DETERMINANT FACTORS ASSOCIATED WITH DIGITALIZATION OF LEADERSHIP COMMUNICATION AT HOSPITAL

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ABSTRACT

Background: The digital era has accelerated the digitalization of organizational processes, including leadership communication. The emergence of digital leadership requires leaders to adapt their communication and leadership styles to dynamic, technology-mediated work environments. In hospital settings, effective digital leadership communication is essential to support coordination, decision-making, and quality nursing care.

Purpose: This study aimed to identify determinants associated with the digitalization of leadership communication in hospitals.

Methods: A cross-sectional study design was employed involving 131 nurses recruited through purposive sampling based on predefined inclusion criteria. Data were collected using structured questionnaires measuring leadership style, communication style, leadership skills, leader enthusiasm, and the implementation of digital leadership communication. Statistical analyses included the Spearman rho test, contingency coefficient, and multiple logistic regression to examine associations between variables.

Results: The findings indicated that 94.7% of respondents perceived the implementation of digital leadership communication as good. Leadership style showed a moderate positive correlation with digital leadership communication (p = 0.000; r = 0.512). Communication style was not significantly associated with digital leadership communication (p = 0.434; r = 0.068). Leadership skills demonstrated a strong positive relationship (p = 0.000; r = 0.589), while leader enthusiasm showed the strongest association (p = 0.000; r = 0.698). Multivariate analysis confirmed that leadership skills and enthusiasm were the most influential determinants.

Conclusion: Leader enthusiasm and leadership skills are key determinants of effective digitalization of leadership communication in hospital settings. Strengthening these competencies may enhance digital leadership practices and improve organizational communication in healthcare institutions.

Keywords: Communication, Digitalization, Enthusiasm, Leadership.

BACKGROUND

The digital transformation of healthcare organizations has significantly altered leadership communication practices, shifting interactions from predominantly face-to-face exchanges to digitally mediated communication channels such as emails, instant messaging platforms, and virtual meetings (Pettersen & Solstad, 2023; Solstad et al., 2021). In hospital settings, this transformation presents unique challenges, as leaders are required to communicate effectively across multidisciplinary teams in high-pressure, time-sensitive environments. However, many hospital leaders experience difficulties in adapting their communication styles to digital platforms due to limited digital competencies, inadequate training, and insufficient organizational readiness (Graesser et al., 2018).

Despite increasing reliance on digital communication tools in hospitals, leadership communication effectiveness remains inconsistent. Leaders often struggle to align their communication strategies with digital media, resulting in reduced clarity, weakened trust, and suboptimal coordination among healthcare professionals. The central research problem, therefore, concerns the factors that determine the successful digitalization of leadership communication in hospital settings (Abbas & Miller, 2025).

Although existing literature has explored digital leadership and e-leadership challenges, empirical studies focusing specifically on determinant factors influencing the digitalization of leadership communication in hospitals remain limited. Previous research has tended to address digital leadership in general organizational contexts, with less attention to healthcare institutions where communication failures can have critical consequences. Moreover, there is a lack of integrated analysis examining how leadership style, leadership skills, communication approaches, and leader enthusiasm collectively influence digital communication effectiveness (Zia et al., 2025).

Effective leadership communication is fundamental to ensuring patient safety, team collaboration, and organizational performance in hospitals. As healthcare systems increasingly adopt digital technologies, leaders who fail to adapt their communication practices risk exacerbating miscommunication, increasing work stress, and undermining team cohesion. Understanding determinant factors of digital leadership communication is therefore urgent to support leaders in navigating digital environments while maintaining high standards of care and organizational effectiveness (Badrinarayanan, 2024; Greimel et al., 2023).

The challenge of digital leadership communication is not confined to individual leaders but reflects a broader organizational issue affecting hospitals globally. The rapid expansion of digital technologies, virtual teamwork, and hybrid work arrangements has increased the complexity of leadership communication across healthcare systems. As digital tools become embedded in daily hospital operations, ineffective leadership communication can have widespread implications for workflow efficiency, staff satisfaction, and service quality (Bauwens & Cortellazzo, 2025).

