meyers, 2019).

In Greece, due to public health problems and reduction in funding, there is a deterioration in the provided services (Apostolopoulos et al, 2021; Liaropoulos et al, 2008; Tountas et al, 2005). This gap has been filled by the booming of private health sector, which is constantly investing in new technologies (Kondilis et al, 2011; Souliotis, 2000). The present research seeks to examine the views of health entrepreneurs on digitalisation and the implemented innovative interventions since these aspects have not been researched in Greece. It also examines the context of operation and development of innovative digital interventions and the obstacles that entrepreneurs face in the digital transformation of their entrepreneurial activities. Exploring the perspectives of experts in healthcare industry helps to gain knowledge in exactly which activity areas are modern digital technologies best applied. (Apostolopoulos et al, 2022; Ross et al, 2018)

2. Literature review

In recent years many studies have focused on the digitization of health sector with the vast majority of them referring to the public health sector (Iyamu et al, 2021; Azzopardi-Muscat et al, 2019). They focus on the complexity of digitalisation in public health (Ricciardi et al, 2019), on the service delivery model they offer (Fitzpatrick et al, 2020), the use and preservation of personal data (Mohamed, 2020; Karampela et al, 2019) and to the needs of users (van Poelgeest et al, 2019; Steinhubl & Topol, 2015). Other researches refer to the views and experiences of health professionals on digitization in public health structures (Sprenger et al, 2017; Ålander & Scandurra, 2015). Finally, some surveys highlight the obstacles and barriers that make it difficult to establish innovative digital practices in health services such as the legal framework of patient data files as well as the functions of the financial departments of health units. (Kulkov et al. 2021; Zajicek & Meyers, 2018; Devlin et al., 2015).

In the private health sector, research on digital innovation focuses on the development and implementation of new health information systems, digital user networks, digital health services, and the creation of modern ecosystems in the field of care that help reducing operating costs and improving the services provided (Schiaivone et al, 2021; Botti & Mondì, 2020; Hwang & Christensen, 2008). There is also more research interest on the evolution of innovative digital practices in relation to health care market issues such as competition, healthcare area conditions, prevailing existed challenges, and business prospects through digitalisation (Joensuu-Salo et al, 2021; Van Velthoven et al, 2019; Pferzinger & Rammerstorfer, 2017). In Greece, research on digital innovation is still in its infancy. The research of Makris & Apostolopoulos (2021) that examined active health companies found that entrepreneurs who implemented innovative practices that included the digitalisation of services had positive results. In their research, Giannopoulou et al, (2020) documented the benefits of developing and implementing new innovative care delivery models based on process digitalisation. In this regard, economic support has been provided through the European Structural Funds for financing, among other enterprises, health companies too (Makris et al, 2021). In addition, Bogdanos et al, (2008) who examined digitization and care determined that the modern models should be developed in the health services market based on both corporate and human goals. The digitalisation of health services in the vaccination programs for protection against the Covid-19 pandemic (Odone et al, 2021) also provided a huge significant benefit.

3. Methodology

This study adopted a qualitative approach with semi-structured interviews (Modgil et al, 2022). Qualitative research contributes positively to the diversity of entrepreneurship issues (Creswell & Poth, 2016; Pringle et al, 2011). Using qualitative methods offered us the opportunity to identify the experiences and beliefs of health entrepreneurs on the development of digitalisation in the health sector as well as on the innovative practices that can be applied (Kyllingstad et al, 2021, Janssen & Moors, 2013). By this methodological progress we traced the key aspects of the new entrepreneurial activities that could be developed according to the views of owners and managers in healthcare industry (Mehrabi et al, 2019). We conducted 12 interviews of 45 duration minutes with each one individual. The interviews commenced in August 2021 and ended in November 2021. This qualitative interview-based study features primary data from a sample of active entrepreneurs in private healthcare sector (Makris & Apostolopoulos, 2021).

Table 1: Characteristics of the selected companies

ENTERPRISE	YEAR OF ESTABLISHMENT	NUMBER OF EMPLOYEES	TYPE OF ENTERPRISE
R1	2010	120	Rehabilitation & Recovery Center
R2	2005	47	Hemodialysis Center
R3	2012	11	Diagnostic Center
R4	2012	176	Rehabilitation & Recovery Center
R5	2014	13	Psychiatric Clinic
R6	2007	18	Diagnostic Center
R7	2019	41	General Clinic
R8	2012	85	Rehabilitation & Recovery Center
R9	2011	210	Rehabilitation & Recovery Center
R10	2008	190	Rehabilitation & Recovery Center
R11	2014	32	Psychiatric Clinic
R12	2017	14	Diagnostic Center

