The impact of digital factors on Digital leadership behavior in hospital context

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Abstract

In this research, we developed the relationship between the behavioral factors of Digital leadership in hospitals the Digital support, Digital guidance, Digital engagement, Digital encouragement factors were introduced. The mixed method research methodology with quantitative research and qualitative research were used to confirm our findings. The questionnaire respondents were collected with 458 sampling of the First Affiliated Hospital of Gannan Medical College, Ganzhou City, Jiangxi Province, China from September 2021 to February 2022. The in-dept interview were done with 3 leaders of the hospital; the Director of the Party and Administration Office, the Secretary of the Mission Committee, and the Vice President. All variables were analyzed descriptively with mean, standard deviation and confirmatory factor analysis (CFA).We found that Digital support and Digital mentoring had a higher impact on Digital leadership behavior than Digital engagement and Digital encouragement. Our findings increase the extent of the understanding on the relationship between Digital guidance, Digital encouragement, Digital support, and Digital engagement in Digital leadership behaviors that improve the knowledge on the hospital leadership behaviors in digital work.

Keywords : Digitization, Digital Leadership, Leadership Behavior, Hospital Leadership, Digital Organization

Introduction

Nowadays, digitization is ubiquitous in our lives and has a huge impact that can change the organizational structure of every industry. In this ever-changing digital organizational environment, hospital leaders must understand the impact their actions have on the hospital. At a macro level, digitization will increase the productivity of society and change organizational leadership models. At the micro level, digital technology also improves organizational efficiency. The impact of digitalization on all industries has made the importance of physician leadership to managing a digital organization unprecedented (Chreim et al., 2013) such as Hospitals identify patients through telemedicine medical technology (Meskó et al., 2017). While healthcare organizations are transforming traditional management practices and improving organizational performance through digital technology, they are also creating challenges for hospital leaders to manage digital organizations. Therefore, the combination of organizational management and medical knowledge becomes a unique challenge for hospital leaders (Pillay, 2008). These indicate that some hospital management problems are mainly due to poor communication and lack of professional management skills of leaders (Weberg, 2012; Vaghee, 2013). The main problem with leadership is due to the absence appropriate coaching behaviors and successful support behaviors (Fleming & Kayser, 2008) that most of the hospital leaders themselves lack effective leadership behaviors and leadership qualities. The success of hospital organizations cannot be achieved without the strong support of senior management (Ghiasipour et al., 2017).

As such, digital leaders must be made aware of how to use digital technology to implement plans to manage the hospital so that the organization continues to grow. As a result of the complexity of leadership, scholars' definitions of leadership vary from chapter to chapter, but most emphasize the two main concepts of competence and influence. For example, the ability of leadership to achieve the organization's heart's desire. In turn, leadership can influence others to achieve the goals set by the organization through motivation. So, this study explores the relationship between behavioral factors of digital leadership and hospitals based on leadership theory.

Hypothesis Development

In this research, we developed a foundational framework for a theory of Digital leadership behavior. In our framework, the Digital support, Digital guidance, Digital engagement, Digital encouragement factors are related to Digital leadership behavior. Digital guidance: the relationship-oriented behavior of leaders, mentoring behaviors tend to be more weighted towards interpersonal relationships. From all that has been mention, we can be summarized as a framework as follows in Figure 1.
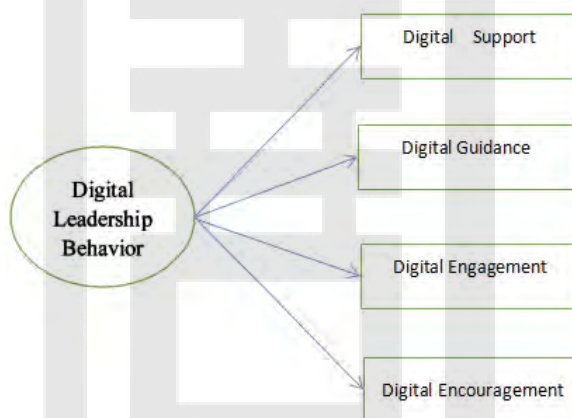

Figure 1 Digital Leadership Behavior framework

Research objectives

- Test the relevance of the factors of digital leadership behavior in hospital.