Initially, leadership communication in hospitals relied heavily on direct interpersonal interactions, allowing immediate feedback and contextual understanding. Over time, advances in information and communication technology have accelerated the shift toward

digital communication platforms. While these tools offer advantages such as speed and accessibility, they also introduce challenges related to message richness, interpretation, and relational connection. This evolution necessitates adaptive leadership approaches that align communication strategies with technological contexts, as emphasized by Contingency Theory, which asserts that leadership effectiveness depends on situational alignment (Oshame & Maureen, 2023; Tsolka, 2020; Wang et al., 2024). Additionally, Media Richness Theory highlights the importance of selecting appropriate communication channels to reduce ambiguity and enhance understanding in complex organizational environments.

To address these challenges, systematic examination of determinant factors associated with the digitalization of leadership communication is required. By identifying key factors such as leadership style, leadership skills, communication competence, and enthusiasm toward digital tools, this study aims to provide evidence-based insights to support hospital leaders in adapting their communication practices. Strengthening digital leadership communication competencies can enhance trust, coordination, and organizational resilience, ultimately contributing to improved healthcare delivery in digitally mediated environments.

OBJECTIVE

This study aimed to identify determinants associated with the digitalization of leadership communication in hospitals.

METHODS

Study Design

This study employed a correlational research design with a cross-sectional approach to identify relationships between research variables.

Setting

The study was conducted at Regional Hospital in Bali, in November 2023.

Research Subject

A stratified random sampling method was employed to recruit participants from a heterogeneous population of nurses, ensuring proportional representation across relevant strata. Following stratification, systematic random sampling was used to select participants who met the predefined inclusion criteria. The inclusion criteria were: (1) permanent nursing staff, (2) a minimum educational qualification of a nursing diploma, (3) at least three years of work experience, and (4) willingness to participate in the study. The exclusion criteria included: (1) nurses working in administrative positions or not directly involved in patient care, and (2) nurses who were undertaking further education during the data collection period.

The total population consisted of 327 nurses. The sample size was determined by including approximately 40% of the total population, resulting in 131 participants. This sample size was considered adequate based on general recommendations for observational studies and multivariate analyses. Specifically, for multiple logistic regression, a minimum of 10–15 observations per independent variable is recommended to ensure stable parameter

estimates and sufficient statistical power. Given the number of predictor variables included in the model, the sample of 131 participants met these requirements. Additionally, with a conventional significance level of $\alpha = 0.05$ and an anticipated moderate effect size, this sample size was deemed sufficient to detect statistically meaningful associations. This approach aligns with STROBE guidelines, which emphasize adequate sample size, transparency in sampling procedures, and representativeness in observational research.

Instruments

Data were collected using a self-administered questionnaire developed by the researchers based on relevant theories of digital leadership and communication. Prior to data collection, the instrument underwent content, construct, and reliability testing to ensure methodological rigor. Content validity was established through expert review by nursing management and communication specialists, who evaluated the clarity, relevance, and representativeness of each item. Convergent validity was assessed using item loading values, which ranged from 0.54 to 0.91 across 24 items, exceeding the recommended threshold of 0.50 and indicating acceptable construct validity. Internal consistency reliability was examined using Cronbach's alpha coefficients. The results demonstrated satisfactory reliability for all dimensions: leadership style ($\alpha = 0.79$), communication style ($\alpha = 0.83$), leadership skills ($\alpha = 0.64$), enthusiasm ($\alpha = 0.94$), and digital leadership communication ($\alpha = 0.93$). All values exceeded the minimum acceptable criterion of 0.60, confirming that the instrument was reliable and internally consistent. The questionnaire comprised several sections. Communication style was measured using 18 items representing six styles: controlling, structuring, equalitarian, dynamic, relinquishing, and withdrawal. Leadership style was assessed with 29 items covering nine leadership types: autocratic, participative, delegative, bureaucratic, charismatic, transformational, transactional, servant, and situational leadership. Leadership skills were measured using 10 items, enthusiasm using 11 items, and digital leadership communication using 13 items. All items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scales were designed to capture participants' perceptions of leadership behaviors, communication practices, and the extent of digitalization in nursing leadership contexts.

