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Beyond the Speculation: Mapping the Real Impacts of Digitalization on the Slovenian Healthcare Business Model

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ABSTRACT

Purpose: The increasing digitalization of healthcare systems worldwide has been welcomed as a transformative force, yet its actual effects on healthcare business models remain underexplored. Moving beyond the speculation and overly optimistic expectations, this study examines the real impacts of digitalization on the Slovenian healthcare business model.

Methodology: A qualitative research approach was employed, combining a comprehensive literature review with semi-structured online surveys. The study surveyed 20 prominent experts responsible for managing national eHealth solutions in Slovenia. Content analysis was used to capture the perspectives of participating experts and systematically map the real impacts of digitalization on the Slovenian healthcare business model.

Findings: Results indicate that digitalization significantly impacts the healthcare business model by improving operational efficiency and care coordination, optimizing data accessibility and management, and enhancing patient engagement. However, due to structural and systemic challenges, the impacts of digitalization on the Slovenian healthcare business model remain relatively limited at this stage and largely depend on the effective alignment of technological advancements with health, business, organizational, and socio-economic factors.

Practical implications: The findings emphasize that digitalization in healthcare should not be regarded merely as a technological endeavour, but as a strategic driver of comprehensive healthcare and business transformation. For healthcare managers and policymakers, this means

investing not only in digital infrastructure but also in governance, organizational processes, business operations, and social dimensions. By doing so, they can maximize the benefits of digital solutions, reduce inefficiencies, and create a more sustainable, patient-centred healthcare system. The study may assist leaders to identify bottlenecks and prioritize actions that ensure digitalization can bring measurable improvements in service delivery and public health outcomes.

Originality: This research contributes novel insights by providing one of the few empirical analyses of digitalization's impacts on the Slovenian healthcare business model. Rather than relying on assumptions or normative expectations, it integrates the viewpoints of leading national eHealth experts and contextualizes them within broader structural and systemic framework. The study adds value by bridging the gap between global discourses on digital transformation and the realities of a small national healthcare system, thus offering lessons transferable to other countries facing similar challenges of scale, resources, and institutional inertia.

Keywords: *business model, digitalization, healthcare system, impacts, qualitative research*

Onkraj špekulacij: oris dejanskih vplivov digitalizacije na slovenski poslovni model zdravstvenega varstva

POVZETEK

Namen: čedalje večja digitalizacija zdravstvenih sistemov po svetu je dobrodošla kot preobrazbena sila, vendar so njeni dejanski učinki na poslovne modele v zdravstvu še vedno premalo raziskani. Članek presega špekulacije in pretirano optimistična pričakovanja ter preučuje resnične vplive digitalizacije na slovenski poslovni model zdravstvenega varstva.

Metodologija: uporabljen je bil kvalitativni raziskovalni pristop, ki je združil celovit pregled literature s polstrukturiranimi spletnimi anketami. Raziskava je zajela 20 vodilnih strokovnjakov, odgovornih za upravljanje nacionalnih rešitev eZdravja v Sloveniji. Za zajem pogledov sodelujočih strokovnjakov in sistematičen oris dejanskih vplivov digitalizacije na slovenski poslovni model zdravstvenega varstva je bila uporabljena analiza vsebine.

Ugotovitve: rezultati kažejo, da digitalizacija pomembno vpliva na poslovni model v zdravstvu z izboljšanjem operativne učinkovitosti in koordinacije oskrbe, optimizacijo dostopnosti do podatkov in upravljanja podatkov ter krepitvijo vključenosti pacientov. Vendar pa zaradi strukturnih in sistemskih izzivov učinki digitalizacije na slovenski poslovni model zdravstvenega varstva v tej fazi ostajajo razmeroma omejeni in pretežno odvisni od učinkovitega usklajevanja tehnološkega napredka z zdravstvenimi, poslovnimi, organizacijskimi in socioekonomskimi dejavniki.

Praktične implikacije: ugotovitve poudarjajo, da digitalizacije v zdravstvu ne moremo obravnavati zgolj kot tehnološkega podviga, temveč kot strateški vzvod celovite zdravstvene in poslovne transformacije. Za menedžerje v zdravstvu in oblikovalce politik to ne pomeni le vlaganja v digitalno infrastrukturo, temveč tudi v upravljanje, organizacijske procese, poslovno delovanje in socialne razsežnosti. Tako lahko maksimizirajo koristi digitalnih rešitev, zmanjšajo neučinkovitosti ter ustvarijo bolj trajnos-

ten in na pacienta osredinjen zdravstveni sistem. Študija lahko voditeljem pomaga pri prepoznavanju ozkih grl in določanju prednostnih nalog ukrepov, ki zagotavljajo, da digitalizacija prinese merljive izboljšave pri izvajanju storitev in zdravstvenih izidih na ravni javnega zdravja.

Izvirnost: raziskava prinaša nove vpoglede, saj je ena redkih empiričnih analiz vplivov digitalizacije na slovenski poslovni model zdravstvenega varstva. Namesto da bi se opirala na domneve ali normativna pričakovanja, vključuje poglede vodilnih nacionalnih strokovnjakov za eZdravje in jih umešča v širši strukturni in sistemski okvir. Študija pripomore k zapolnjevanju vrzeli med globalnimi diskurzi o digitalni preobrazbi in realnostmi majhnega nacionalnega zdravstvenega sistema ter tako ponuja lekcije, prenosljive tudi v druge države, ki se soočajo s podobnimi izzivi obsega, virov in institucionalne inercije.

