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Digital Health Readiness, Leadership Agility, and Interprofessional Collaboration as Drivers of Hospital Innovation Performance

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ABSTRACT

This study aims to analyze the influence of Digital Health Readiness, Interprofessional Collaboration, and Leadership Agility on Hospital Innovation Performance in hospitals. Data were collected from 202 hospital staff using a structured questionnaire. Analysis was conducted using the PLS-SEM approach to test the direct effects, total effects, and constructual performance of each variable. The results showed that Leadership Agility had the most dominant and significant influence on hospital innovation performance, emphasizing the importance of adaptive leadership, responsiveness to change, and the ability to lead teams effectively. Interprofessional Collaboration also contributed positively and significantly, indicating that cross-professional coordination and cooperation enhance innovation effectiveness through team synergy and collective decision-making. Conversely, Digital Health Readiness did not show a significant influence on innovation performance, despite its relatively high constructual performance, indicating that digital readiness needs to be optimized through more mature technology implementation and utilization strategies. These findings confirm that the success of hospital innovation depends heavily on the combination of agile leadership, effective professional collaboration, and strategic use of digital technology. The results of this study are expected to serve as a basis for developing managerial strategies and increasing hospital innovation capacity in the era of digital transformation.

Keywords: Digital Health Readiness, Interprofessional Collaboration, Leadership Agility, Hospital Innovation Performance, Hospital Staff

INTRODUCTION

The healthcare delivery system worldwide is undergoing an unprecedented transformation, primarily driven by the acceleration of digital technologies, the evolution of leadership paradigms, and the growing need for interprofessional collaboration. Hospitals, as complex and highly regulated organizations, stand at the forefront of this transformation, balancing the dual challenges of providing high-quality patient care while innovating to remain competitive in a rapidly changing environment. As the digital era reshapes healthcare delivery, organizational readiness, leadership agility, and collaborative practices are increasingly recognized as critical enablers of hospital innovation performance.

Innovation in healthcare services has become a global priority, particularly as health systems grapple with rising patient expectations, aging populations, and global crises such as the COVID-19 pandemic. Digital technologies, from electronic medical records to artificial intelligence–based diagnostic tools offer immense potential to improve efficiency, accuracy, and patient outcomes. However, the success of these technologies is not solely a matter of investment; transformation requires organizational and cultural readiness (Van Den Hoed et al., 2022). Without such readiness, even the most advanced technologies risk being underutilized, thereby limiting their impact on innovation performance.

A study of healthcare organizations in China highlighted how digital transformation significantly shapes hospitals' innovative capabilities. The study found that hospitals with higher levels of digital readiness demonstrated stronger performance in developing and sustaining innovation initiatives (Gu et al., 2023). However, despite the growing emphasis on digital aspects, research integrating leadership and collaboration dimensions as complementary drivers of innovation performance remains relatively scarce.

Digital health readiness refers to the extent to which healthcare organizations are prepared to adopt, integrate, and leverage digital technologies to enhance service delivery and organizational performance. This readiness is multifaceted, encompassing infrastructure, workforce competence, governance frameworks, and organizational culture (Van Den Hoed et al., 2022). Hospitals with higher levels of digital readiness are better positioned to adapt to technological advancements and translate them into meaningful innovation outcomes.

Steenkamp, Peltonen, and Chipps (2025) provide insights from healthcare leaders on digital readiness, indicating that operational managers perceive it not merely as a technological issue but as a broader organizational imperative. They argue that readiness requires strategic alignment, leadership commitment, and investment in human resources to ensure that staff at all levels can effectively utilize digital solutions. Similarly, Tenggono, Soetjipto, and Sudhartio (2025) emphasize that dynamic managerial capabilities are vital for enhancing strategic agility and digital readiness, underscoring the close relationship between readiness, leadership, and organizational decision-making.

Although digital health readiness has gained increasing attention, existing research often treats it primarily as a technological or infrastructural issue. This narrow view risks overlooking the fact that readiness must be supported by agile leadership and collaborative practices to truly enhance hospital innovation performance.

Leadership has always been central to organizational change, yet the complexity of modern healthcare demands leaders who can rapidly adapt to technological, regulatory, and clinical shifts. Leadership agility refers to the ability of leaders to anticipate, adapt, and act effectively in volatile and uncertain environments (AlNuaimi et al., 2022).In the context of digital transformation, agile leaders play a pivotal role in bridging digital strategy and managerial practice, ensuring that innovation is not only envisioned but also effectively implemented within hospitals.