Data Analysis

Data were tabulated and analyzed using inferential statistical techniques, encompassing both bivariate and multivariate analyses. Bivariate analysis employed the Spearman rho test to examine non-parametric correlations between leadership skills, enthusiasm, education level, and work experience and digital leadership communication. Associations between nominal-scale independent variables including age, gender, leadership style, and communication style and digital leadership communication were analyzed using the contingency coefficient test. Multivariate analysis was conducted using multiple logistic regression to assess the simultaneous influence of independent variables on digital leadership communication while controlling for potential confounding factors. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the Ethics Committee of the Institute of Technology and Health Sciences (ITEKES) Bali (Approval No. 03.0438/KEPITEKES-BALI/XI/2023). Written informed consent was obtained from all participants prior to data collection. Participant confidentiality and anonymity were strictly maintained, with data securely stored and accessible only to the research team. Additional site-specific permissions were obtained in compliance with institutional and local governance requirements.

RESULTS

Table 1. Distribution of general characteristics of respondents (n=131)

Characteristics of Respondents	Frequency (f)	Percentage (%)
Gender		
- Male	45	34.4
- Female	86	65.6
Age (year)		
- 19-28	23	17.6
- 29-42	107	81.7
- >42	1	0.8
Education		
- Diploma 3 of nursing	104	79.4
- Diploma 4 of nursing	1	0.8
- Bachelor of nursing	26	19.8
Working experience (year)		
- 5-9	70	53.4
- 10-14	51	38.9
- ≥15	10	7.6

Table 1 shows that most respondents are female, with 86 individuals (65.6%), aged 29-42 years, with 107 individuals (81.7%), holding a Diploma III in Nursing, with 104 individuals (79.4%), having work experience of 5-9 years, with 70 individuals (53.4%), and having work experience of more than 15 years, with 10 individuals (7.6%).

Table 2. Distribution of leadership communication digitization, leadership style, communication style, leadership skills, and enthusiasm (n=131)

Variable	Frequency (f)	Percentage (%)	Mean	Median	SD
Digitalization of Communication Leadership					
- Good	124	94.7	1.05	1	0.22
- Poor	7	5.3			
Leadership style					
- Good	121	92.4	1.13	1	0.34
- Poor	10	7.6			
Communication style					
- Good	121	92.4	1.07	1	0.26

- Poor	10	7.6			
Leadership skill					
- Poor	8	6.1	2.85	3	0.49
- Moderate	3	2.3			
- Good	120	91.6			
Enthusiasm					
- Very low	9	6.9	3.95	4	0.97
- Moderate	11	8.4			
- High	79	60.3			
- Very high	32	24.4			

Table 2 shows that leadership communication digitization is proceeding well, reaching 94.7%, with good leadership style at 92.4%, good communication style at 92.4%, good leadership skills at 91.6%, and high enthusiasm at 60.3%.

