

Digital Customer Journey as a Quality Management and Managerial Decision-Support Instrument in Digitally Transformed Medical Laboratory Services

Marina ȚENU

National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania,
Doctoral School of Industrial Engineering and Robotics, Bucharest, Romania
marina.tenu0105@stud.fiir.upb.ro

Ștefan Constantin PETRICEANU*

National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania,
*Corresponding author, constantin.petriceanu@upb.ro

Augustin SEMENESCU

National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania,
augustin.semenescu@upb.ro

Abstract. *Digitalization transforms the way organizations order their processes, make decisions and interact with customers, even in regulated industries like healthcare services. Digital platforms, data integration, and greater process transparency have changed how organizations design services, track performance and relay service quality to customers. Because of this, the digital customer journey is no longer only a customer interaction-oriented concept. Of course, the digital customer journey can also serve as a management tool that helps with process control and guided by data.*

In literature, past works depict the digital customer journey from a customer experience perspective whereas management of service quality in healthcare is mostly investigated through internal standards, procedures and accreditation mechanisms. The conceptual distinction constrains the understanding of how patient processes can embody internal quality management systems into tangible and understandable signals for patients that emanate through digital channels. This creates a gap between the service quality that is internally delivered compared to what customers perceive.

This paper assumes a theoretical and conceptual approach and addresses the following research question: how can the digital customer journey be conceptualized as a managerial instrument for quality management within the process of business digitalization? The analysis starts with the literature review on digital transformation, customer journey, and service quality management. After that it is adapted to the organizational context of medical laboratory services and it is applied to the specific characteristics of the pre-analytical, analytical, and post-analytical process chain.

The conceptual results show the potential to create a new model in which the digital consumer journey brings together business digitalization, service quality management and strategic managerial decision-making. The proposed model illustrates how the digital visibility of processes can facilitate treating data generated in the digital customer journey as managerial resources. This, in turn, aids in bridging the gap from intangibility to service quality as perceived internally which matches up with the external assessment of organizational performance.

Keywords: medical laboratory services; digital customer journey; business digitalization; service quality management; managerial decision-making; the transparency of the process; business digitalization.

Introduction

Digitalization has changed fundamentally the way businesses work nowadays. Businesses use more and more digital platforms and data's to profoundly influence how firms structure their processes, manage resources, and ground managerial decision-making. Digital platforms and access to a large volume of data have pushed businesses to move from reactive managerial practices to decision based on real data and process control. This can mean that, digitalization can no longer be understood solely as a technological initiative, but rather as a strategic process that reshapes the relationship between organizations, customers, and internal performance control mechanisms.

One such concept that has become more relevant in modern times is customer journey. Routed in marketing and customer experience research, this idea describes the order of employee-customer interactions with an organization during service delivery. As the digital interactions increase, so does the customer journey which has been transformed into a digital dimension and become a key data vessel.

The collected data on customer behavior, process performance, and organizational outcomes give businesses large perspectives of improvement. From a manager point of view, these data go beyond customer experience considerations and can support operational performance monitoring, the identification of process dysfunctions, and managerial decision-making.

As a result, the present paper proposes a reconceptualization of the digital customer journey, positioning it not only as a customer experience-oriented tool, but as a managerial mechanism for quality management. The paper contributes by proposing a conceptual model and outlining how the digital customer journey can be conceptualized as a transformation process of data resulting from digital interactions into process visibility and managerial decision support. In that way the model closes the gap between the quality of process executed internally and the quality perceived by customers.

Most studies predominantly treat the digital customer journey from a customer-oriented perspective, focusing on satisfaction, loyalty, or service design. By contrast, research on quality management in highly regulated services tends to focus on internal control mechanism such as standards, procedures, and accreditation mechanisms that ensure the compliance and reliability of internal processes. As a result we have a conceptual fragmentation, in which the digital customer journey and quality management systems are analyzed as distinct dimensions rather than being integrated into a coherent digital business context.