We used in-depth interviews to capture entrepreneurs' perspectives on the implementation of digital practices as well as possible obstacles (Schiafone et al, 2021; Gastaldi et al, 2018). We chose Convenience Sampling technique which is among the most adequate strategies in qualitative research to identify the sample in healthcare area. We have harmonized with the literature's knowledge on qualitative research methodology which suggests that the collected sample size should be small in order to keep subjective and individual characteristics (Moser & Korstjens, 2017). The sample consists of medical surgery clinics, diagnostic centres, hemodialysis services, psychiatric care, rehabilitation-recovery centres located in various small towns in Greece's regions. In order to highlight the impact of digitalisation progress on health companies, we focused on innovative digital interventions in relation with specific factors such as the suppliers, materials, wares, supplies and payments, the public services and local self-administrative authorities, insurance funds and public health structures as well as the quality care of the patient, his treatment and upgrading the offered health services.

4. Data analysis

In order to capture the topics and subthemes (Gioia et al, 2013) the semi-structured interviews were examined individually using an inductive approach before proceeding further in any comparisons between them (Thomas, 2006; Creswell, 2005). The coding was exclusive and independent (Krippendorff, 2018) and there was a percentage weighting of agreement or non-agreement between the research team coding (Hayes & Krippendorff, 2007; Strauss & Corbin, 1990).

Table 2: Emerging topics και sub-themes

Emerging topics	Sub-themes	Summary
Innovative digital interventions in relation to suppliers, materials, wares, supplies and payments	Digital supplies of materials	Most of the supplies are now made using digital technology Technology solved problems in the supply chain in a fast and efficient way
	Digital commission payments	All payments for the supply of materials are now made electronically
	Digital transactions with financial institutions	Electronic transactions with financial institutions are mostly digital. Very few transactions are made in person
Innovative digital interventions compared to the public services and self-administrative authorities, insurance funds and public health structures.	Digital services with public health structures	The digital transformation of public health structures is not complete, and this makes it difficult to do business with them. There are also system incompatibilities in some cases
	Digital transactions with self-administrative authorities and other public services	A large part of the transactions with the local government continues to be done with a physical presence

Emerging topics	Sub-themes	Summary
	Digital transactions with insurance organisations	Despite the progress made in recent years, there is still a problem with digital transactions
Innovative digital interventions in relation to the quality care of the patient, his treatment and upgrading the offered health services.	Digital interventions to serve patients	Innovative digital projects were implemented to serve citizens with positive results
	Digital interventions for better internal operation and upgrading of the services provided	Innovative projects were implemented that facilitated and accelerated the internal operation of health enterprises

5. Findings

Ten entrepreneurs of the twelve individuals who participated in this study, stated that they have implemented digital innovations in their enterprises. Two entrepreneurs among interviewees said they were hesitant to develop large-scale digital innovations fearing that innovative digital activities would require a large amount of financial capital and new skilled staff that would increase their operating costs. The structure of the findings as far as the entrepreneurs who developed digital innovations was carried out based on the emerging thematic topics: Innovative digital interventions in relation to suppliers, materials, wares, supplies and payments. Innovative digital interventions compared to the public services and self-administrative authorities, insurance funds and public health structures. Innovative digital interventions in relation to the quality care of the patient, his treatment and upgrading the offered health services.

- Innovative digital interventions in relation to suppliers, materials, wares, supplies and payments

In relation to the supply of materials concerning the entrepreneurs participating in the research, it was detected that they have digitised the supply chain and this fact has created positive outcomes for their enterprise.

"Technology has solved dozens of problems we have had with our supply chain operation. Everything is now done quickly and efficiently. We are able to have direct information and we can easily compare product specifications and prices."

In relation to the payment system from the purchase of materials and products, survey found that entrepreneurs have developed the electronic payment system and are satisfied with its use.

"All our transactions as far as the payment invoices from suppliers are now done electronically. This has solved dozens of problems for us. It reduced costs and facilitated transactions. Everything is done instantly and quickly."

It was found that most of the transactions with financial institutions are now done electronically and only a few require physical presence.

"All our transactions that are relevant to the banks are carried out electronically. Only for a few transactions we have to go to the bank ourselves. This fact offered a whole new dynamic in our performance. The lost working hours in the banks ceased to exist "

- Innovative digital interventions compared to public services and self-administrative authorities, insurance funds and public health structures

In relation to digital transactions with the public sector, it was detected that they are problematic since the digital transition of public services has not yet been completed.

"There's a negative reflection in our transactions with the public services since the public sector has not completed its digital transition. In many cases the transactions are made in the old traditional ways "

In the present research it was detected that there are also problems in the transactions of health enterprises with the self-administrative services since the digital transition has not been completed in the local government.