Ključne besede: *poslovni model, digitalizacija, zdravstveni sistem, vplivi, kvalitativna raziskava*

JEL: I15, M15

1 Introduction

In recent years, the Slovenian healthcare system, much like other healthcare systems within the European Union (EU), has faced substantial structural challenges. These challenges are driven by objective circumstances and cannot be avoided in the foreseeable future, necessitating fundamental changes to the current healthcare setting. Healthcare reform has thus emerged as a societal imperative, requiring policymakers to adopt a more comprehensive and innovative approach in the years ahead. One of the key structural reforms needed to address these challenges effectively is the digitalization of the healthcare system. A robust and integrated health information system is envisioned to facilitate precise patient tracking, streamline treatment processes, manage costs, and enhance data accessibility. Such a system would enable efficient scheduling of medical appointments, coordination of waiting lists, tracking of completed medical procedures, and evaluations of their health outcomes and costs. Additionally, health information system could improve the efficiency and transparency of public healthcare in Slovenia and optimize the operational processes within healthcare institutions (MoH, 2022). Despite the undeniable potential and opportunities offered by digitalization, misleading and overly ambitious political slogans, unrealistic predictions by certain experts, and uncritical public debates have often led to inflated public expectations that digitalization will provide miraculous solutions to all the shortcomings of the healthcare sector.

However, while digitalization is not a panacea, it will undoubtedly have a profound and long-term impact on the entire healthcare system and its subsystems. This is supported by experiences from the most developed countries (Perianez et al., 2024; Wang and Xu, 2023; Majcherek et al., 2024). These experiences emphasize the importance of the healthcare system's business

model, which plays a pivotal role in the system's functioning and development (Schiavone, et al., 2021; Cosenz et al., 2024). A business model can be broadly defined as a framework of components, their roles, interconnections, and dependencies that, combined with information flows and business processes, create added value for both internal and external stakeholders (Osterwalder et al., 2005; Zott and Amit, 2024; Snihur and Markman, 2023). By outlining the structural and functional elements of an organization, the business model serves as a foundation for setting strategic goals, providing a logical operational framework for objective and data-driven business planning. The business model is sensitive to systemic changes, making it an effective tool for analysing and projecting the financial and operational implications of business policies or projects (Lanzolla and Markides, 2021; Westerveld et al., 2023). Given the rapid advancements in digitalization, which are becoming key drivers of structural and business changes in healthcare, this article explores the broader, often overlooked impacts of digitalization on the healthcare system's business model. Drawing on theoretical constructs, empirical cases, and online surveys with renowned experts from the field, this article addresses two primary research objectives: 1) exploring the concept of a business model and assessing the current state of the healthcare business model in Slovenia and 2) mapping the real impacts of digitalization on the Slovenian healthcare business model.

Following the introduction, the second section of the article reviews existing research and literature, offering insights into the concept of the business model and its role in contemporary organizational systems. The third section outlines the qualitative research design, detailing the methodological framework and content analysis procedures. The fourth section presents the research results, with a primary focus on the current state of the healthcare business model in Slovenia and the tangible impacts of digitalization on the healthcare business model. The fifth section engages in a critical discussion, addressing open questions related to business model digitalization and its role in implementing structural reforms within the healthcare system. Finally, the sixth section concludes with key findings and closing remarks.

2 Review of Previous Research in the Field

In recent years, the concept of the business model has garnered significant attention from professionals and academia (Aagaard and Nielsen, 2021; Ancillai et al., 2023; Leal Neto and Von Wyl, 2024). An expanding body of research underscores the need to examine critical success factors and mechanisms for creating added value. This trend reflects a broader recognition among organizations that their competitive edge and business success hinge on elements such as business expertise, innovation, human resources, business processes, service and product quality, and customer relationships – factors that are largely intangible (Miller et al., 2021; Wirtz et al., 2021; Mignon and Bankel, 2023).

As interest in business success factors has grown, so too has the exploration of the business model as a wide-ranging concept. Although the term has long

existed in economic theory to describe the "way of doing business", its significance has expanded. In general terms, a business model can be defined as a framework of interconnected factors that shape an organization's operations and underpin its success. This success may stem from the quality and uniqueness of products or services or from cost efficiencies that enable the achievement of long-term goals (Bigelow and Barney, 2021; Purnomo et al., 2022). Chesbrough and Rosenbloom (2002) trace the origins of the business model concept back to Chandler's seminal work Strategy and Structure (1969), which analysed the factors distinguishing successful from unsuccessful companies. Chandler's research highlighted mechanisms for creating added value, optimizing the transformation of resources into products and services, and building efficient value chains.

While most studies underscore the positive impact of business models, some researchers focus on the interplay between added value, business models, and strategy. They contend that the configuration of key business factors and the management of core strategic values, such as customer relationships, access to technology, and understanding customer needs, are more critical to an organization's growth than inventing entirely new business models. These scholars argue that opportunities for added value lie in enhancing these strategic connections. Added value may come from solving systemic challenges, improving business performance, or reducing risks and costs (Bresciani et al., 2021; Mostaghel et al., 2022; Colovic, 2022). Achieving this often requires reconfiguring an organization's core values, such as adopting new approaches to customer engagement, leveraging advanced information and communication technologies (ICTs), or gaining deeper insights into customer needs.