This gap is particularly relevant to the topic of medical laboratory services, as businesses operate in environments that are marked by complicated processes, high quality demands and considerable regulation. Medical laboratories exercise extensive quality management systems based on standardized procedures and internal control mechanisms, but patients find these elements hard to comprehend or judge. From this perspective, the manner of digital interactions of customers reaches a strategic significant as it allows to translate internal processes into external customer-related elements so that methods of quality control become an externally observable factor per se.

The laboratory sample collection process is perceived by patients to be an intrusion making them need for predictability and transparency more compelling. That digital interactions decrease uncertainty, thereby encouraging trust in service providers. Those interactions are also each small pieces in a digital system you can leverage to support process control and data-driven decision-making.

This paper analyses the digital customer journey as a managerial tool for quality management in the context of business digitalisation in medical laboratory services. The study is

guided by the following research question: how can the digital customer journey be formulated as a managerial instrument for quality management, in the context of medical laboratory services? The theoretical argument of the paper comes from the assumption that integrating the digital customer journey into quality management systems contributes to increased process transparency and improved managerial decision-making.

Literature review

Business digitalization and the transformation of managerial practices

Business digitalization, in the academic literature, is defined as a process of organizational change that goes further than the mere adoption of digital technologies and involves structural changes in processes, business models, and managerial practices (Vial, 2019; Verhoef et al., 2021). Research emphasizes that digitalization generates organizational value only to the extent that it is embedded in decision-making mechanisms and management systems, rather than being approached solely as a technological initiative (Westerman et al., 2014). In this context, digitalization is associated with a transition from fragmented processes and reactive decisions toward integrated processes and decisions grounded in data relevant for managerial purposes.

Existing research suggests that new digital platforms and integrated information systems drive the collection, correlation, and visualization of significant volumes of data from operational processes as well as customer interactions (e.g., Kane et al. 2015). Such data serve as strategic resources for management that enable performance tracking, process variation detection, and enhance the forecasting and control capabilities of management. Therefore, digitalization has an important influence on managerial decision-making, which is characterized to a greater extent by transparency, traceability and the standard use of key performance indicators.

A central aspect of business digitalization is the transformation of the relationship between organizations and customers. Digital interactions are no longer limited to communication or promotion, but become an integral part of service delivery processes and of the mechanisms through which managerial information is generated (Verhoef et al., 2021). Through these interactions, organizations gain increased visibility into how services are actually delivered, which creates the conditions for using the customer journey as a source of information relevant to both operational and strategic management. This evolution provides the necessary foundation for integrating the customer journey into organizational managerial practices.

Digitalization of customer interactions and the emergence of patient journey management

Digitalization of customer interactions, is a critical dimension of a service organization's digital transformation that applies both to the customer relationship and the design of organizational processes (Verhoef et al., 2021). The proliferation of digital touchpoints has given rise to an approach known as customer journey management which focuses on how to govern interactions across the entire service in a coherent fashion. This view extends on the analysis of individual interactions and stresses the coordinated sequence of service stages from an organizational perspective impacting process control and operational performance (Lemon & Verhoef, 2016; Meyer et al., 2020).

Likewise, in healthcare services context, the studies adapted this concept through the patient journey form outlining patient pathway across the medical service delivery stages and work interactions (McColl-Kennedy et al., 2019). Previous research highlights that digitalisation enables management of patient journeys: it contributes less fragmented information and enables

incorporation of digital touchpoints such as online scheduling, electronic communication, and digital access to information (Halvorsrud et al., 2016). In that sense, patient journey management can be viewed as a proxy for the orchestration of processes and interactions, supporting operational efficiencies resulting in strengthening the perception of quality service delivery.

However, most recent on patient journey focuses mainly on the end user's experience and satisfaction, paying limited attention to its role in supporting managerial decision-making and process control. Most studies look on how patients perceive interactions and how they feel during the process, without explicitly integrating the use of data generated through digital interactions into organizational management systems (Lemon & Verhoef, 2016; McColl-Kennedy et al., 2019).