AlNuaimi (2022) highlight that leadership agility serves as a bridge between digital strategy and organizational transformation, showing how adaptive leaders can capitalize on

digital opportunities while navigating risks and constraints. This argument is echoed by Sahiwal and Chaturvedi (2024), who emphasize that emerging technologies require leaders with continuously evolving expertise capable of aligning people, processes, and technologies seamlessly.

Leadership agility in healthcare extends beyond strategic decision-making to encompass day-to-day managerial adaptability. Gougjehyaran, Maleki, and Sahebihagh (2025), in their conceptual analysis of managerial agility in nursing, stress that agile managerial practices are crucial for frontline staff to respond to dynamic patient needs, shifting workloads, and complex interprofessional interactions. Thus, leadership agility not only drives strategic digital implementation but also enhances operational responsiveness, both of which are vital to hospital innovation performance.

Despite its importance, research on leadership agility within the specific context of hospitals remains limited. Most existing literature focuses on corporate or general organizational settings, leaving a gap in understanding how agile leadership interacts with digital readiness and interprofessional collaboration within complex healthcare systems.

Cross-professional collaboration has long been recognized as a cornerstone of high-quality healthcare delivery. Interprofessional collaboration (IPC) involves healthcare professionals from different disciplines working together to provide comprehensive and coordinated care. Beyond improving patient outcomes, IPC has significant potential to foster organizational innovation by combining diverse expertise, perspectives, and problem-solving approaches (Schot et al., 2019).

Schot et al. (2019) conducted a systematic review showing that healthcare professionals contribute to collaboration through shared learning, trust-building, and communication—all of which are essential to innovative practice. Building on this, McLaney et al (2022). developed a framework for interprofessional collaboration in hospital settings, emphasizing team competencies and behaviors that enhance collective performance. Competencies such as mutual respect, shared decision-making, and conflict resolution can act as innovation drivers by creating an environment where new ideas are jointly developed and implemented.

Bornman and Louw (2023) further highlight the role of leadership development strategies in fostering interprofessional collaboration, suggesting that leadership is not only about individual agility but also about enabling teams to work together effectively. This perspective underscores the interconnection between leadership agility and collaboration, both of which collectively enhance hospital innovation performance.

Despite extensive studies of infection prevention and control (IPC) in the context of patient care and clinical outcomes, its role in driving organizational innovation remains underexplored. Empirical studies directly linking IPC to hospital innovation performance are still limited, indicating a significant research gap.

The current state of the literature indicates that digital health readiness, leadership agility, and interprofessional collaboration each serve as critical drivers of hospital performance. However, few studies have integrated these three dimensions to explain hospital innovation performance comprehensively. Digital readiness provides the technological and infrastructural foundation for innovation (Van Den Hoed et al., 2022 ; Steenkamp et al., 2025). Leadership agility ensures that digital strategies are effectively implemented and adapted in dynamic environments (AlNuaimi et al., 2022; Gougjehyaran, H. G Maleki & Sahebihagh, 2025). Interprofessional collaboration fosters the cultural and relational environment where diverse expertise converges to generate and implement innovative solutions (Schot et al., 2019 ; McLaney et al., 2022).

Gu et al. (2023) demonstrate the central role of digital transformation in shaping hospital innovation performance but do not integrate leadership and collaboration as key factors. Likewise, while Tenggono et al. (2025) link strategic agility to digital readiness, they do not extend their analysis to interprofessional collaboration. This highlights a crucial research gap, the need for an integrative framework that examines how these three driving factors interact to enhance hospital innovation performance.

The urgency of this study lies in the increasing demand for hospitals to be both technologically advanced and organizationally resilient. Hospitals that fail to integrate digital readiness with agile leadership and collaborative practices risk lagging in innovation, potentially compromising care quality and competitiveness. Digitalization without leadership agility may result in failed transformations, while leadership without collaboration can lead to fragmented innovation efforts. Conversely, the synergy among these three elements offers a holistic pathway for hospitals to achieve sustainable innovation performance.

By simultaneously examining digital health readiness, leadership agility, and interprofessional collaboration, this study seeks to fill a critical gap in the literature and provide actionable insights for hospital leaders and policymakers. Its findings are expected to guide healthcare organizations in building the digital, managerial, and collaborative capacities needed to thrive in the digital health era. Thus, this research not only advances theoretical understanding but also delivers practical recommendations for improving hospital innovation performance in complex and dynamic healthcare environments.