Despite the increasing interest from both practitioners and academics, the term business model remains elusive, with no universally accepted definition. The theoretical underpinnings of the concept remain ambiguous, and definitions vary widely, reflecting diverse research angles and interpretations. Recent research on business models spans a broad range of areas, including organizational dynamics, business processes and structures, value chains and networks, innovative and ICT-based approaches, corporate strategy and competitive advantage, entrepreneurship, sustainability, and ecosystem functions. Although these research domains often overlap and terminological ambiguities persist, the existing body of literature allows us to roughly distinguish three predominant directions in business model research (Sjödin et al., 2020; Vaska et al., 2021; Menter et al., 2024): 1) organizational changes and new organizational forms, 2) value creation, and 3) business model innovation and digitalization. The boundaries between the outlined research directions are fluid, making it challenging to chart the business model research thus far, identify and assess the prevailing topics, and forecast the research trends and priorities in the future. The fragmented and isolated study of business models from various perspectives hinders a thorough and critical evaluation of their potential impact on organizational systems. This fragmented approach often leads to a lack of motivation to transform outdated or inadequate business models, particularly within public sector organizations. As a result, these

organizations experience stagnation and fail to harness their full potential to deliver innovative products and services or meet the evolving and diverse needs of their users.

2.1 The Concept of a Business Model

Research often roughly defines a business model as a network of factors, their interrelationships, processes, and causal links that create added value. Studies generally argue that a comprehensive business model should identify the target users, articulate the organization's comparative advantages, specify the product and service offerings, and assess cash flow, projected profit, and associated risks (Trischler and Li-Ying, 2023). Some studies are even more comprehensive and provide a broader interpretation, describing a business model as an organizational framework designed to gather, connect, and communicate information about an organization's operations and activities (Verhagen et al., 2021).

In the late 1990s, the concept of a business model became closely associated with e-business and the emerging digital economy. The rise of the internet and the widespread digitalization of both private enterprises and the public sector gave birth to innovative business models, pushing e-business models into the spotlight (Bresciani et al., 2021; Ancillai et al., 2023). Since then, researchers and professionals have focused on understanding how digitalization and online business reshape organizational practices and influence business model components and their interrelationships. Successful business models often take inspiration from the banking and online retail sectors (Hanafizadeh and Marjaie, 2021; Palmié et al., 2022). Despite differences in structure, naming conventions, characteristics, and interrelationships, several core components consistently appear across most business model definitions, concepts, and depictions (Zott and Amit, 2024; Lanzolla and Markides, 2021; Wirtz et al., 2023; Lorenz et al., 2024; Menter et al., 2024; Mignon and Bankel, 2023; Miller et al., 2021; Westerveld et al., 2023; Trischler and Li-Ying, 2023). They are summarized in Table 1. These components provide a framework for understanding how business models can be utilized, adapted and optimized to meet contemporary challenges and opportunities, particularly in the context of digital transformation.

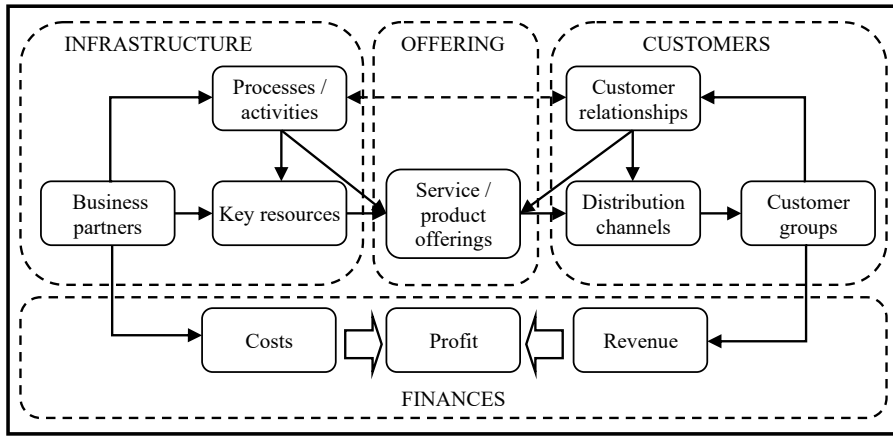
Table 1. Components of a generic business model

Component	Description
Service / product offering	Which customer desires and needs does the organization's service / product offering focus on?
Customer groups / market segmentation	How and to what extent does the organization satisfy customer desires, needs, and expectations overall or for specific market segments?
Business / communication distribution channels	Through which channels and how does the organization communicate with customers and offer its services / products?
Customer relationships / connections	What are the relationships with customers, how are they maintained, and what are the customers' expectations regarding these relationships / connections?
Business processes / activities / value configuration	Which key business processes / activities are carried out within the organization, and how do they contribute to creating added value?
Key resources / capabilities / capacities	What resources, and in what quantities, does the organization utilize in its operations, and how effectively are they used?
Business partners / partner network	To what extent do various partners contribute to the organization's operations, success and efficiency, and in what way?
Costs / expenses / expenditure	What is the cost structure for services / products and the organization's operational activities, and are these costs aligned with the organization's business plan?
Revenues / income	Which services/products offered by the organization are customers willing to pay for, how much, and in what manner?
Profit / added value / business performance	Does the organization's business performance reflect as an operational outcome in the form of profit/added value generated through the production and sale of products or the provision of services?

Source: Authors' compilation (different sources).

The illustration below presents an adapted version of Osterwalder and Pigneur's (2010) business model ontology, a widely recognized and frequently applied framework for visualization and understanding business models and their components (Figure 1). Osterwalder and Pigneur (2010) developed the business model ontology as a structured framework for understanding, designing, and analysing business models. The ontology defines a business model as a conceptual tool that describes how an organization creates, delivers, and captures value. It consists of nine interrelated building blocks, which together form the well-known business model depiction. The business model ontology provides a shared language for managers, entrepreneurs, and researchers, making it easier to visualize and innovate business models systematically. It is widely used as a strategic management tool.