Within the process of business digitalization, this limitation becomes particularly relevant, as digital interactions with patients generate significant volumes of data that can support process monitoring and managerial decision-making (Kane et al., 2015). Consequently, the digitalization of customer interactions creates the conditions for an integrative approach, in which patient journey management is analyzed not only as a user-oriented instrument, but also as part of managerial control and coordination mechanisms. This perspective is the setting point for the analysis of existing conceptual models and for the identification of gaps in the literature, which are discussed in the next subsection.

Conceptual models and gaps in the literature

Different conceptual models have been proposed in the literature for analyzing both the customer journey and the patient journey, with the primary objective of understanding how users experience services throughout the delivery process. Customer journey models describe the customer's path as a series of stages and touchpoints, emphasizing the importance of interaction coherence and continuity in shaping service perceptions (Lemon & Verhoef, 2016). These models are commonly used to map interactions and to identify key moments that influence customer satisfaction.

A complementary research direction is represented by the concept of service journey quality, which extends the analysis of quality beyond the final service outcome and emphasizes the quality of the service journey as a whole. Research shows that problems appearing at different stages of service delivery can affect the overall perception of quality, even when the final outcome meets the required standards (Halvorsrud et al., 2016). This approach highlights the relevance of stage coordination and process visibility for the evaluation of service performance.

In the healthcare domain, patient journey models are used to describe the patient experience across the stages of medical service delivery, highlighting the importance of communication and coordination among different touchpoints (McColl-Kennedy et al., 2019). Digitalization is frequently mentioned as a facilitating factor for these models, through information integration and the reduction of process fragmentation. However, most approaches remain predominantly focused on the end-user perspective and on the experiential dimensions of the journey.

A comparative analysis of these models reveals a conceptual gap that is highly relevant for organizational management. Although journey models acknowledge the importance of coherence and transparency across the service journey, they rarely explicitly integrate the use of data generated through digital interactions into managerial control mechanisms and decision-making processes. In previous studies the digital customer journey, the patient journey, and service quality management are addressed as separate domains, without proposing an integrative framework that connects these perspectives within the context of business digitalization (Kane et al., 2015).

This fragmentation of approaches to service quality management and journey-based models, as well as the absence of an explicit managerial integration mechanism for digitally generated interaction data, are summarized in Figure 1.