- Determine the degree of relationship between digital leadership behaviors in hospital.

Literature review

Scholars have defined digital leadership behaviors differently. Using the literature on digital leadership behavior as a theoretical foundation, the researchers defined the various variables of digital leadership behavior.

Digital support

Digital support is service delivered via digital channels such as email, chat, mobile apps, social media, and more. In leadership explanations, digital support is the process by which leaders guide employees through their work tasks. During the work process, the content of the task is explained, and direction is provided to the members. These directions include the act of providing essentially complete guidance on the content of work tasks, as well as telling subordinates what to do, planning, planning, and controlling the achievement of goals (Hanson, 2003). Also, it is the act of following the procedures of the job, providing guidance to the employee task on its purpose, how to do it, when to do it, and by whom, and expecting the employee to obey (Lorinkova et al, 2013).

Digital Guidance

In the theoretical explanation of leadership relationship-oriented behavior, it prefers the weight of interpersonal relationships. They act by building emotional bridges with subordinates and giving emotional support to help them feel comfortable in the work environment. These leadership behaviors create good relationships with subordinates that not only improve team cohesion, but also promote organizational climate (Northouse, 2010) Leadership task-oriented behavior, on the other hand, is mainly task-oriented and focuses more on the progress and quality of the employee's work and how to come to achieve the organization's goals. Unlike relationship-oriented behaviors, they do not interact too frequently with employees and pay attention to their emotions during the work process (Yukl et al., 2009).

Digital Engagement

Explanation of leadership behavior in terms of digital engagement can be the establishment of a shared vision of the good and taking relevant practical actions to give the organization the promise of a better future (Mischel, 1973).

Digital Encouragement

Explained in terms of task-oriented leadership behaviors, leaders are able to encourage their subordinates to accomplish organizational goals through communication while executing their plans. These studies were able to consolidate existing classifications and enhance the leadership behavior concept of leadership behavior theory (Behrendt et al., 2017). It also stimulates the higher needs of organizational members and creates a climate of trust among members, thus transcending the process of aspiration.

Research Methodology

The aims of this research is to investigate the factorial structure of Digital Leadership Behavior in hospital context. The Mixed Method research methodology with quantitative research and qualitative research are used to confirm the our findings. The procedures of our study consisted of 1) An analyze, synthesize, summarize the concepts and theories related, 2) Creating a questionnaire, testing validity by Cronbach's Alpha coefficient and the expert

opinion. 3) The sample size is collecting from a general hospital of the First Affiliated Hospital of Gannan Medical College. 4) Quantitative data were analyzed using SPSS software; mean, standard derivation, Confirmatory Factor Analysis. 5) Qualitative analysis by using in-depth interview with Semi structure questionnaire (Britten, 1999) on the senior managers, middle and lower-level managers of each department and general employees of the hospital. , and 6) Summary the research results.

Population and sample

The study period for this research is from September 2021 to February 2022. Respondents and questionnaire respondents were mainly from the existing 3,302 personnel of the First Affiliated Hospital of Gannan Medical College, Ganzhou City, Jiangxi Province, China. Among them are, 1,057 doctors; 1,576 nurses; 348 medical technicians; and 321 Organs departments. As of September 2021, Ganzhou City, Jiangxi Province has 9,503 health service institutions, including 257 hospitals: there are 153 general hospitals, 9 tertiary general hospitals and 36 secondary general hospitals. The questionnaires is developed and distributed through Questionnaire Star (APP) on WeChat software. However, language factor of the questionnaire could cause some misunderstanding of dyslexia to the respondents and might cause some errors in the survey results. Therefore, the researcher used the Chinese and English versions of the questionnaire so that the respondents could understand more clearly the content and information expressed in the questionnaire. The sample size for the study, the Yamane's theoretical formula (Yamane, 1967) were used to determine that the sample size of 357 for 3,302 people is the lower number of respondent responses that maintains the 95% confidence interval. The final number of samples collected was 458 (n=458).