Figure 1. Business model ontology



Source: Adapted from Osterwalder and Pigneur, 2010.

This business model framework, although predominantly applied in the private sector, provides a comprehensive and transparent representation of the key factors and their interrelations that determine the success of an organizational system. As such, it will serve as a foundation for mapping the real impacts of digitalization on the healthcare business model in Slovenia.

3 Methods

The methodological framework is adapted to the interdisciplinary nature of the research problem and encompasses a comprehensive review of existing literature on the business model, synthesis of findings, and online surveys to map the impacts of digitalization on the Slovenian healthcare business model (Yin, 2017; Braun et al., 2021; Barroga et al., 2023). By addressing the technological, medical, and business dimensions of the Slovenian healthcare system, policymakers can better navigate the complexities of healthcare system operations and ensure long-term benefits for patients, healthcare providers, and society as a whole.

3.1 Research Design

This study employs a qualitative research design to analyse the impacts of digitalization on the Slovenian healthcare business model. Following a comprehensive review of existing literature on business models, the primary data collection method involved semi-structured online surveys with 20 prominent experts from the National Institute of Public Health who manage national eHealth solutions. These surveys were conducted between January and February 2025. The study's qualitative approach aligns with the complex and interdisciplinary nature of the research problem, which requires in-depth exploration of expert insights into digitalization and its ubiquitous impacts on the healthcare business model. The methodological framework follows a structured process: 1) designing the study and developing the survey protocol, 2) conducting the surveys, 3) transcribing and coding the survey data, 4) analysing the data using qualitative content analysis, 5) interpreting the findings, and 6) reporting the results. This approach is based on established methodologies for qualitative research and content analysis ensuring rigor and reliability in the research process (Shava et al., 2021; Yadav, 2022).

3.2 Sample

The sample for this study comprises 20 experts who hold leadership positions in the management of national eHealth solutions. These participants were purposefully selected based on their unparalleled expertise and extensive experience in digitalization initiatives, healthcare information systems, operations, and structure of the Slovenian healthcare system. The non-random, purposive sampling method ensures that participants possess the necessary knowledge to provide credible and insightful perspectives on the research topic. The selected experts represent a diverse group of individuals specialized in information technology, medicine, economy, organization, and public health. This diversity allows for a comprehensive examination of digitalization's effects on various components of the healthcare business model. Recruitment was guided by the principle of maximum variation sampling to capture a broad spectrum of views and experiences (Hennink and Kaiser, 2022). The sampling procedure achieved data saturation point, ensuring that no significant new information emerged during the final stages of data collection.

3.3 Data Collection and Analysis

The online surveys were conducted using a miscellaneous set of questions including open-ended questions and semi-structured format to maintain focus of the research and address both consistency and flexibility in exploring emerging themes. Open-ended questions within the survey protocol were designed to elicit detailed insights into participants' experiences, perceptions, and evaluations of digitalization initiatives within the Slovenian healthcare system. The survey questions presented below were applied:

1. How would you assess the current state of the healthcare business model in Slovenia? Is there a clearly defined business model within Slovenian healthcare system?
2. Can you identify and define the real impacts of digitalization on the business model? Provide detailed insights into how each of the business model components listed below is affected:
   - Infrastructure
   - Offering of healthcare services and products
   - Patient
   - Public health and public finance

Prior to conducting the online survey, participants were provided with a detailed explanation of the business model concept, including its components, interconnections, and relationships on the one hand, and its characteristics, functions, and objectives on the other. Before proceeding with the survey, any uncertainties or ambiguities raised by participants were clarified and resolved, ensuring that they were able to contribute to the study as effectively and reliably as possible. Each online survey took approximately 90 minutes to complete and was conducted with the participants' consent. To ensure data confidentiality and ethical compliance, all identifying information were anonymized.

The content analysis was conducted using MAXQDA Analytics Pro 2022 (version 22.4.1), a qualitative analysis software. This tool allows for systematic coding and categorization of the survey data, enabling the identification of patterns, themes, and relationships. The content analysis followed a typical multi-stage coding process: 1) initial reading: transcripts were reviewed to familiarize the researchers with the data and identify preliminary themes, 2) coding framework development: codes were derived both inductively from the survey data and deductively from the literature review, 3) thematic analysis: coded data was organized into overarching themes, reflecting the viewpoints and statements of the participating experts regarding the survey questions, and 4) validation: both coders independently analysed the data to ensure reliability and minimize bias. The coding framework comprised 9 primary codes, categorized into 2 main areas based on the survey questions (Figure 2). These codes reflect various issues and perspectives shared by participants regarding digitalization and the healthcare business model, their interplay, and the real impacts of digitalization on the Slovenian healthcare business model.

The software's analytic capabilities were used to generate visualizations, such as code diagrams and thematic maps, to support the interpretation of findings. The results were triangulated with existing literature to validate and contextualize the insights, ensuring robust conclusions (Im et al., 2023). By combining literature review and expert surveys with systematic content analysis, this study provides a nuanced understanding of digitalization's current impacts on the Slovenian healthcare business model. The findings aim to inform evidence-based strategies for aligning digital initiatives with systemic healthcare reforms.

Figure 2. Code system developed in content analysis software

Source: Authors' research.