Table 3. Bivariate analysis of determinant factors associated with leadership communication digitization at regional hospital in Bali (n=131)

Variable	Digitalization of Communication Leadership				Total		r	P-value
	Good		Poor					
	f	%	f	%	f	%		
Gender								
- Male	39	29.8	6	4.6	45	34.4	0.249	0.003*
- Female	85	64.9	1	0.8	86	65.6		
Age (year)								
- 19-28	22	16.8	1	0.8	23	17.6		
- 29-42	101	77.1	6	4.6	107	81.7	0.030	0.944
- >42	1	0.8	0	0	1	0.8		
Education								
- Diploma 3 of nursing							0.684	-0.036*
- Diploma 4 of nursing								
- Bachelor of nursing								
Working experience (year)								
- 5-9							0.219	0.108
- 10-14								
- ≥15								
Leadership style								
- Good	113	86.3	0	0	113	86.3	0.512	0.000*
- Poor	11	8.4	7	5.3	18	13.7		
Communication style								
- Good	114	87	7	5.3	121	92.4	0.068	0.434
- Poor	10	7.6	0	0	10	7.6		
Leadership skill								
- Poor							0.589	0.000*
- Moderate								
- Good								

Enthusiasm		
- Very low		
- Moderate	0.698	0.000*
- High		
- Very high		

Significant*

Table 3 presents the results of the bivariate analysis, indicating that gender, education level, leadership style, leadership skills, and enthusiasm are significantly associated with leadership digitalization ($p < 0.05$).

Table 4. Multivariate analysis of determinant factors associated with leadership communication digitalization

Variable	DCL	Gender	Age	Education	WE	LS	CS	LK	E
Digitalization of Communication Leadership (DCL)	1	-0.28	0.02	-0.04	-0.10	0.60	-0.07	-0.75	-0.72
Gender	-0.26	1	-0.06	-0.02	0.09	-0.09	0.21	0.34	0.13
Age	0.02	-0.06	1	0.22	0.27	0.06	0.05	-0.05	0.00
Education	-0.04	-0.02	0.22	1	0.11	-0.15	-0.15	-0.05	0.12
Work experience (WE)	-0.10	0.09	0.27	0.11	1	0.04	0.16	0.15	0.03
Leadership style (LS)	0.60	-0.09	0.06	-0.15	0.04	1	0.64	-0.60	-0.60
Communication style (CS)	-0.07	0.21	0.05	-0.15	0.16	0.64	1	0.08	0.01
Leadership skill (LK)	-0.75	0.34	-0.05	-0.05	0.15	-0.60	0.08	1	0.78
Enthusiasm (E)	-0.72	0.13	0.00	0.12	0.03	-0.60	0.01	0.78	1

$R^2 = 0.708$
$p < 0.001$

Table 4 presents the results of the multivariate analysis, which yielded an R^2 value of 0.708, indicating that 70.8% of the variance in leadership communication digitalization is explained by characteristic factors (gender, age, education level, and work experience), leadership style, communication style, leadership skills, and enthusiasm. The remaining 29.2% of the variance is attributable to other factors not examined in this study. The ANOVA test produced a p-value of 0.000 ($p < 0.001$), demonstrating that the independent variables collectively have a statistically significant association with leadership communication digitalization.

DISCUSSION

The findings of this study indicate that the majority of implementing nurses perceived the digitalization of leadership communication as being well implemented in the hospital setting. This perception suggests that digital communication practices have been relatively accepted and integrated into daily leadership activities. Such outcomes may be influenced by several supporting factors identified in this study, namely leadership style, communication style, leadership skills, and leader enthusiasm. Among these factors, leadership style demonstrated the strongest and most consistent association with the digitalization of leadership communication, highlighting its central role in shaping how digital communication is enacted within healthcare organizations.

The strong relationship between leadership style and leadership communication digitalization may be explained by leaders' capacity to adapt their leadership approaches to situational demands rather than relying on a rigid or singular style. Digital work environments are inherently dynamic, requiring leaders to respond flexibly to technological changes, team diversity, and evolving communication needs. This adaptive orientation reflects key characteristics of digital leadership, which emphasize agility, responsiveness, and continuous learning. Digital leadership has been described as the ability to lead effectively through digital communication, conduct virtual supervision without physical presence, manage tasks efficiently through digital platforms, and respond constructively to rapid technological developments. These attributes are consistent with Contingency Leadership Theory, which posits that leadership effectiveness depends on the alignment between leadership behaviors and situational demands rather than adherence to a single leadership style (Santos, 2021).