Data gathering methods

The survey questionnaire is a closed-ended question that consists of three parts together. The first part is about the demographic information of the samples; gender, age, department, position, etc. The second part contains options for specific questions related to leadership behaviors. The third part contains options for questions related to Digital leadership behaviors. In addition to this, the researcher use video interviews with two vice presidents and three physician directors. Respondents will be asked about their responses to the questionnaire and data will be collected to analyze the characteristic behaviors of the study participants. The Likert scales were used in the questionnaire that the options of respondents were "strongly agree", "agree", "not necessarily", "disagree", and "strongly disagree", which were recorded as 5, 4, 3, 2, and 1 (Likert, 1932).

Research results

Basic information of the sample

A total of 458 valid samples were collected in this study. The basic information of the valid samples are shown in the table 4.1.

Table 1 Basic information of the sample

		N	%
gender	Male	235	51.3
	Female	223	48.7
age	Under 30 years old	105	22.9
	31- 40 years old	141	30.8
	41-50 years old	120	26.2
	51 years old and above	92	20.1
work years	Within 1 year	26	5.7
	1-5 years	153	33.4
	6-10 years	147	32.1
	More than 10 years	132	28.8
education	College and below	75	16.4
	Bachelor's degree	76	16.6
	Master's degree	194	42.3
	Doctoral degree	113	24.7
department	Nursing Department	75	16.3
	Medical Service	104	22.7
	Outpatient Department	79	17.2
	Logistics Department	70	15.3
	Science and Technology Department	36	7.9
	Information Service	47	10.3
	Medical Equipment Department	47	10.3
Position	Senior Managers	5	1.1
	Middle Managers	8	1.7
	Grassroots Managers	19	4.1
	Grassroots staff	426	93.0
	total	458	100.0

By gender, males (51.3%) are slightly higher than females (48.7%); considering age,

the proportion of each age group are relatively balanced; from the perspective of working years, the proportions of 1-5 years and 6-10 years are slightly higher, accounting for about 33.4% and 32.1%. From the perspective of educational background, the percentage of masters and doctorates is the highest representing approximately 42.4% and 24.7%; from the perspective of department, the proportion of each department is relatively balanced; By position, the percentage of grassroots staff is the highest, accounting for about 93%, followed by grassroots Managers (4.1%), middle managers (1.7%), and senior Managers (1.1%).

Descriptive Statistics

The individual constructs of Digital leadership behavior were defined; Digital support (DS), Digital guidance (DG), Digital engagement (DENG),and Digital encouragement (DENC). A pretest to evaluate the construct items, and a confirmatory test of the measurement model were conducted using confirmatory factor analysis (CFA). The distribution of each construct items were investigated which the kurtosis and skewness were found. The maximum absolute value of kurtosis were less than 10, and the absolute value of maximum skewness were less than 3, indicating that the data in this study basically meet the requirements of normal distribution which can be further analyzed by parameter estimation (Park, 2015). The descriptive statistics results of each variable are shown in Table 2.

Table 2 Descriptive analysis results of variables

	Items	Mean	SD	Mean	SD
	DS1	3.734	1.033		
	DS2	3.679	0.988	3.724	1.036
Digital support(DS)	DS3	3.672	0.978		
	DS4	3.668	1.087		
	DS5	3.869	1.095		
	DG1	3.972	1.051		
	DG2	4.201	1.080		
Digital guidance(DG)	DG3	4.131	1.121	4.115	1.073
	DG4	4.105	1.039		
	DG5	4.168	1.073		
	DENG1	3.504	1.040		
	DENG2	3.498	1.171		
Digital engagement(DENG)	DENG3	3.697	1.053	3.611	1.104

	Items	Mean	SD	Mean	SD
	DENG4	3.683	1.153		
	DENG5	3.675	1.102		
	DENC1	3.821	1.186		
	DENC2	3.747	1.199		
Digital encouragement(DENC)	DENC3	3.729	1.193	3.756	1.200
	DENC4	3.771	1.192		
	DENC5	3.710	1.229		

From the Table 2, the mean values of the observed variables of Digital leadership behavior are concentrated between 3 and 4, which generally shows that the respondent have upper-middle levels of perceived evaluation of these variables. The variables with the highest mean are Digital guidance (4.115), Digital encouragement (3.756), Digital support (3.724), and Digital engagement (3.611), respectively.