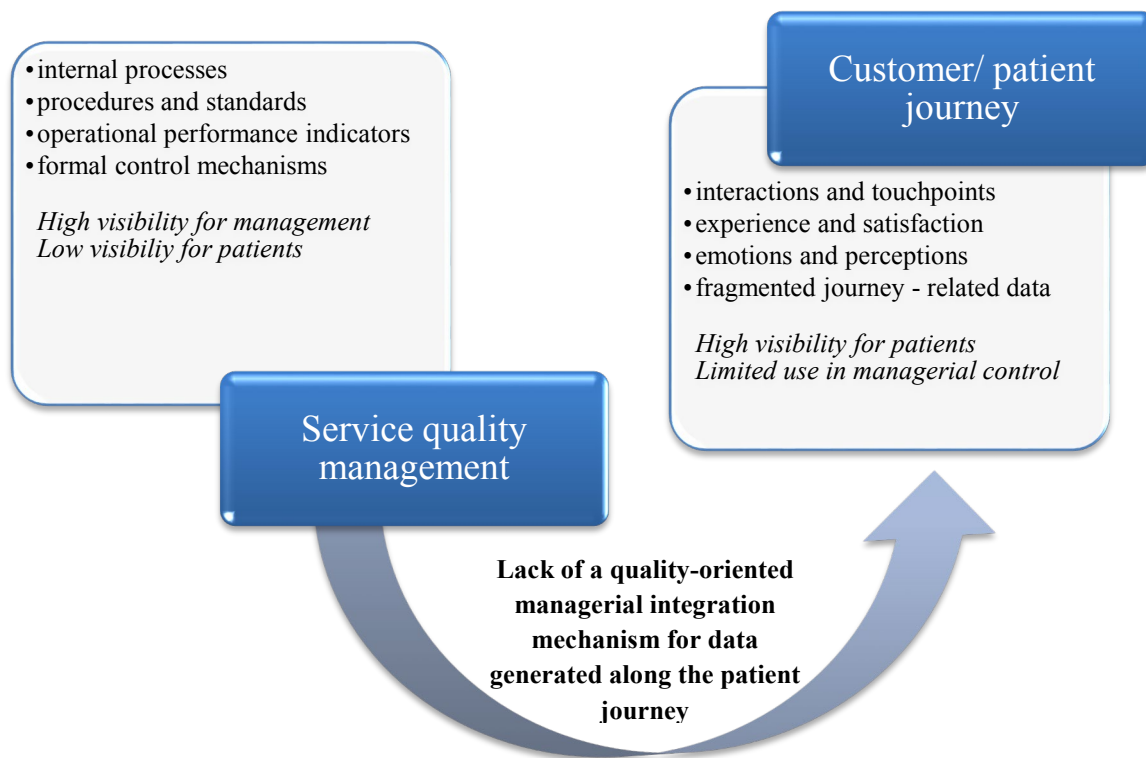


Figure 1. Distinct approaches to service quality management and the patient journey in the literature

Source: authors' own research contribution.

Methodology

This study adopts a qualitative, theoretical, and conceptual research design. The objective is to develop an integrative conceptual framework that explains the role of the digital customer journey as a managerial instrument for service quality management within the broader process of business digitalization. This approach is appropriate given the current stage of the literature, which indicates the need for conceptual clarification and integration prior to empirical validation (Vial, 2019; Verhoef et al., 2021).

The research method is based on a critical synthesis of relevant literature on business digitalization, digital customer journey, patient journey, and service quality management. Using deductive reasoning, the analysis identifies key concepts, examines their relationships, and integrates insights from management, service marketing, and digital transformation research. Similar conceptual approaches have been employed in prior studies addressing digital transformation and its managerial implications (Westerman et al., 2014; Kane et al., 2015).

Based on this analysis, the study formulates three conceptual propositions rather than empirically testable hypotheses: (1) the digitalization of the patient journey increases process visibility; (2) increased process visibility contributes to reducing the gap between internal service quality and perceived quality; and (3) data generated through digital interactions can support

managerial process control and decision-making. These propositions structure the development of the proposed conceptual model.

Given the conceptual nature of the research, no quantitative methods or statistical data processing software are employed. The outcome of the study is a conceptual model and a set of managerial implications, which provide a foundation for future empirical research aimed at validating and operationalizing the proposed framework in specific organizational contexts, such as medical laboratory services.

Results and discussions

A conceptual model of digital patient journey management

The results of this study consist in the development of a conceptual model that positions digital patient journey management as an integration mechanism between business digitalization, service quality management, and managerial decision-making. From the synthesis of the analyzed literature, was proposed this model to address the identified gaps related to the conceptual separation between patient experience-oriented approaches and those focused on managerial control and organizational performance.

The proposed conceptual model is illustrated in Figure 2, highlighting the mechanism through which the digital patient journey is integrated into service quality management and managerial decision-making processes.

The proposed model has three levels and represents analytical layers rather than discrete structural components, and are reflected across the integration logic illustrated in Figure 2.

The model has a simple start point and it is assumes that the digitalization of patient interactions produces a constantly and continues flow of data regarding how services are delivered across all the stages. These data can be used as managerial resources for process monitoring, the identification of dysfunctions, and decision support.