"Our transactions with the self-administrative authorities are mostly done in traditional ways since the digital transition has not been completed and system incompatibilities prevail"

Through the reports of the health entrepreneurs, it was found that despite the digitalisation steps that have been developed in the public insurance organisations, they continue to make transactions in the traditional way.

"Both public insurance organisations and public services have not completed their digital transition. This progress greatly complicates the expanded use of our own innovative digital designs."

- Innovative digital interventions in relation to the quality care of the patient, his treatment and upgrading the offered health services.

The individual's in-depth interviews revealed that the private health sector, taking advantage of the weaknesses of the public sector, invested in innovative digital projects and has gained a comparative advantage in the health system, both in serving the citizens and in its dynamic operation. Due to the investments in high level technology, these enterprises forced the public sector and the insurance organisations to become the biggest consumers of their healthcare services.

"Our comparative advantage is the investment in high level technology that delivers reliable services to our patients. For us, serving the citizens is our primary aim. These are the differences between us and the public sector."

The entrepreneurs who participated in the present research believe that investing in innovative digital designs solved problems in their internal operation and gave them a strong dynamic. Due to the investments in high level technology, they forced the public sector and the insurance organisations to become the biggest consumers of their services.

"Investing in innovative practices in our medical facilities has solved our operational problems and made us credible to patients."

6. Discussion

This study captured that health entrepreneurs have proceeded to innovative digital projects and only a small percentage of them continue to operate in traditional ways. Those entrepreneurs who have invested in digital innovations consider that the outcomes had positive effects both in terms of their internal operation and in terms of their dealings with suppliers and financial institutions. They contributed to the better service of the citizens and to the quality improvement of the provided services. However, the research identified obstacles in the development of digital transactions of these enterprises with public healthcare services, insurance organisations, self-administrative authorities, and some other public services. Entrepreneurs have attributed them issues to the fact that these public structures have not completed the digital transformation of their services. The above findings are consistent with other research findings which are showing that digital innovations contribute positively to the interaction with health consumers (Pillay, 2019) and improve their experience linking with healthcare professionals (Wulfovich & Meyers, 2020). Digital innovations improve patient outcomes, increase the quality of the offered services and reduce internal costs (Lupton, 2013). They create business opportunities in the health sector (Belolipetskaya et al, 2020) and improve the quality of citizens' life (Iyawa et al, 2016). They increase the competitiveness of enterprises and contribute to the transformation of services (Bumann & Peter, 2019).

At the same time, these digital interventions enable enterprises to reduce the waste use of certain resources and enhance the entrepreneurial activities (Yousaf et al, 2021). In this survey, a small percentage of entrepreneurs (2/12) were reluctant to invest in digital innovation practices by fearing that innovative digital activities would require more financial capitals and new qualified staff which surely increase the operating costs. This view and perception of the entrepreneurs, contrasts with many researches showing that implement digital innovation practices reduces performance and service delivery costs and combats the waste as far as the expenditures (Yousaf et al, 2021). In their research Moro Visconti & Morea, (2020) point out that traditional technologies often increase the cost of investment while digital applications are cheaper and may allow for its timely reduction. The research of Simpson et al (2006), which examined the positive and negative aspects of innovative projects among the negative elements reflected the fear of rising the overall cost of procedures. There are also studies that found that the ways of controlling the overall costs which usually incurred in investing in digitizing processes and implementing innovative digital practices of health companies need to be further expanded (Kraus et al, 2021). Barriers in the collaboration with central government and local self-administrative services that have not yet completed the digital transition are also identified in other researches (Makris & Apostolopoulos, 2021). Katakis et al (2018) argues that for modern health systems to function, effective cooperation between

stakeholders such as insurance organizations and the public sector is needed, and the interoperability is a prerequisite as far as the information and communication technology systems

7. Conclusions

Digital innovation projects are a challenge for the private health sector as well, and where such projects have been implemented the results have been successful. They reduced the operating costs of enterprises, upgraded the offered healthcare services, and facilitated the service of patients. They provide private health companies with a comparative advantage over public medical services. The non-completion of the digital transformation of the public sector, local self-administrative services and insurance organisations were highlighted in the research as an obstacle to the digital innovation plans of the private health sector. The results of this research provide a useful tool to the health policymakers but also to the investors. It is also a useful guide for the EU institutions that develop and implement Member States' health programs. As this article provides insights into how the digital transformation in private healthcare enterprises can contribute positively in entrepreneurship issues, further in-depth investigation could combine the findings of this paper with the views of local administrative authorities and other health professionals as well as it could be expanded in rural areas. Of course many other issues as far as the economic environment which is very tough for most of the companies that are activated in Greece but also variable, needs to keep in close monitoring for further influence.

8. Limitations and future research

This survey has identified the views of health entrepreneurs on digital innovation practices without reflecting the views of the workforce in private health units as well as the patients themselves, which is a fact that future research should include.

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