Reliability Analysis

The Cronbach's α was used to test the reliability of the questionnaire. It is generally believed that when Cronbach's α>0.9, the reliability is very good; when 0.7<Cronbach's α<0.9, the reliability is relatively good; when 0.6<Cronbach's α<0.7, the reliability is acceptable, if Cronbach's a lower than 0.6, it indicates that the reliability of the questionnaire is poor, and it is necessary to re-collect the data after the questionnaire is revised. The Cronbach's α of each variable of Digital leadership behavior in this study are all above 0.8, indicating that the internal consistency of each variable in this study is high and the variable has good reliability (Gliem & Gliem, 2003).

Table 3 Reliability Analysis

Variables	Cronbach's α	Average Cronbach's α
Digital Support	0.867	
Digital Guidance	0.956	
Digital Engagement	0.894	0.903
Digital Encouragement	0.895	

Validity Analysis

The confirmatory factor analysis result of Digital leadership behavior were done which their results were shown the Table 4. The CR is a less biased estimate of reliability than Cronbach's alpha, the acceptable value of CR is 0.7 and above. The AVE measures the

level of variance captured by a construct versus the level due to measurement error, values above 0.7 are considered very good, whereas, the level of 0.5 is acceptable. From the table 4, we found that the standardized loading of each variable were greater than 0.5, the CR is greater than 0.7, and the AVE is greater than 0.5, indicating that the validity of Digital leadership behavior is better (Fornell & Larcker, 1981).

Table 4 Confirmatory factor analysis results of Digital leadership behavior

Digital leadership behavior		loading	CR	AVE
Digital Support	DS3	0.739		
	DS4	0.658	0.869	0.572
	DS5	0.762		
Digital Guidance	DG1	0.890		
	DG2	0.945		
	DG3	0.908	0.956	0.814
	DG4	0.858		
Digital Engagement	DENG1	0.706		
	DENG2	0.650		
	DENG3	0.862	0.898	0.641
	DENG4	0.903		
	DENG5	0.852		
Digital Encouragement	DENC1	0.866		
	DENC2	0.821		
	DENC3	0.673		
	DENC4	0.766	0.897	0.636
	DENC5	0.846		

The correlation analysis of variables were done by Pearson Correlation analysis as shown in Table 5.

Table 5 Pearson Correlation analysis and discriminant validity

	Digital Support	Digital Guidance	Digital Engagement	Digital Encouragement
Digital Support	1			
Digital Guidance	0.691	1		
Digital Engagement	0.504	0.466	1	
Digital Encouragement	0.441	0.418	0.342	1

The test for multicollinearity and the correlation estimate of pairs of variables are calculated and found that the correlation factor was positive and, in the range, 0.342-0.691 with p<0.01. Those with less than 0.8 were agreed upon (Hair et al., 2010). These results indicated that variables of Digital leadership behavior have good discriminant validity.

This paper focuses on the basic concept of Digital leadership behavior and points out that the four key factors of Digital leadership behavior are Digital support, Digital guidance, Digital engagement, and Digital encouragement. During the researcher's study of the degree of association between Digital leadership behavior and Digital support, Digital guidance, Digital engagement, and Digital encouragement, the quantitative data analysis showed that Digital leadership behavior was most associated with Digital guidance, Digital leadership behavior was essentially the same as Digital engagement and Digital encouragement, and Digital leadership behavior was least associated with Digital support.