4 Results

One of the most important segments of strategic planning and mechanisms for achieving long-term organizational goals and satisfying stakeholder needs is the business model of the organization. A comprehensive and appropriately digitalized business model facilitates the effective transformation of organizational resources into high-quality products and services. It represents an integral link between the organization's strategic goals and the business processes required to achieve them.

4.1 The Impact of Digitalization on Organizational Systems and Healthcare Business Models

Research consistently highlights digitalization as a driving force behind changes and development in business models (Caputo et al., 2021; Broccardo et al., 2023). According to research thus far, the influences of digitalization on business models range from minimal ICT use to a complete redefinition of the business landscape. Studies in the field further emphasize the role of digitalization in adapting organizational processes, improving business efficiency within and between organizations, and enhancing interactions with the broader societal environment (Wang et al., 2023; Snihur and Markman, 2023). To date research generally indicates a strong positive correlation between comprehensive digitalization and business success, positioning digitalization as a critical factor for organizational management and value creation (Climent and Haftor, 2021; Reim et al., 2022). Lessons and experience reveal that the conversion of digital assets (e.g., infrastructure, technologies, and expertise) into strategic resources and further digitalization initiatives have

a significant impact on business performance, including improved products, processes, and communication efficiency (Gregori and Holzmann, 2020; Astrom et al., 2022). Nevertheless, it is important to keep in mind that business models are under constant pressure to evolve due to global trends, regulatory changes, shifting user behaviour, and, in particular, technological advances. In this context, successful digitalization depends on an organization's ability to continuously adapt its business model to volatile market conditions and remain relevant and effective in a dynamic environment.

Digitalization projects in healthcare focus on digitalizing clinical and business processes, as well as systematically collecting, analysing, and utilizing healthcare data. These initiatives are part of comprehensive healthcare reforms that began in developed countries during the 1980s. The goals are twofold: to improve the quality and timeliness of patient care and to provide robust support for decision-making, planning, and management at both institutional and system-wide levels. However, many digitalization projects have focused on isolated segments of healthcare operations, overlooking the broader business model as a critical success factor within the healthcare system. A well-designed, digitalized business model facilitates the effective transformation of organizational resources into high-quality healthcare services and serves as a bridge between strategic goals and the processes required to achieve them. Successful healthcare reforms depend not only on technological improvements but also on a deep understanding of business, organizational, policy, socio-economic, and other factors contained in the business model framework (Sibalija at al., 2021). Understanding how digitalization affects the healthcare system's business model requires familiarity with the system's architecture and operations. However, due to the rapidly changing public health conditions and technological landscape, this understanding may not always be sufficient. The business model is inherently dynamic, as demonstrated by its complex structure and variety of its components. Therefore, healthcare organizations must continuously adapt their business models to keep pace with healthcare needs and demands on the population level, financial restrictions, regulatory changes, and digitalization advancements (Wirtz, 2023). However, while digitalization and technological innovation are essential, they do not guarantee public health or business success on their own. The healthcare system is a wide-ranging network of components, activities, interconnections, and dependencies that leverage information and resources to create health value for stakeholders. Such systems are intrinsically complicated, involving numerous stakeholders and multi-layered organizational structures. Achieving public health and business success thus require a well-planned business model, effective implementation, and careful strategic alignment of digitalization projects with healthcare system's operations and long-term goals.

The following paragraphs present summaries of the responses and perspectives shared by the participating experts regarding the survey questions.

4.2 The Current State of the Healthcare Business Model in Slovenia

The participants shared in-depth opinions and various arguments in response to the survey's introductory question about the current state of the healthcare business model in Slovenia. The existing healthcare business model in Slovenia is ill-defined and characterized by poor collaboration among stakeholders, leading to inefficiencies in decision-making, resource allocation, and service delivery. The undefined and often arbitrary business framework makes it challenging to establish clear guidelines and structures that ensure effectiveness, accountability, and long-term sustainability. Patient interaction remains weak, with limited engagement and communication, often resulting in a lack of patient-centred care and lower overall satisfaction. The current approach to business operations, which can hardly be considered a true business model, remains technologically incapacitated and underdeveloped. The digital infrastructure is often fragmented and outdated, posing significant challenges to achieving an effective digital transformation and better business and healthcare outcomes. The lack of investment in digital health infrastructure and workforce training further amplifies inefficiencies and hinders Slovenian healthcare system from achieving its desired transformational goals. The lack of coordination and agreement on financial matters between healthcare providers, policymakers, and insurers is evident in the frequent strikes of healthcare workers. This not only further complicates service delivery but also slows down progress in digital health initiatives. Compared to other sectors, the development of the Slovenian healthcare system business model has been slow, with a significant lag in adopting digital technologies and innovative operational strategies. The organization of work is often inadequate, characterized by rigid hierarchies and bureaucratic obstacles that hinder timely operations, responsiveness, and adaptability to evolving healthcare needs. Business processes are inconsistent and fragmented, resulting in duplication of efforts, increased administrative burdens, and inefficiencies in service delivery. The healthcare system generally operates on outdated principles that are misaligned with modern business paradigms, preventing it from leveraging best practices in digital innovation and healthcare management.

4.3 The Real Impacts of Digitalization on the Slovenian Healthcare Business Model

Digitalization is anticipated to significantly enhance the healthcare system's business model, provided it is implemented sensibly and effectively. Nevertheless, the potential long-term effects of digitalization on the healthcare business model, as outlined by the participating experts, remain somewhat uncertain and, for now, merely hypothetical. In this study, however, we focus primarily on the real and immediate impacts of digitalization on the healthcare business model.