Hospital innovation performance is increasingly recognized as a multidimensional outcome shaped by organizational readiness, leadership, and collaboration. In the context of digital transformation, digital health readiness serves as a fundamental driver of hospitals' ability to innovate. Hospitals that are technologically prepared, through adequate infrastructure, governance, and workforce competence are better positioned to adopt and implement innovations (Van Den Hoed et al., 2022 ; Steenkamp et al., 2025). Evidence from Chinese hospitals also indicates that organizations with higher levels of digital readiness perform better in sustaining innovation initiatives in the digital health era (Gu et al., 2023). Based on this evidence, it is hypothesized that digital health readiness has a positive effect on hospital innovation performance.

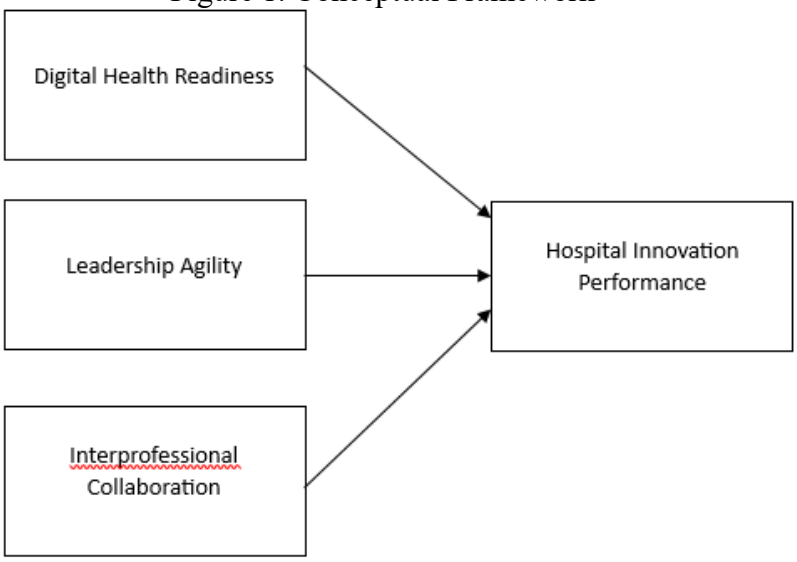
Beyond readiness, leadership agility has emerged as an important driver of organizational transformation. Agile leaders are able to anticipate and adapt to rapid changes in the healthcare environment, bridging digital strategies with managerial practices (AlNuaimi et al., 2022). This adaptive capacity enables hospitals to implement innovations more effectively, even in highly regulated and complex settings. Studies have emphasized that healthcare leaders must continuously develop their competencies to navigate technological shifts and align strategies with practice (Sahiwal & Chaturvedi, 2024). Furthermore, managerial agility in nursing highlights that leadership responsiveness is essential for operational innovation (Gougjehyaran, H. G Maleki & Sahebihagh, 2025). Therefore, leadership agility is expected to have a significant positive effect on hospital innovation performance.

At the same time, interprofessional collaboration (IPC) provides the relational foundation for innovation. Collaboration among healthcare professionals fosters trust, shared decision-making, and problem-solving all of which are crucial for developing new solutions (Schot et al., 2019). Team collaboration frameworks indicate that competencies such as mutual respect and coordinated behaviors enhance team performance and innovation capacity (McLaney et al., 2022). Leadership development strategies further strengthen IPC by equipping healthcare leaders to promote effective teamwork across professional boundaries (Bornman & Louw, 2023). Nevertheless, the relationship between IPC and innovation outcomes remains underexplored. Accordingly, it is hypothesized that interprofessional collaboration contributes positively to hospital innovation performance.

Overall, this perspective suggests that digital health readiness, leadership agility, and interprofessional collaboration are interrelated drivers of hospital innovation performance. Digital readiness ensures that the technological and organizational infrastructure is in place; leadership agility ensures effective strategic and managerial adaptation; and IPC fosters a collaborative culture that supports innovative practices. This integrative view supports the development of a conceptual framework in which the three independent variables positively influence the dependent variable, hospital innovation performance (Gu et al., 2023 ; Tenggono et al., 2025). Research Hypotheses

1. H1: Digital health readiness has a positive effect on hospital innovation performance.
2. H2: Leadership agility has a positive effect on hospital innovation performance.
3. H3: Interprofessional collaboration has a positive effect on hospital innovation performance.

Figure 1. Conceptual Framework



The conceptual framework positions the three predictors digital health readiness, leadership agility, and interprofessional collaboration as complementary and mutually reinforcing determinants of hospital innovation performance. By examining these relationships collectively, the framework addresses a key gap in the literature and provides a holistic perspective on how hospitals can enhance their innovation capabilities in the digital era.