The present findings support the view that effective leadership in digital environments requires continuous adaptation of communication strategies to maintain trust, clarity, and engagement (Nieken, 2022). However, this perspective is challenged by studies suggesting that leadership style remains relatively stable despite technological change, implying that digitalization alone may not be sufficient to alter entrenched leadership behaviors. The divergence between these perspectives indicates that leadership adaptation is not an automatic consequence of digital transformation but is instead contingent upon contextual enablers such as organizational culture, leadership development mechanisms, and the extent of technological integration. In hospital settings, where ineffective communication can directly compromise patient safety and disrupt team coordination, leaders may face stronger situational pressure to adjust their leadership behaviors, thereby reinforcing the relevance of contingency-based leadership adaptation in digital contexts (Musaigwa & Kalitanyi, 2024).

In contrast to leadership style, communication style demonstrated a weaker association with leadership communication digitalization, suggesting that the adoption of digital tools does not necessarily translate into meaningful changes in communication practices. This finding highlights a critical gap between technological availability and communicative effectiveness, where traditional, one-way communication patterns persist despite digitalization. Such patterns undermine the interactive potential of digital platforms and limit opportunities for feedback and shared decision-making. Consistent with prior research, authoritarian and unidirectional communication styles have been shown to be ineffective in digital contexts due to their restrictive impact on engagement, creativity, and collaboration (Hidayatullah & Toni, 2023). These findings underscore that, particularly in healthcare settings, digital leadership communication must move beyond information transmission toward dialogic, two-way communication that supports interdisciplinary collaboration and collective problem-solving.

Furthermore, communication dynamics in digital leadership contexts are shaped not only by technological factors but also by individual differences among communicators, including gender-related communication orientations and social positioning. Genderlect Theory posits that men and women tend to employ different communicative orientations

commonly characterized as information-focused ("report talk") and relationship-focused ("rapport talk") which can influence how messages are constructed, interpreted, and responded to in digitally mediated interactions (Rodino, 1997). In addition, Standpoint Theory argues that individuals' social locations and lived experiences shape their perspectives, resulting in communication interpretations that are partial and context dependent rather than universal (Rolin, 2009). In the context of digital leadership communication, these theories help explain why the effectiveness of communication styles may vary across team members despite the use of the same digital platforms. They suggest that the success of digital communication is not determined solely by the medium or frequency of interaction, but also by how messages are framed, received, and interpreted within diverse professional and social standpoints. This reinforces the need for leaders to adopt inclusive, dialogic communication approaches that accommodate diverse interpretive frameworks within multidisciplinary healthcare teams.

Leadership skills emerged as a strong determinant of leadership communication digitalization, highlighting the critical role of competency development in enabling effective leadership within digitally mediated environments. Digital leadership skills encompass communication proficiency, digital literacy, adaptability, role modelling, digital vision, and cultural awareness, all of which are essential for sustaining leadership effectiveness during digital transformation (Cahyarini, 2021). Leaders who possess strong digital competencies are better equipped to use digital platforms strategically, communicate messages clearly, and preserve relational connections despite physical distance. These findings are theoretically supported by Social Information Processing Theory, which explains that meaningful impressions and interpersonal relationships can be developed through computer-mediated communication by leveraging available verbal, linguistic, and contextual cues (Sumner & Ramirez, 2017). Nevertheless, the present findings diverge from previous studies that reported limited digital competence and preparedness among leaders, particularly in managing remote teams and digital service delivery (Pettersen & Solstad, 2023). This divergence may be explained by contextual differences such as variations in organizational support systems, access to leadership training, availability of digital infrastructure, and the maturity of digital leadership development initiatives.

