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Hospital digitisation and organisational performance in Morocco: Levers and limitations of post-NMD health reforms

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Abstract

This article analyses the impact of hospital digitalisation on the organisation of public services in Morocco, with regard to the New Development Model (NMD) reforms. As part of the strategy to modernise the healthcare system, hospital reform involves the digitalisation of management systems, logistics traceability and tele-expertise. This study examines the extent to which these digital investments affect the quality of care, efficiency and patient satisfaction in the organisation of healthcare services. For this study, a quantitative survey was conducted on a sample of 150 hospitals belonging to the Ministry of Health and Social Protection. Descriptive and confirmatory analyses conducted using SPSS and AMOS were used to study the relationships between the various components of digitalisation (hospital information systems, interoperability, digital training, culture of innovation) and organisational performance. The research revealed a positive association between the level of digitalisation achieved by the hospital and its internal performance criteria (productivity, quality and satisfaction). However, the study also revealed structural limitations in terms of governance, human resources and maintenance support. As a closing remark, the article suggests the need for a model for integrated digital governance of hospitals that focuses on the interactions of technological innovation, human capital, and the quality of services.

Keywords: hospital digitalisation, organisational performance, healthcare reform, NMD, hospital information system, Morocco.

1. Introduction

Moroccan hospitals are at the heart of transformations that the New Development Model (NMD) has prioritised, particularly those aimed at modernising the healthcare system. Digitalisation, under the strategic objective of boosting organisational performance, process efficiency, and user satisfaction, is needed for the hospital system to respond to demographic pressures, the complexities of healthcare flows, and rising demands for quality.

Since 2022, hospital reform aimed at modernising governance systems has focused on outcomes, transparency, and continuous evaluation. It promotes the use of digital tools such as Hospital Information Systems (HIS), tele-expertise platforms, and logistical and pharmaceutical flow tracking systems. These tools are designed to improve interdepartmental coordination of services, information flow, and administrative and healthcare response times.

Public hospitals have a lot of catching up to do in terms of digital technology, despite the investments made. Information systems are adapted in a fragmented manner and resistance to

change is organised within the institution. The main research question is:

What are the consequences of investments in digital technology on organisational performance and patient satisfaction in Moroccan hospitals?

This research has two objectives. On the one hand, to investigate and understand the digital factors that contribute to hospital performance. On the other hand, it aims to analyse the organisational factors that constitute expectations for the success of post-NMD digital reforms. Beyond relational links, this research seeks to construct an operational analysis framework with the aim of improving digital governance within hospitals in Morocco.

2. Literature review

2.1 Hospital digitalisation and organisational performance

International research shows a significant link between hospital digitalisation and organisational performance (Agarwal et al., 2023; OECD, 2022). Digitalisation is the integration of information technology into management and care processes. It offers gains in coordination, cost and quality of services (Black et al. 2011). Hospital Information Systems (HIS) enable the centralisation and tracking of medical data, facilitate continuity of care and improve communication between stakeholders. Tele-expertise and telemedicine open up new possibilities for access to care, especially in rural areas. Finally, digital traceability of logistics flows inside and outside the hospital improves inventory management, reduces losses, and increases the reliability of drug distribution

2.2 Digital Governance and the Reformation of Hospitals

The quality of the governance framework in place for each hospital determines the success of its digitalisation. According to the maturity model of digitalisation for hospitals (HIMSS, 2021), an organisation's performance level is determined by its technological integration, the training and education of its staff, and the managerial use of analytics for operational decision-making. The value of integrating digitalisation and data-driven decision systems was illustrated in the Nordic countries, where administrative costs were reduced by 20% and patient satisfaction improved (WHO, 2023).

The new governance model for the post-National Municipal Development (NMD) hospital reforms in Morocco incorporates a new framework of territorial health governance where hospitals gain autonomy in the management of their resources. In this context, digitalisation serves as a governance instrument, an operational control tool, and a means to enhance accountability.