At this relatively early stage, precisely identifying and assessing the long-term effects of digitalization remains challenging. However, we can reasonably

map its real and current impacts on the healthcare business model key components (although not precisely defined): infrastructure, offering, patients, and public health and public finance. The table below (Table 2) outlines the impacts of digitalization on each of these core components, illustrating how digital transformation is driving significant changes across the entire Slovenian healthcare system.

Despite the undeniable potential of digitalization, its real and current impacts on the healthcare business model remain relatively limited. There are undoubtedly many reasons for this. In collaboration with participating experts, we have identified some of the key factors. One of the primary reasons is likely the absence of a clearly defined business model within the Slovenian healthcare system that all stakeholders follow. Consequently, initiating the transformation of an entity that lacks both a formal and, in many respects, a material structure presents a significant challenge. Digitalizing such a vast and complex organizational system as healthcare is a demanding socio-technological project – one that requires a strategic approach, significant resources, time, expertise, and systemic support. However, Slovenia does not adequately meet any of these requirements. As a result, the business model of Slovenian healthcare largely follows the inertia of past periods, with only sporadic integration of otherwise successful and high-quality digital solutions. Yet, these solutions alone – without radical changes in other areas and systemic support – are insufficient to bring about deeper, more visible, and lasting improvements. Despite the growing importance and recognition of digitalization as a critical success factor, the healthcare system remains hesitant to implement more fundamental changes. This reluctance manifests in unwillingness to transform its business model and subsequently restructure business processes, communication channels, integrate comprehensive digital solutions, and align innovative technologies with strategic healthcare goals. As a result, the rigid organizational structure and the existing inflexible business model persist, hindering the healthcare system's ability to adapt to growing and diverse patient needs and the evolving broader environment.

Table 2. The real impacts of digitalization on the healthcare business model

Business model aspects	Impacts of digitalization
Infrastructure aspect	▪ Increased investment in digital technology – improved digital infrastructure at the national level and within healthcare providers. ▪ Automated exchange of a significant portion of healthcare data among public healthcare providers. ▪ Partially automated exchange of health, administrative, and financial data with regulators and government institutions. ▪ Standardization and simplification of digitalized processes (not all business processes). ▪ Enhanced oversight and monitoring of healthcare services provided by healthcare providers. ▪ Increased funding for ICT experts at healthcare providers, regulatory bodies, and government agencies. ▪ Greater investment in digital skills training for healthcare employees. ▪ Enabled monitoring of some performance indicators. ▪ Adoption of digital services by healthcare providers and patients. ▪ Digitalization is becoming an increasingly important factor in the socio-political context due to its developmental potential.
Offering aspect	▪ A transparent definition and list of available healthcare services and products are accessible online. ▪ Healthcare providers, along with their contact information and the healthcare services they offer, are available online. ▪ Certain segments of healthcare services and products are offered in digital form. ▪ Availability of eHealth services, including the Patient Portal, ePrescription, eAppointment, medical test results, health documents, certificates of sick leave, etc. ▪ Information about medications and treatments is available online.
Patient aspect	▪ Increased exchange and use of healthcare data for improved healthcare delivery. ▪ Partially redefined relationships between healthcare professionals and patients, including better control over personal data and treatment processes, improved communication, and better access to information. ▪ eHealth services on the Patient Portal (accessible 24/7). ▪ Reduced costs for patients due to eHealth services, including savings on time and transport expenses. ▪ Improved accessibility of certain healthcare services for disadvantaged patient groups. ▪ Increased digital literacy among patients.

Public health and public finance aspect	▪ Enhanced mechanisms for collecting and analysing data on health and financial efficiency and effectiveness of the healthcare system, as well as non-health factors. ▪ Greater transparency in expenditure and income structures. ▪ More transparent overview of public health indicators. ▪ Improved evaluation of service and product pricing. ▪ Accessibility of certain indicators for managing healthcare providers and the overall healthcare system. ▪ Availability of certain indicators related to operational, human resources, and financial management aspects.

Source: Authors' research.

Successful transformation requires an understanding of theoretical business model concepts relevant to the organization's context and a deep comprehension of operational processes, relationships, and interdependencies (Wirtz, 2020). It also necessitates recognizing the healthcare system's role within a broader society (Barnett et al., 2025). Given the complexity and specificity of healthcare as a public sector service, the transformation process must consider the broader context and ensure that business model components are aligned with socio-economic, policy, technological, organizational, public health, and financial factors and constraints (Lorenz et al., 2024). The future Slovenian healthcare system's business model needs to incorporate adaptations beyond Osterwalder and Pigneur's (2010) traditional business model ontology, widely used in the private sector. The healthcare system's public nature involves more factors, with modified functions and relationships reflecting the unique role of healthcare in modern societies and confirming the complexity of organizational systems in the public sector that generate public benefit. Public sector business models operate in a more diverse and restrictive environment than those in the private sector. In addition to core business model elements such as infrastructure, offering, customers, and finances, public healthcare must also consider public health and public finance factors. These elements typically shape strategic objectives, operational priorities, and guide healthcare system development and sustainability (Rosati et al., 2023). This is reflected in the numerous obstacles that impede the faster adoption of Slovenian eHealth solutions, which are generally well-developed and highly advanced. For comprehensive transformation of the current healthcare business model, digitalization must be given a more significant role. It should integrate the fragmented elements of the business model, enhancing healthcare services, two-way communication, and patient empowerment (Stanimirović and Stanimirović, 2025). Digitalization can improve the utilization of human, material and digital resources, optimize operation and processes, ensure transparency, and enable better oversight of expenditures and incomes (Gehde et al., 2022). Improved data transparency allows for enhanced financial oversight and supports cost-containment measures in public health financing. A comprehensive digitalization of the healthcare business model would enable the Slovenian healthcare system to seize opportunities for high-quality patient care, drive business and organizational restructuring, and support

long-term development. By leveraging accurate and reliable clinical, financial, and administrative data, digitalization could also streamline the management of healthcare organizations and the healthcare system as a whole.