The qualitative data analysis

This study used In-dept interview and purposive sampling for qualitative research method with 3 key informants whose are leaders of the hospital; the Director of the Party and Administration Office, the Secretary of the Mission Committee, and the Vice President. The interview questionnaire was designed to support quantitative results explain and confirm quantitative results within China's hospital context (EMIC). After that collected digital data based on the information answered by the respondents and analyzed and summarized the data. For the qualitative data analysis, interviews with three hospital leaders were conducted. The study revealed that the three leaders used Digital guidance behaviors the most in managing the hospital. They thought that Digital guidance could train better hospital trainees, improve the efficiency of all hospital staff and create a good environment. The hospital's continued purchase of medical equipment to improve the efficiency of hospital operations can drive hospital growth and improve hospital intelligence. And finally, effective Digital guidance not only solves deep-rooted hospital problems, but also drives sustainable development, making hospitals smarter and more digital in the future. Regarding the leaders' views on the use of Digital engagement and Digital encouragement in hospitals, their view is that Digital support creates a platform for communication between hospitals, staff and patients. It promotes the relationship between all hospital staff and communication between the hospital and patients. Digital encouragement supports the whole staff to participate in the knowledge about the digital activities in the hospital and makes them understand

the importance of digitalization for the future development of the hospital. Regarding the Digital support behaviors of leaders in the hospital, they point out that Digital leaders are mainly related to digital work and provide relevant facilitation for digital activity work. These are simple executive actions that employees are able to use on their own initiative to familiarize themselves with in their work and basically do not require leaders to spend time to guide them. Therefore, Digital support has the least relationship with Digital leadership behavior.

Discussions

The findings in this study facilitate the definition of digital leadership behaviors and provide informative insights into Digital leadership behaviors in the healthcare industry. The results of the study showed that the highest relational intimacy with Digital leadership behavior was Digital guidance, Digital encouragement and Digital engagement were basically the same, and Digital support was the lowest. It indicates that Digital guidance has more influence on Digital leadership behavior in hospitals in digital work. In contrast, Digital support had the least impact on hospital Digital leadership behavior. Consistency between the qualitative study interview results and the quantitative study results, with respondents indicating that leaders use Digital guidance the most when they focus on their subordinates' digital efforts. And Digital encouragement and Digital engagement are more along the lines of Digital guidance, so they are consistent. Then Digital support is the least used behavior by leaders in their hospital work. Our findings show the agreement that Digital leaders provide digital technology to facilitate school transformation and create digital learning communities for them (Zhong, 2017). In targeting their management level, principals should mentor teachers and improve their digital skills. The findings indicate that Digital support and Digital guidance are strongly associated with Digital leadership behaviors. Digital leadership behaviors provide employees with training sessions, access to digital channels, expanded e-learning platforms and the creation of flexible work models that make digital work more engaging (Klassen, 2021). Digital support, Digital guidance, Digital engagement and Digital encouragement are strongly associated with the degree of Digital leadership behavior. These findings validate the extent to which Digital leadership behaviors and Digital guidance, Digital encouragement, Digital engagement, and Digital support are related.

Implication

Through the analysis of questionnaire data and interview information, we establish the study of Digital leadership behavior relationships. We can define Digital leadership behaviors as the behaviors of leaders in terms of guidance, support, encouragement, and engagement in the implementation of all digital activities. They can be categorized as Digital guidance, Digital encouragement, Digital support, and Digital engagement. On a national level, Digital guidance guides various parties to collaborate with each other in the process of national governance in order to assist in its digital (Peng, 2021). From another level brings us to understand the concept of Digital encouragement that can encourage subordinates in implementing plans to achieve organizational goals through communication (Behrendtetal, 2017). These leaders support digital work by supporting, guiding, engaging and encouraging behaviors. Our results were also promoted the development and further research on Digital leadership behaviors in the healthcare industry.

Conclusion

This study was investigated the degree of Digital guidance, Digital encouragement, Digital support, and Digital engagement associated with Digital leadership behaviors in the First Affiliated Hospital of Gannan Medical College. The researchers analyzed the questionnaire data to understand which variables showed the most important role in Digital leadership behaviors in the hospital. The analysis of the data based on the variables showed that Digital support and Digital guidance had a higher impact on all the models considered than Digital engagement and Digital encouragement. This implies that the Digital support and Digital guidance aspects of Digital leadership behavior are doing well and people need more Digital engagement and Digital encouragement. These findings increase the extent to which we understand the relationship between Digital guidance, Digital encouragement, Digital support, and Digital engagement in Digital leadership behaviors that improve the knowledge on the hospital leadership behaviors in digital work.

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