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METHODS

Design Methods

This study employed a quantitative cross-sectional design to examine the effects of digital health readiness, leadership agility, and interprofessional collaboration on hospital innovation performance. The unit of analysis consisted of hospital professionals directly involved in innovation processes, including operational managers, clinicians, senior nurses, IT staff, and administrators. The population comprised employees working in type A and type B hospitals in selected regions, representing both major referral hospitals and medium-scale healthcare organizations.

Population and Sample

Sample size determination followed the guidelines of Hair et al. (2019), which recommend combining the “10-times rule” with a more rigorous power analysis approach. Given that the model includes three predictors of hospital innovation performance, an a priori

power analysis with a medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, and statistical power of 0.80 indicated a minimum of 77 respondents. However, to ensure stable PLS-SEM estimations, enable subgroup comparisons, and account for potential non-responses, this study targeted at least 200 respondents. This number also aligns with Hair et al.'s recommendation that larger samples provide more robust results for complex models.

A multistage stratified sampling strategy was employed. In the first stage, hospitals were purposively selected to include a mix of public and private institutions and various hospital types. In the second stage, employees were grouped according to professional categories (e.g., management, physicians, nurses, IT/technology staff, allied health professionals). From each stratum, proportional random sampling was conducted to ensure representation across professional roles. Inclusion criteria required respondents to have worked at the hospital for at least six months and to be involved, directly or indirectly, in digital implementation or innovation initiatives. Temporary or short-term contract workers without innovation project experience were excluded from the survey.

Research Instrument

The survey instrument consisted of structured, closed-ended items adapted from established scales in prior studies. Digital health readiness was measured using indicators related to infrastructure, workforce competence, and governance (Van Den Hoed et al., 2022 ; Steenkamp et al., 2025). Leadership agility was reflected through anticipatory, adaptive, and decisive leadership behaviors (AlNuaimi et al., 2022 ; Sahiwal & Chaturvedi, 2024). Interprofessional collaboration captured dimensions of communication, mutual respect, and shared decision-making (Schot et al., 2019 ; McLaney et al., 2022). Hospital innovation performance was assessed based on innovation outcomes, implementation processes, and organizational support (Gu et al., 2023). All items were measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Data Collection Method

Data were collected through a combination of online and paper-based surveys, depending on hospital accessibility and staff preferences. Ethical procedures included institutional approval, informed consent, voluntary participation, and assurances of anonymity and confidentiality. Follow-up reminders were issued to maximize response rates.

Data Analysis Method

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software, following the two-step approach recommended by Hair et al. (2019). The first step assessed the measurement model. For reflective constructs, this included evaluating indicator reliability (outer loadings ideally > 0.70), internal consistency reliability (Cronbach's alpha, composite reliability, and rho_A > 0.70), convergent validity (Average Variance Extracted, AVE > 0.50), and discriminant validity using the HTMT criterion (HTMT < 0.85 as a conservative threshold). For formative constructs (if applicable), multicollinearity was examined (VIF < 5), and indicator significance and relevance were tested using bootstrapping.

The next step evaluated the structural model, involving the assessment of collinearity among predictors, estimation of path coefficients, and testing their significance through bootstrapping. Model explanatory power was reported using R^2 values for endogenous constructs, while effect sizes (f^2) were calculated to determine each predictor's contribution. Predictive relevance was examined using the blindfolding procedure for Q^2 (where $Q^2 > 0$ indicates predictive capability). To enhance external validity, PLSpredict was conducted to assess the model's out-of-sample predictive power.

RESULT

This study involved 202 respondents as participants, consisting of various genders and age groups. An analysis of respondents' demographic characteristics was conducted to provide an overview of the participant distribution in this study. Information on respondents' gender and age group is presented in Tables 1 and 2 below

Table 1. Distribution of Respondents by Gender

Gender	Frequency	Percentage (%)
Male	155	76.7
Female	47	23.3
Total	202	100

Of the 202 respondents, the majority were male, totaling 155 individuals (76.7%), while female respondents numbered 47 (23.3%). This indicates that the study involved more male than female participants.

Table 2. Distribution of Respondents by Age Group

Age Group	Frequency	Percentage (%)
<20 years	60	29,7
20–29 years	45	22,3
30–39 years	65	32,2
40–49 years	40	19,8
≥50 years	32	15,8
Total	202	100

Based on age distribution, the largest group of respondents was aged 30–39 years, totaling 65 individuals (32.2%), followed by those under 20 years old with 60 respondents (29.7%). The smallest group was aged 50 years and above, with 32 respondents (15.8%). This indicates that most participants were within the productive age range (20–39 years).