5 Discussion

In modern organizational paradigms, the business model serves as a crucial tool for analysing operations, planning technological innovations, and guiding organizational transformation (Klos et al., 2021; Grego et al., 2024). Despite the growing interest from the professional and academic community in business models over the past two decades, compelling studies exploring the material impacts of digitalization on healthcare business models remain scarce. Existing research generally emphasizes the complex and multifaceted influence of digitalization on organizational business models, confirming that comprehensive digitalization is a crucial step in developing an effective business model (Ramori et al., 2021; Kraus et al., 2021), which is essential for enhancing patient care on one hand, and improving healthcare system efficiency on the other.

The research indicates that the real and current impacts of digitalization on the healthcare system's business model in Slovenia can be assessed from four key aspects: infrastructure, offering, patient, and public health and public finance. In these areas, digitalization demonstrates some very significant effects, although perhaps not as extensive or profound as one might expect or desire at this stage. Even more far-reaching effects of digitalization can be expected in the future, likely playing a pivotal role in shaping the transformation of the business model. However, the effective strategic transformation and development of a suitable business model for the Slovenian healthcare system depend not only on advancements in digital technologies but also on a deeper understanding of policy, business, organizational, socio-economic, and other critical factors (Heubeck, 2023; Bamel, 2023). While digitalization undoubtedly offers significant potential for development and positively impacts organizational business models, it is clear that it cannot, in isolation, drive an effective transformation of the healthcare system or improve its overall outcomes. The success of the healthcare system's operations and efficiency is heavily reliant on aligning digitalization with a wide range of systemic and organizational factors (Stanimirović and Stanimirović, 2025). Moreover, the business model must be adapted to meet the needs of patients, healthcare organizations, and the broader healthcare ecosystem (Oderanti, 2021). Therefore, the successful digitalization of the healthcare system's business model requires the involvement of numerous stakeholders and the balancing of often conflicting factors and interests within the healthcare system (Cosenz et al., 2024). This complexity makes implementation challenging but underscores the importance of careful planning and coordination in building a long-term, effective business model. Despite these challenges, digitalizing the business model represents a substantial opportunity for development (Perianez et al., 2024). When properly aligned with other systemic factors,

digitalized business models can integrate the fragmented elements of the healthcare system, enhance the utilization of organizational capabilities, and accelerate the transformation of resources into tangible value for patients and measurable public health benefits.

In the context of utilizing a properly digitalized business model for implementing structural reforms and achieving strategic goals within the healthcare system, it is essential to recognize that digitalization may improve productivity, boost business performance, and promote organizational innovation (Wirtz et al., 2023). The greatest benefits of an effectively digitalized business model are realized when investments in digital technology are combined with broader systemic measures and organizational changes. These include new strategic approaches, the reengineering of both business and healthcare processes, the adaptation of healthcare services and products, and the transformation of relationships between healthcare providers and patients (Cardinaal, et al., 2024). An appropriately digitalized business model must account for the unique characteristics of healthcare and facilitate better health outcomes and improved business results.

Accordingly, the digitalization of healthcare business models should not be viewed or evaluated solely as a technological advancement; it also constitutes a potential economic intervention in healthcare service delivery, establishing systemic mechanisms with significant implications for efficiency, cost-effectiveness, and the fiscal sustainability of healthcare systems (Lange, 2023). From a public economics perspective, successful digital transformation in healthcare carries significant strategic importance, as it can enhance allocative efficiency, optimize resource utilization, and support the long-term rationalization of public expenditure (Stanic et al., 2023).

The consistent and appropriate application of digital tools such as ePrescription, eAppointment, the Patient Portal, and centralized electronic health records can optimize the use of scarce healthcare resources by reducing administrative redundancies, minimizing medical errors, and streamlining clinical workflows, resulting in tangible operational efficiencies (Tagde et al., 2021). These digital tools may also improve scheduling, enhance patient treatment adherence, reduce unnecessary visits and avoidable hospitalizations, and limit the duplication of diagnostics, thereby directly contributing to efficiency gains and cost savings (Stanic et al., 2023). For example, automated appointment systems reduce waiting times and facilitate better alignment between the supply and demand of healthcare services, thereby improving public health outcomes and allocative efficiency.

Furthermore, digitalization introduces mechanisms for real-time monitoring of healthcare spending, predictive data analytics, and transparent reporting. These features support more effective workforce deployment, capacity planning, and evidence-based policy formulation (WHO, 2019). Such mechanisms directly address common inefficiencies linked to healthcare service inertia and fragmented budget planning. While investment in digital health infrastructure is initially capital-intensive, it frequently yields a high return

on investment over time by reducing expenditures, lowering administrative burdens, and enhancing preventive care, thus alleviating the strain on long-term healthcare budgets (Biggs et al., 2019). Consequently, digitalization should be regarded as a strategic investment in public sector productivity. As healthcare demands and expenditures rise due to demographic shifts and the increasing prevalence of chronic diseases, a digitally enabled healthcare system can promote better population health, greater resilience, and economic sustainability, thereby supporting broader objectives such as economic growth, fiscal consolidation, and efficient public service delivery (Olu et al., 2019). Accordingly, digitalization should be embedded within national long-term expenditure frameworks and healthcare reform agendas (Perianez et al., 2024). This integration enables the synchronization of digital investment cycles with budgetary planning, ensuring sustained funding and effective oversight. The adoption of key performance indicators related to cost savings, patient outcomes, and system responsiveness facilitates continuous assessment of return on investment and public spending efficiency (Willis et al., 2022). The findings reinforce the notion that digitalization constitutes a form of public capital investment with multifaceted returns – not only in financial terms but also in institutional resilience, transparency, and long-term adaptability of health systems.