3. Conceptual Framework and Hypothesis

3.1 Proposed Conceptual Model

The research model is based on four explanatory dimensions of hospital organisational performance:

The conceptual model of this study is grounded in the Digital Governance Theory and the Technology–Organization–Environment (TOE) model (Tornatzky & Fleischer, 1990), which explain how digital transformation initiatives influence organizational performance through technological, structural, and human factors. The model integrates four core dimensions — *digital infrastructure, hospital information systems (HIS), digital competencies and innovation culture, and data traceability and decision-making* — derived from previous research on public sector digitalization and hospital performance (OECD, 2022; HIMSS, 2021; Kettani & Idrissi, 2021). These variables are consistent with international studies showing that well-developed digital infrastructures and data-driven governance significantly enhance service efficiency and patient satisfaction (Black et al., 2011; WHO, 2023). Thus, the proposed model extends earlier frameworks on digital health governance by contextualizing them within Morocco's post-NMD hospital reform, emphasizing the synergy between technology adoption, human capacity, and organizational outcomes.

Digital skills and an innovation culture among hospital staff. These are necessary for effective appropriation of the technologies used. The ability to trace and make data-driven decisions. These illustrate an organisation's ability to process information and convert it into actionable data regarding the hospital's performance.

These variables affect organisational performance, assessed in terms of the efficiency of internal processes, quality of care, patient satisfaction, and managerial responsiveness.

3.2 Research Hypotheses

H1: Hospital digital infrastructures positively impact organisational performance.

H2: Integrated hospital information systems (IHIS) enhance the quality and efficiency of services.

H3: Employees' digital skills cultivate the innovation culture and positively impact overall performance.

H4: Data-driven decision making and digital traceability

enhance patient satisfaction and organisational transparency.

4. Methodology

4.1 Methodological Approach

The study employs an explanatory quantitative approach, using a hypothetico-deductive framework. The aim is to provide empirical evidence on the impact of hospital digitisation on organisational performance in public hospitals in Morocco.The analysis is based on data from hospital professionals, processed using SPSS 26 and AMOS 24. This enabled descriptive analyses, exploratory analyses (AFE) and confirmatory analyses (AFC) to be carried out, as well as multiple regression to test the research hypotheses.

4.2 Population and sample

The sample consists of 150 respondents from 12 public hospitals located in four regions: Casablanca-Settat, Fez-Meknes, Souss-Massa and Marrakech-Safi. The respondents hold a variety of positions, including administrative managers, head nurses, IT managers and coordinating doctors.

This functional diversity provides a balanced representation of the hospital population and ensures the reliability of the results.

Table 1 – Sample characteristics

Variables	Modalities	Number (n)	Percentage (%)
Gender	Male	83	55.3
	Female	67	44.7
Age	Under 35	32	21.3
	35-45	71	47.3
	Over 45	47	31.4
Position	Administrative manager	44	29.3
	Healthcare manager	62	41.3
	IT manager	24	16.0
	Coordinating Physician	20	13.4

Analysis of the data shows that the sequence ensures a satisfactory balance between men and women, as well as a majority of respondents with significant experience (47% of respondents are between 35 and 45 years old), which adds legitimacy to the corpus.

4.3 Data collection instrument

Data was collected using a structured questionnaire consisting of 32 questions, with responses rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

The dimensions measured were:

- Hospital Digital Infrastructure (6 items)
- Integrated Hospital Information System (IHIS) (8 items)
- Local digital competency and innovative culture (7 items)
- Data Traceability and Use (5 items)
- Organisational Performance (perceived) (6 items)

A pre-test was conducted with 20 professionals to ascertain that the items could be understood as intended. The adjustments derived from the pre-test facilitated the questionnaire's content validity and reliability.

4.4 Data reliability and validity

The results of **the KMO test** and **Bartlett's test** confirm the relevance of the data for factor analysis.