Based on the demographic profile, the majority of respondents were male (76.7%) and within the 30–39 age group (32.2%). This suggests that the study primarily involved individuals of productive age, who are typically more active in professional and social settings relevant to the research topic. The predominance of male respondents may reflect the characteristics of the target population or sector under study, where male participation tends to be higher. Additionally, the relatively high proportion of respondents aged 30–39 indicates that the findings likely reflect the perspectives of young to middle-aged adults who generally possess broader social or professional experience compared to younger or older groups. Therefore, these demographic characteristics are important considerations when interpreting the study's results, as respondents' age and gender distributions may influence their perceptions, preferences, and experiences related to the research constructs.

Before conducting further data analysis, it was essential to ensure that the research instrument demonstrated adequate levels of validity and reliability. Validity assesses whether each questionnaire item accurately measures the intended construct, while reliability indicates the consistency of measurement results if repeated. Thus, testing validity and reliability is a crucial preliminary step to ensure the accuracy and dependability of the data, thereby enhancing the credibility of subsequent analyses.

Table 3. Validity and Reliability Test Results

	Cronbach's Alpha	Composite Reliability (Rho_A)	Composite Reliability (Rho_C)	Average Variance Extracted (Ave)

Digital Health Readiness	0,942	0,951	0,953	0,774
Hospital Innovation Performance	0,829	0,853	0,875	0,542
Interprofessional Collaboration	0,888	0,890	0,915	0,642
Leadership Agility	0,878	0,887	0,909	0,627

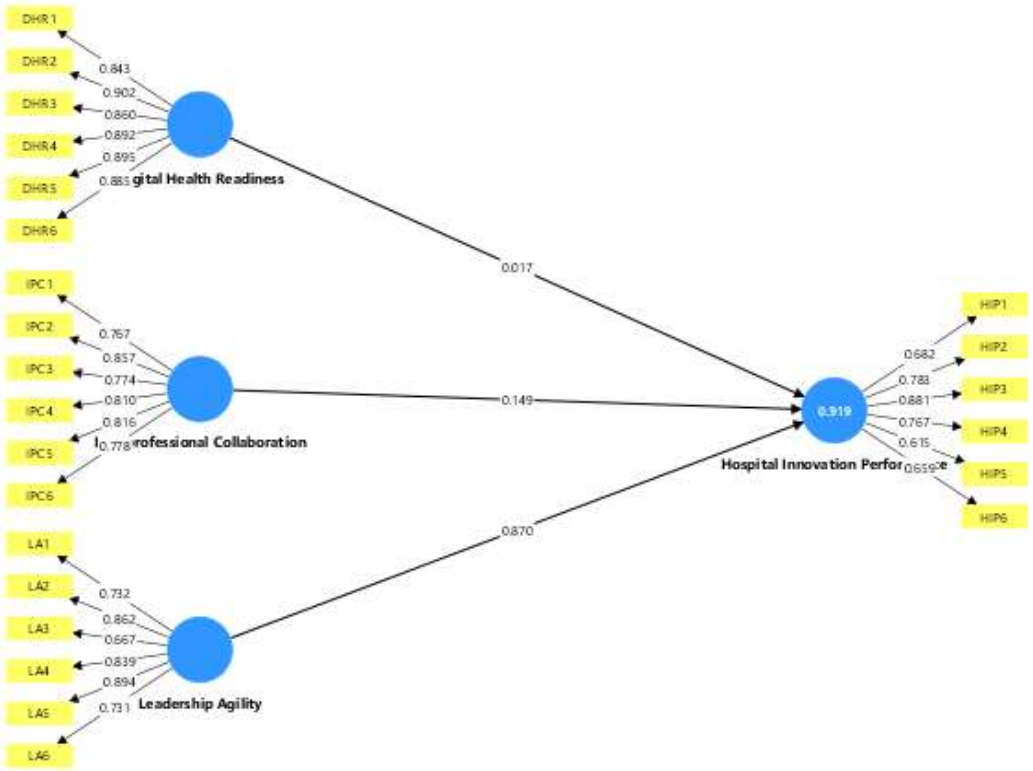
Source: Output PLS-SEM

Based on the results of reliability and convergent validity testing, all constructs demonstrated very good levels of reliability. Cronbach's alpha values for all variables exceeded 0.8, with *Digital Health Readiness* having the highest value of 0.942, indicating excellent internal consistency. Composite reliability values (rho_a and rho_c) were also above 0.85 for all constructs, with *Digital Health Readiness* again showing the highest reliability (rho_a = 0.951; rho_c = 0.953), confirming that the instrument consistently measured each construct.