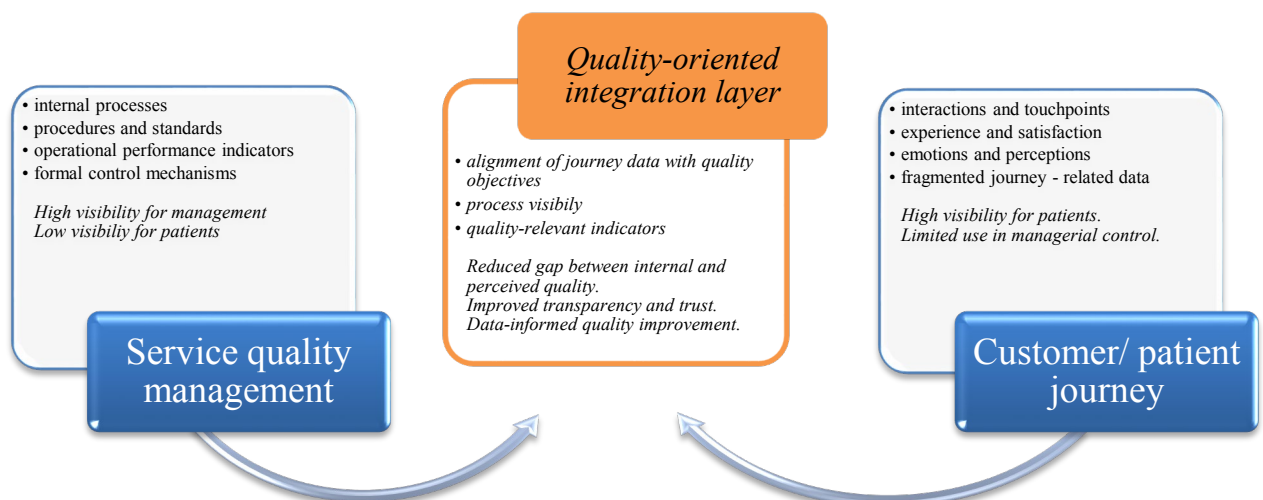


Figure 2. A quality-oriented digital patient journey management model

Source: authors' own research contribution.

Conceptual application of the model in medical laboratory services

The proposed model was an appropriate conceptual application of it within medical laboratory services because operational processes are complex, patient interactions are sensitive and quality management is important for service delivery. While all these services are dependent on solidly built internal quality control systems, measuring the patient side perception of service quality is still difficult and heavily dependent on process transparency and visibility.

The digital patient journey management tool helps to reproduce the patient–laboratory path from a fragmented interpretation of the systematic sequence of interactions into a coherent (theory and managerial) system. Patient journey across pre-analytical, analytical and post-analysis parts of the patient journey [6], including specific digitally mediated touch points (DMPs) where information relevant for patients and management is generated

Pre-analytical stage

In the pre-analytical stage, the digitalization of patient interactions it is used to reduce uncertainty and increase the process predictability. Online appointment scheduling, digital communication, and automated notifications help patients understand upcoming steps and better organize their service pathway. In practice, these interactions generate data on patient flows, waiting times, and appointment adherence, which can be used for capacity planning, identify bottlenecks, and prevent operational disruptions.

Analytical stage

At this point, patients do not know anything about their sample, they are not directly involved in carrying out inner laboratory operations, which promotes informational asymmetry between the organization and the service user. Within this context, the concept of the number of digitally mediated status updates in relation to how a sample is processed can be seen as a process that enhances perceived transparency. Information on the progress of processes has the effect of reducing uncertainty, signalling control and professionalism while allowing managers to connect internal performance measures to patient expectations and perceptions of service reliability.

Post-analytical stage

The continuity in the relationship between the patient and the laboratory, in the post-analytical stage, it is supported by the digital access to test results and historical records of this samples. The manner in which information is presented and made available influences the overall perception of service quality and process reliability. For those managing these processes, data generated at this stage enable the assessment of journey coherence and facilitate the identification of areas where both operational performance and the structuring of information delivery can be improved.

By integrating the pre-analytical, analytical, and post-analytical stages into a coherent digital patient journey, we can translate internally managed process quality into visible and intelligible signals for patients. In this way, digital patient journey management supports greater transparency and informational control, while enabling management to monitor processes, align quality objectives with patient-facing interactions, and support continuous improvement initiatives within medical laboratory services.

Discussion

The proposed model adds to the existing literature by looking at the digital patient journey as a managerial mechanism rather than a tool focused exclusively on user experience improvement. While most customer journey and patient journey frameworks focus on how users experience the service and what they think during the service, the proposed model shows that patients digital interactions can be used as important sources for managers and this can support process visibility, quality management, and decision-making. In conclusion, the digital patient journey is positioned as an unifying element that connects business digitalization initiatives with internal quality management systems and managerial control practices.