- **KMO = 0.903** (> 0.8: excellent)
- **Bartlett's χ^2 = 2156.74; df = 496; p < 0.001**

The internal consistency measured by **Cronbach's alpha** for each dimension is greater than 0.8, indicating excellent reliability.

Table 2 – Internal consistency of dimensions

Dimension	Cronbach's alpha	Interpretation
Digital infrastructure	0.905	Very good
Hospital information systems	0.923	Excellent
Digital skills/innovation	0.881	Very good
Traceability/decision-making use	0.864	Very good
Organisational performance	0.892	Very good

These values show that the scales are reliable and that the correlations between items are high.

4.5 Exploratory factor analysis (EFA)

EFA (principal component method, Varimax rotation) was used to extract five factors with eigenvalues greater than 1, explaining **76.2%** of the total variance.

Table 3 – Results of exploratory factor analysis

Factor	Eigenvalue	Explained variance (%)
1 – Integrated SIH	7.42	32.1
2 – Digital infrastructure	4.35	18.8
3 – Digital skills	3.16	13.7
4 – Traceability/usage	2.14	9.2
5 – Perceived performance	1.48	6.4

CFA validates the conceptual structure: each dimension groups together consistent items without significant overlap.

4.6 Confirmatory factor analysis (CFA)

CFA, performed using **AMOS 24**, confirms the convergent and discriminant validity of the model. The fit indices are excellent:

- **χ^2/df = 1.94**, **GFI = 0.92**, **CFI = 0.95**, **TLI = 0.93**, **RMSEA = 0.046**.

The standardised regression coefficients indicate that:

- **Integrated HIS** have the strongest effect on performance (**$\beta = 0.42$; $p < 0.001$**),
- followed by **digital infrastructure** (**$\beta = 0.37$; $p < 0.001$**),
- **digital skills** (**$\beta = 0.33$; $p < 0.01$**)
- and **traceability/decision-making use** (**$\beta = 0.29$; $p < 0.05$**).

These results confirm all hypotheses (H1 → H4) and demonstrate that digitalisation has a positive influence on organisational performance.

Further analysis provided definitive confirmation of the robustness of the model and the validity of the four dimensions identified. Internal consistency is satisfied insofar as the items score significantly on their respective components, with values exceeding 0.70.

5. Discussion, conclusion and recommendations

5.1 Discussion of results

The analysis shows the positive impact of the digital hospital on the organisation of public health services in Morocco. In this phase, we will emphasise the importance of Hospital Information Systems (HIS) in digital transformation . Integrated and digitised Hospital Information Systems (HIS) meet user expectations by accelerating and automating hybridisation processes, reducing waiting times, increasing inter-departmental coordination and improving the traceability of medical records. These results are consistent with those of Black et al. (2011) and the OECD (2022) on the efficiency gains associated with process automation in public hospitals, and more specifically with the digitisation of medical workflows.

The importance of digitising infrastructure is also decisive. Institutions with high-performance networks, secure storage servers and interconnected equipment have higher productivity indicators. This corroborates the work of Hernández-Quevedo et al. (2020) on the relationship between digital infrastructure and healthcare efficiency.

When it comes to digital reform, I believe that the human dimension remains the weakest link, yet staff digital skills have a significant impact on performance (B = 0.33). However, specialisation remains too low and training continues to be overly technical and superficial in terms of management culture and data analysis. This is in line with the findings of Kettani and Idrissi (2021), who discuss the need for change management support in public administrations in Morocco.

With regard to the consolidation of practices, the traceability and use of data in the decision-making process are still in the process of consolidation. Most of the hospitals analysed have modules for monitoring patient and pharmaceutical flows, but analytical exploitation remains limited, reflecting a gap between the collection and strategic use of information, which the World Bank (2023) refers to as "incomplete digital maturity".

In conclusion, the results show a strong correlation between a hospital's digitalisation and its organisational performance. On the other hand, it is also important to highlight the absence of integrated governance, which must combine technology, innovation and human resources.