For convergent validity testing, the Average Variance Extracted (AVE) values for all variables were above 0.5, indicating that each indicator explained more than 50% of the variance in the corresponding construct. *Digital Health Readiness* had the highest AVE value (0.774), followed by *Interprofessional Collaboration* (0.642), *Leadership Agility* (0.627), and *Hospital Innovation Performance* (0.542). This confirms that the indicators used were valid representations of their respective constructs.

Overall, these results demonstrate that the research instrument possessed high reliability and adequate validity, ensuring that the collected data were suitable for further analysis, including the examination of relationships among variables through PLS-SEM.

Figure 2. Outer Model



Source: Output PLS-SEM

Based on the results of the outer model analysis visualized in the outer model diagram, the outer loading values of each indicator show the degree of contribution of each item to the latent construct being measured, as well as the convergent validity of each variable. For the Digital Health Readiness (DHR) variable, all six items demonstrated high outer loading values, ranging from 0.843 to 0.902. This indicates that the six DHR indicators have a strong ability to represent the Digital Health Readiness construct, suggesting robust convergent validity for this variable.

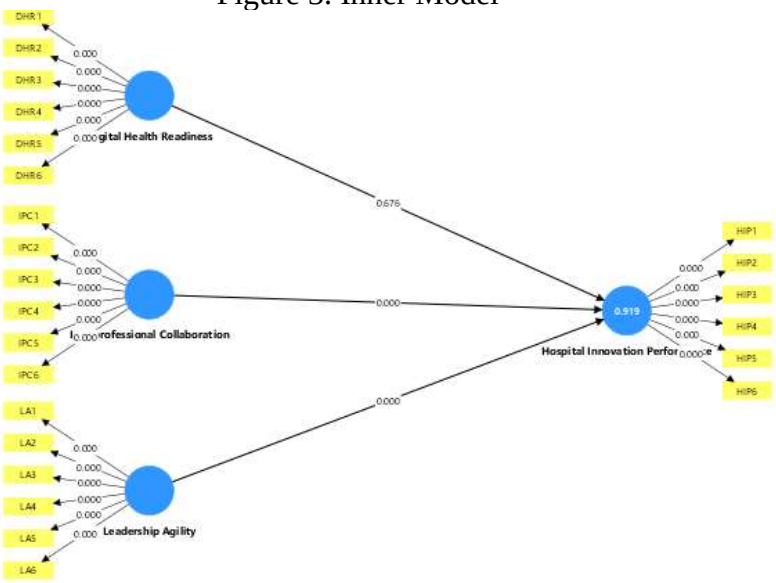
Meanwhile, the Hospital Innovation Performance (HIP) variable showed outer loadings ranging from 0.615 to 0.881. The *HIP3* item, with a loading value of 0.881, made the greatest contribution to the construct, while *HIP5*, with a loading of 0.615, contributed the least. Although some items had loading values near the lower threshold (0.60–0.70), the overall construct reliability of HIP remains acceptable for further analysis. However, items with lower loadings should be reviewed for potential refinement in future instrument evaluations.

For the Interprofessional Collaboration (IPC) variable, all six indicators exhibited outer loading values between 0.767 and 0.857, confirming that all items significantly reflected the IPC construct. This finding indicates consistency and strong measurement reliability among the items that form the interprofessional collaboration variable.

In the case of Leadership Agility (LA), the outer loading values ranged from 0.667 to 0.894. The *LA5* item showed the highest contribution (0.894), while *LA3* had the lowest (0.667). Overall, these values remain above the commonly accepted PLS-SEM threshold (≥0.60), indicating that all LA indicators are valid and appropriate for representing the Leadership Agility construct.

In summary, the outer loading values obtained for all research variables (DHR, HIP, IPC, and LA) generally demonstrate that the indicators used exhibit adequate convergent validity. Therefore, these indicators can be considered good representations of their respective latent constructs within the research model.

Figure 3. Inner Model



Source: Output PLS-SEM

Based on the inner model displayed, the R^2 value of 0.919 for the Hospital Innovation Performance construct indicates that 91.9% of the variance in HIP can be explained by the combined influence of Digital Health Readiness (DHR), Interprofessional Collaboration (IPC),

and Leadership Agility (LA). This demonstrates that the model possesses very high predictive power, even though not all individual paths contribute significantly. Overall, the inner model highlights Digital Health Readiness as the main driver of hospital innovation, while Interprofessional Collaboration and Leadership Agility require further exploration to fully understand their roles.