The proposed model offers a structured approach for leveraging digital patient interactions as inputs for process control and decision-making. By integrating data generated along the patient journey into quality management practices, organizations can enhance process monitoring, identify critical points, and align improvement actions with both operational objectives and patient-facing interactions. This approach supports a shift from reactive quality management toward a more transparent and data-informed managerial practice, particularly relevant in highly regulated service environments such as medical laboratory services.

The present study has several limitations because it is a theoretical study. It is important to mention that has not been empirically validated and is intended to provide a theoretical framework rather than testable causal relationships. Future research may build on this model by conducting empirical studies in specific organizational contexts to examine its applicability, operationalization, and impact on service quality outcomes and managerial decision-making. In further work could also explore how different levels of digital maturity influence the effectiveness of digital patient journey management.

Conclusion

This article proposes to development of a conceptual framework that underlines the role of the digital patient journey as a tool supporting service quality management in the context of business digitalization. By integrating insights from previous studies on digital transformation, patient journey management, and service quality management, the study identified a relevant gap resulting from the fragmented treatment of these perspectives in existing research.

The main contribution of the paper lies in redefining the digital patient journey from a sequence of interactions primarily oriented toward user experience into a mechanism that enhances process visibility and supports managerial decision-making. The proposed model shows how digitally interactions can be seen as a bridge between internally managed process quality and externally perceived service quality, which helps to reduce the gap between these two dimensions.

The conceptual application of the model in medical laboratory services highlights its practical relevance for service organizations operating in environments characterized by complex processes and high quality requirements. Digital patient journey management can complement existing practices by strengthening transparency and informational control and this without replacing formal quality assurance mechanisms.

The study is subject to limitations related to its conceptual nature, as the proposed model has not been empirically validated. Future research may focus on testing and implementation of the model in different service contexts. Also can pay attention on examining the relationship between digital patient journey management, organizational performance, and user-perceived outcomes.

Acknowledgements

This research was supported by the National University of Science and Technology POLITEHNICA Bucharest, Doctoral School of Industrial Engineering and Robotics, through the doctoral grant awarded by the University. The funding institution had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

During the preparation of this work, the author(s) utilized ChatGPT 4 to enhance readability and language clarity. Following the use of this tool, the author(s) meticulously reviewed and revised the content as necessary and assume(s) full responsibility for the final content of the publication.

Ethical statements

The main author acknowledges professional experience gained in a Senior Brand Manager role within organizations involved in the management of medical laboratory networks operated by Regina Maria and Poliana in Romania. This experience contributed to an informed understanding of the managerial and organizational specificities of medical laboratory services, without involving the use of any proprietary or confidential data.

The use of generative artificial intelligence tools was limited to language editing and clarity improvement. All scientific content, data analysis, and interpretations are the sole responsibility of the authors.

References

- Halvorsrud, R., Kvale, K., & Følstad, A. (2016). Improving service quality through customer journey analysis. *Journal of Service Theory and Practice*, 26(6), 840–867. <https://doi.org/10.1108/JSTP-05-2015-0111>
- Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). Strategy, not technology, drives digital transformation. *MIT Sloan Management Review*, 14.
- Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6), 69–96. <https://doi.org/10.1509/jm.15.0420>
- McColl-Kennedy, J. R., Danaher, T. S., Gallan, A. S., Orsingher, C., Lervik-Olsen, L., & Verma, R. (2019). How do you feel today? Managing patient emotions during health care experiences to enhance well-being. *Journal of Business Research*, 100, 24–34. <https://doi.org/10.1016/j.jbusres.2019.03.021>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Boston, MA: Harvard Business Review Press.
- Elg, M., Witell, L., & Gustafsson, A. (2012). A balanced approach to service quality measurement. *Managing Service Quality*, 22(2), 134–150. <https://doi.org/10.1108/09604521211218954>