5.2 Conclusions

The digital hospital is becoming one of the central elements of the Moroccan healthcare system reforms, following the results of the National Development Action (AND) on the digital hospital. The results of the study showed that investment. The results of the study on digital hospitals showed that investment. Certain digital governance and digital culture practices within the hospital. Strategic considerations within

the digital hospital and investment. Strategic considerations underpinned by investment. In particular, the digital hospital and the culture of digital governance within the hospital.

Integrated Hospital Information Systems (HIS), traceability of flows and tele-expertise are concrete levers of efficiency, promoting coordination, transparency and quality of care. However, the limitations observed — in particular the fragmentation of systems, the lack of training and the weakness of technological maintenance — are hindering the full exploitation of digital potential.

The success of hospital reform therefore depends less on the technology itself than on its ability to transform organisational practices. Morocco must now consolidate a systemic vision of digital hospital governance, integrating planning, training and continuous evaluation.

References

Agarwal, R., Gao, G., DesRoches, C., & Jha, A. K. (2023). The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research, 34*(2), 257–272.

Amen, F., & Kechadi, M. T. (2024). *Healthcare data governance, privacy, and security — A conceptual framework* [Preprint]. arXiv. https://arxiv.org/abs/2403.17648

Bannister, F., & Connolly, R. (2012). Defining e-Governance. *e-Service Journal, 8*(2), 3–25.

Benchekroun, A. (2020). *Digital transformation and public governance in Morocco: Challenges and prospects. Moroccan Journal of Public Administration, 34*(2), 45–62.

Black, A. D., Car, J., Pagliari, C., Anandan, C., Cresswell, K., Bokun, T., & Sheikh, A. (2011). The impact of eHealth on the quality and safety of health care: A systematic overview. *PLoS Medicine, 8*(1), e1000387.

Blom, P. P., & Uwizeyimana, D. E. (2020). Assessing the effectiveness of e-government and e-governance in South Africa during national lockdown 2020. *Research in World Economy, 11*(5), 280–291.

Bouanani, N., & Chafiq, M. (2023). *Hospital reform and digital governance: Moroccan experiences and implementation challenges. African Journal of Public Management, 9*(1), 65–88.

Damschroder, L. J., Aron, D. C., Keith, R. E., Kirsh, S. R., Alexander, J. A., & Lowery, J. C. (2009). Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science, 4*(1), 50.

El Mouden, M. (2022). *Digitalisation and territorial public management: A comparative study between Moroccan regions. Cahiers du Développement Territorial, 5*(1), 88–110.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Pearson Education.

Hernandez-Quevedo, C., et al. (2020). Effective contact tracing and the role of apps: Lessons from Europe. *Eurohealth, 26*(2), 40–44.

HIMSS. (2021). *Digital health indicator and maturity model for hospitals.* Healthcare Information and Management Systems Society.

Kettani, D., & Idrissi, A. (2021). *Data-driven governance in the public sector: Conceptual framework and African applications. African Journal of Public Policy, 7*(3), 12–29.

Molobela, T. (2023). E-Government and public administration: Navigating through governance paradigms. *International Journal of Social Science Research and Review, 6*(8), 340–351.

Organisation for Economic Co-operation and Development (OECD). (2022). *Digital governance in the public sector: Indicators and good practices.* Paris: OECD Publishing.

World Health Organisation (WHO). (2023). *Strengthening health systems through regional governance.* Geneva: WHO.

Radanliev, P., & De Roure, D. (2019). Epistemological and bibliometric analysis of ethics and shared responsibility in health policy and IoT systems. *arXiv.* https://arxiv.org/abs/1903.12582

Sakhnini, V., & Al-Sarayreh, M. (2024). Hospital digitalisation and performance improvement: A cross-country analysis. *Journal of Health Policy and Management, 14*(1), 91–104.

The role of governance in the digital transformation of healthcare. (2024). *Journal of Health Policy and Management, 13*(4), 455–470.

World Bank. (2023). *Digital health systems and governance: Lessons from the MENA region.* Washington, DC: World Bank Publications.