In Slovenia, digitalization has already begun to generate these effects, though their full realization remains constrained by several factors, including fragmented approaches, uneven development, outdated policies and regulations, and inconsistent implementation practices. An evaluation conducted by the Ministry of Public Administration for the 2016–2018 period suggests that the implementation of eHealth solutions, specifically the ePrescription and eAppointment systems, contributed to substantial cost savings within the Slovenian healthcare system. The Ministry estimates the cumulative financial savings to be approximately EUR 40 million in this period (MPA, 2019).

5.1 Relevance Beyond the National Context: Potential Broader Implications of the Slovenian Case

While this study focuses on Slovenia, the findings hold valuable implications for similarly structured healthcare systems, particularly those across Central, Eastern, and Southern Europe, as well as other small to mid-sized, publicly funded health systems. The Slovenian public healthcare system reflects common characteristics such as centralized financing, hierarchical governance, and incremental digitalization (Albreht et al., 2021), making it a relevant case study for broader international comparative analyses.

Challenges faced by Slovenia – fragmented digital architecture, limited inter-institutional coordination, constrained resources, and resistance to structural change – are similarly observed in numerous EU and OECD member states (Stanimirović, 2024; Bruthans et al., 2025). By detailing technological, institutional, and economic issues, this study offers a diagnostic framework that can inform policy evaluations, support strategic planning, and guide imple-

mentation efforts for healthcare digitalization initiatives beyond the national context. Accordingly, the systemic barriers and enablers identified herein may help shape digital transformation projects across the region. Slovenia's gradual integration of eHealth services aligns with broader strategies set forth by the World Health Organization and the EU, including the European Health Data Space initiative (WHO, 2021; European Commission, 2025). This alignment enables cross-national dialogue, collaborative initiatives, and knowledge transfer, particularly in areas such as interoperability standards, patient data exchange and governance, as well as information security. In this light, the Slovenian case, demonstrating both realized and potential impacts of digitalization in healthcare, could serve as a reference point for designing scalable, context-sensitive digital health policies in comparable regional settings.

5.2 Limitations of the Study and Future Research Directions

The research framework applied in this study has one clear methodological limitation. The Slovenian healthcare system does not have a formally defined business model, so all our assumptions about the structure of the Slovenian healthcare business model and how digitalization might impact it in the future are based on theoretical constructs and surveys with experts in the field of healthcare digitalization. Despite the validated information from literature and the unquestionable expertise and experience of the participating specialists, it is important to note that the potential impacts of digitalization on the transformation of the Slovenian healthcare business model have been conjectured without empirical corroboration in the real healthcare environment. On the other hand, some effects of digitalization on the healthcare business model have already materialized, and the transformative impacts of digitalization can now be assessed and monitored in terms of tangible results and improvements in the healthcare system's operations and outcomes. This was particularly evident during the COVID-19 pandemic, when digital solutions represented one of the few components of the healthcare system that continued to operate without significant disruption.

Therefore, the issues related to the projected impacts and implications of digitalization on the healthcare business model may raise some questions, and the research outcomes might be subject to debate. These concerns should be addressed in future studies aimed at a comprehensive analysis of the long-term impacts of digitalization on the healthcare system. Future research should include a detailed investigation of the direct effects and implications of digitalization on the healthcare business model, including simulations, modelling, and empirical testing in real-world healthcare settings. The focus of these studies should be on providing recommendations and operational guidelines for implementing proper digitalization procedures in countries striving to adapt their business model structures to rapid technological advancements, thereby contributing to increased efficiency of healthcare systems. Despite the methodological limitations outlined, the research reveals the complex dynamics between digitalization and healthcare, highlighting the critical importance of continuously adapting the operations of organizational

systems to broader social and technological changes. It has been shown that, in this regard, the public sector lags significantly behind the private sector.

6 Conclusions

Business practice demonstrates a clear correlation between digitalization and improved business model efficiency, sparking increased interest in how new technologies transform organizational models. This trend is particularly relevant to healthcare and other public sector subsystems, where digitalization can drive the effective integration of innovative technologies, process restructuring, and reorganization. This article explores these pressing issues, emphasizing the need for further multidisciplinary research into the intricate background of digitalization initiatives, business models, and healthcare systems. The study provides a comprehensive overview of business model concept, key components, and their functions. The research outlines the digitalization as one of the catalysts for the necessary transformation of the healthcare business model. It highlights the real impacts of digitalization and stresses that its full transformative potential can be realized only when all business model components, organizational frameworks, and (eco)systemic factors are successfully aligned. A thorough analysis of impacts of digitalization on healthcare business models requires understanding and consideration of broader context in which digitalization takes place and healthcare operates. Successful digitalization of healthcare business models, along with their adaptability and resilience, clearly depends on integrating these diverse elements. Ultimately, all the synergies created should strengthen the efficiency of the healthcare system, fostering sustainable, patient-centred development and contributing to improved public health.

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