Among all variables examined, enthusiasm demonstrated the strongest association with leadership communication digitalization. Enthusiasm reflects intrinsic motivation, curiosity, and positive engagement with change, which are essential for learning and adaptation during digital transformation. Individuals who display high levels of enthusiasm are more inclined to explore new communication tools, overcome resistance to change, and actively participate in digital communication processes, thereby supporting effective leadership communication in digital environments. Enthusiasm has been described as a self-reinforcing emotional state that generates energy, commitment, and persistence, enabling individuals to respond constructively to organizational change (Abhari, 2025). The prominence of enthusiasm in this study highlights the affective dimension of digital leadership, which is often underemphasized compared to technical competence and strategic leadership capabilities. While digital skills and leadership strategies remain important, emotional readiness and positive attitudes toward change appear to play a decisive role in

determining whether digital leadership communication is successfully implemented. This finding is consistent with research on organizational change, which emphasizes that motivation and positive affect significantly influence individuals' willingness to adopt and sustain new practices. Therefore, fostering enthusiasm through supportive leadership, recognition, and continuous learning opportunities may represent a critical strategy for strengthening digital leadership communication in healthcare organizations (Sacavém et al., 2025).

Overall, this study reinforces the view that digitalization of leadership communication in hospitals is a multifaceted process influenced by behavioral, cognitive, and affective factors. Leadership style, leadership skills, and enthusiasm appear to play particularly significant roles, while communication style may require more intentional refinement to fully leverage the potential of digital communication platforms. These findings contribute to the growing body of knowledge on digital leadership in healthcare and provide practical implications for leadership development and organizational policy in digitally transforming hospital environments.

Implications for Practice

The findings of this study have important implications for hospital leadership and organizational development. Given the strong influence of leadership style, leadership skills, and enthusiasm on the digitalization of leadership communication, hospitals should prioritize leadership development programs that emphasize adaptive leadership, digital communication competence, and positive engagement with technological change. Training initiatives should not only focus on technical digital skills but also on fostering flexibility, emotional readiness, and participatory communication approaches. Moreover, hospital management should create supportive environments that encourage experimentation with digital communication tools and provide continuous feedback to enhance leaders' confidence and effectiveness in digital settings.

Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design limits the ability to infer causal relationships between determinant factors and the digitalization of leadership communication. Second, data were collected using self-reported perceptions of implementing nurses, which may be influenced by response bias or social desirability. Third, the study focused on a single institutional context, which may limit the generalizability of the results to other hospitals with different organizational cultures, technological infrastructures, or leadership models. Despite these limitations, the study provides valuable empirical insights into factors influencing digital leadership communication in hospital settings.

Future Research

Future studies are recommended to adopt longitudinal or mixed methods designs to better capture changes in leadership communication practices over time and to explore causal mechanisms. Further research could also examine additional variables such as organizational culture, digital infrastructure readiness, and psychological safety as potential determinants of

digital leadership communication. Comparative studies across different hospital types or healthcare systems would enhance generalizability and deepen understanding of contextual influences. Additionally, qualitative exploration of leaders' lived experiences could complement quantitative findings and provide richer insights into how digital leadership communication is enacted in practice.

CONCLUSION

The digitalization of leadership communication in nursing care services within hospital settings has been effectively implemented. This success is significantly influenced by leadership style, communication style, leadership skills, and leader enthusiasm, which are further associated with leaders' age and educational level. Greater maturity and higher educational attainment support the development of adaptive leadership behaviors, effective digital communication, and sustained motivation in the digital leadership process. These findings highlight that effective digital leadership extends beyond technological adoption and requires strengthening leadership competencies and enthusiasm for change. Hospital management should prioritize leadership development initiatives focused on digital communication skills, flexible leadership approaches, and continuous professional education. Future research is recommended to explore additional organizational and technological factors influencing leadership digitalization using longitudinal or mixed-methods designs to enhance the sustainability of digital leadership practices in nursing services.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest associated with the material presented in this paper.

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