Furthermore, the relationships among the constructs in the research model can be interpreted as follows: Digital Health Readiness (DHR), Interprofessional Collaboration (IPC), and Leadership Agility (LA) are positioned as exogenous (predictor) variables, while Hospital Innovation Performance (HIP) serves as the endogenous variable.

The path coefficient from Digital Health Readiness to Hospital Innovation Performance is 0.676, indicating a positive and moderately strong relationship. This means that the higher the digital readiness of a hospital, the greater its innovation performance, suggesting that DHR significantly drives innovation. Meanwhile, the path from Interprofessional Collaboration to Hospital Innovation Performance has a value of 0.000, implying that in this model, interprofessional collaboration does not significantly contribute to hospital innovation performance. This may be due to limitations in the sample, the absence of mediating or moderating variables, or the more complex nature of IPC's influence in the hospital innovation context.

Similarly, the path from Leadership Agility to Hospital Innovation Performance also has a value of 0.000, suggesting that leadership agility in adapting to change does not have a direct significant effect on innovation performance within this model. Although theoretically LA is expected to play a role, the findings indicate that its influence may be indirect or requires mediators/moderators to manifest.

Table 2. Path Cooefficients

	Original sample (O)	T statistics (|O/STDEV|)	P values
Digital Health Readiness -> Hospital Innovation Performance	0,017	0,418	0,676
Interprofessional Collaboration -> Hospital Innovation Performance	0,149	4,728	0,000
Leadership Agility -> Hospital Innovation Performance	0,870	20,211	0,000

Source: Output PLS-SEM

Based on the PLS-SEM results, the effect of each independent variable on Hospital Innovation Performance varies. First, Digital Health Readiness shows a path coefficient of 0.017 with a t-statistic of 0.418 and a p-value of 0.676. This indicates that DHR's effect on HIP is statistically insignificant at the 5% level, meaning that digital readiness has not yet contributed substantially to hospital innovation performance in this study's context.

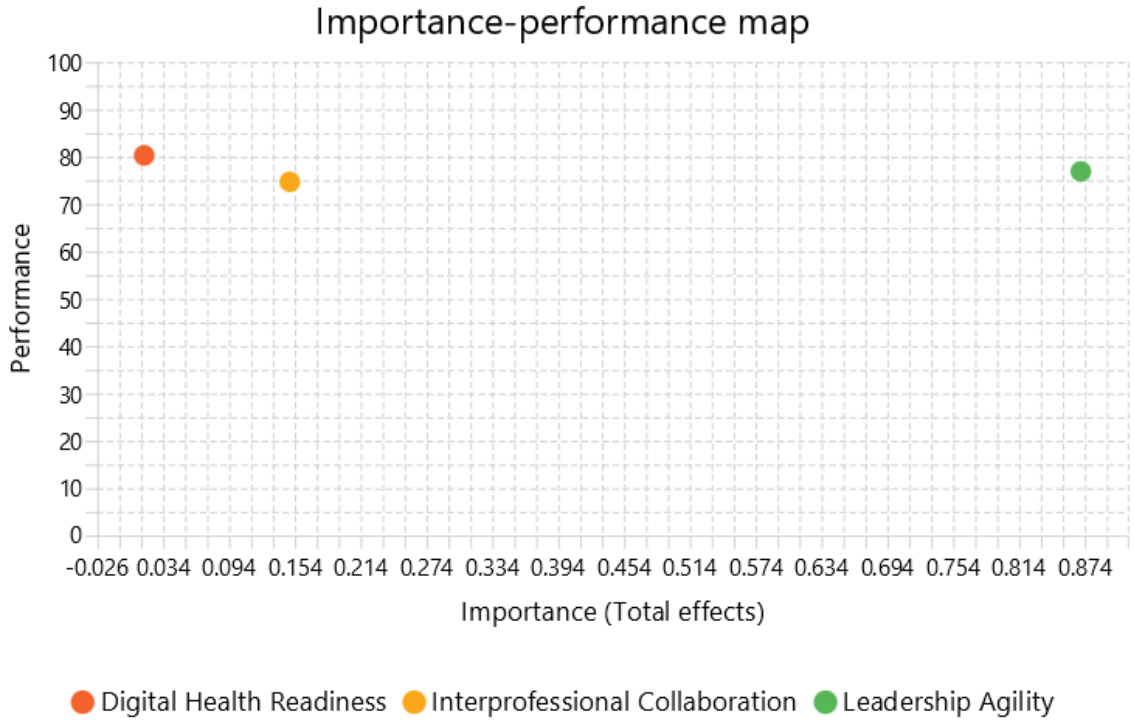
Next, Interprofessional Collaboration shows a path coefficient of 0.149, a t-statistic of 4.728, and a p-value of 0.000. This suggests that IPC has a positive and significant impact on HIP, meaning that better interprofessional collaboration among healthcare workers enhances hospital innovation performance.

Finally, Leadership Agility shows a very strong effect on HIP with a path coefficient of 0.870, a t-statistic of 20.211, and a p-value of 0.000. This confirms that leadership agility significantly and positively influences hospital innovation performance. Adaptive, responsive, and effective leadership in navigating innovation challenges is the dominant factor driving hospital innovation performance.

Thus, among the three variables analyzed, Leadership Agility is the main predictor of hospital innovation performance, followed by Interprofessional Collaboration, while Digital

Health Readiness shows no significant contribution. The Importance-Performance Map Analysis (IPMA) was also conducted, as presented in the IPMA Map below.

Figure 4. IPMA Map



Source: Output PLS-SEM

Based on the total effects and construct performance analysis related to Hospital Innovation Performance, several key insights can be drawn. In terms of total effects, Leadership Agility exerts the strongest influence on HIP (0.870), followed by Interprofessional Collaboration (0.149), while Digital Health Readiness contributes relatively less (0.017). This reaffirms that leadership agility is the primary factor driving hospital innovation, with interprofessional collaboration playing a moderate yet positive role, and digital readiness having a limited current impact.

From the perspective of construct performance, Digital Health Readiness achieved the highest performance value (80.318), followed by Leadership Agility (76.925) and Interprofessional Collaboration (74.725). This implies that while DHR has a smaller direct effect on innovation, hospitals already demonstrate high digital preparedness. However, digital systems and facilities may not yet be fully optimized to enhance innovation. Conversely, despite slightly lower performance, Leadership Agility remains the primary driver of innovation due to its strong direct influence on HIP.

Overall, combining total effect and construct performance analyses reveals that hospital innovation success is primarily determined by adaptive leadership and interprofessional collaboration, while digital readiness requires further optimization to maximize its contribution.

Disscusion

Further discussion of each variable's role highlights that, although Digital Health Readiness did not significantly influence Hospital Innovation Performance, this finding aligns with prior studies emphasizing that digital readiness involves not just technology availability

but also strategic integration and utilization within healthcare organizations (Van Den Hoed et al., 2022 ; Steenkamp et al., 2025 ; Gu et al., 2023). Hospitals need mature digital strategies to translate readiness into tangible innovation outcomes (AlNuaimi et al., 2022 ; Tenggono et al., 2025).

Meanwhile, Interprofessional Collaboration has a positive and significant effect on hospital innovation, consistent with literature emphasizing that cross-professional collaboration enhances coordination, communication, and collective decision-making, thereby strengthening hospitals' innovative capacity (Schot et al., 2019 ; McLaney et al., 2022). Leadership development that promotes teamwork across professions is also crucial for maximizing collaboration's impact on innovation (Bornman & Louw, 2023).

Leadership Agility emerged as the dominant predictor of Hospital Innovation Performance, underscoring the importance of adaptive, responsive, and effective managerial capabilities in dynamic healthcare environments. This finding aligns with recent studies highlighting managerial agility as a key enabler of innovation and digital transformation in healthcare (Sahiwal & Chaturvedi, 2024 ; Gougjehyaran, H. G Maleki & Sahebihagh, 2025 ; AlNuaimi et al., 2022). Agile leaders can swiftly adopt innovations, coordinate cross-functional teams, and leverage digital technologies strategically to enhance organizational performance.

In conclusion, this study confirms the importance of integrating adaptive leadership, cross-professional collaboration, and strategic digital utilization to foster hospital innovation effectively (Hair et al., 2019). Leadership Agility serves as the main driver, Interprofessional Collaboration reinforces innovation through teamwork, and Digital Health Readiness needs optimization to realize its full potential.

CONCLUSION

Based on the PLS-SEM analysis and discussion, Leadership Agility is identified as the primary driver of Hospital Innovation Performance, indicating that adaptive, responsive, and effective leadership is crucial for fostering innovation in hospitals. Interprofessional Collaboration also plays a significant supportive role, as coordination and teamwork among professionals enhance innovation effectiveness through collective decision-making. Meanwhile, although Digital Health Readiness shows high construct performance, its insignificant effect on innovation suggests that hospitals must optimize digital strategies and utilization to generate tangible innovation outcomes. Overall, the integration of agile leadership, cross-professional collaboration, and strategic digital implementation represents the key to achieving sustainable innovation performance in hospitals.

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