Factors Influencing Innovative Work Behaviour in University in Yunnan, China

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Received: 2023-12-16; **Revised:** 2024-6-29; **Accepted:** 2024-6-30

Abstract

This study aims to determine the relationship and effects between digital leadership, digital culture, innovation willingness on innovative work behavior of universities in China. This research is quantitative research. Population and sample for the study is college teachers and scholars of universities in Yunnan Province, this study uses the combination of stratified sampling and random sampling to sample universities with different rankings in different Yunnan Province.

The study showed a lowly significant positive relationship between innovation willingness and innovative work behavior. We found that innovation work behavior had moderately significant positive relationships with digital leadership and digital culture. In this study, the results of the multiple regression analysis conducted using the backward method. As these results indicate, our analysis determined that 64.4% of the changes in the innovation work behavior were explained by the changes in the four dimensions. According to these results, the value innovation work behavior can be formulated as follows: “Innovation Work Behavior = 5.960 + (0.756 x digital leadership) + (0.129 x digital culture) + (0.062 x innovation willingness developed)”

Keywords: Digital Leadership, Digital Culture, Innovation Willingness, Human Capital Enhancement

Introduction

Since the 21st century commenced, our societal economic structure has shifted from an industrial economy to one propelled by knowledge, earning it the designation of the knowledge era. Advancements in human cognition, coupled with the evolution of modern

technologies and enhancements in information management systems, enable effective interdisciplinary communication. This progress has significantly streamlined knowledge sharing across diverse disciplines (Li, 2023).

Building upon this foundation, the Chinese government and businesses are consistently augmenting their investments in research and development, actively fostering diverse innovations. The growing number of patent grants signifies a positive momentum in China's independent innovation output, and there is a gradual improvement in the conversion rate of innovative accomplishments.

Contemporary studies on human capital management primarily center around enhancing enterprises' return on assets and elevating corporate performance. This is achieved through the development, innovation, and application of knowledge, along with effective knowledge management (Zhao, 2012). Consequently, the pivotal factors driving the core competitiveness of enterprises are the innovation capability and performance of individual human capital.

Research of Objectives

This study aims to determine the relationship and effects between digital leadership, digital culture, innovation willingness on innovative work behavior of universities in China.

Literature review

Digital Leadership

The knowledge economy emerges as a byproduct of a highly advanced industrial economy, where economic development fundamentally revolves around acquiring and distributing intellectual resources. The production, distribution, and consumption of knowledge are predominantly steered by science and technology (Wang, 2023). The typical facets of digital leadership are primarily formulated to advance digital technology and strategically adapt to the prevailing environment. Considering the organizational traits and innovative management approaches in academic institutions, this study categorizes digital leadership in colleges and universities into three dimensions: (1) digital capability and execution, (2) digital visionaries, and (3) transformational leadership.

Digital Culture

The concept of digital culture, introduced in recent years, has garnered attention from numerous scholars who have explored it from various angles, suggesting measurement

dimensions. Considering the organizational features and human capital traits of colleges and universities, this study opts for the following dimensions: (1) open culture, (2) collaboration, and (3) innovation culture.

Innovation Willingness

Drawing from the aforementioned studies, Hu and her research team have devised a measurement system for gauging the willingness of knowledgeable employees to engage in innovative behaviors. This system is designed to predict and guide the innovation behaviors of human capital. The inclination of these individuals toward innovation is associated with the encouragement stemming from their beliefs and attitudes. As the potential for innovation increases, so does the measurement of human capital's willingness to innovate. On the basis of this premise, a scale has been developed to assess the innovation willingness of academic staff. Utilizing psychological theories, Hu's scale breaks down human capital innovation willingness into three primary aspects: (1) individual's subjective values; (2) subjective norms of conduct; (3) subjective norms of conduct (Hu, 2013).

Innovation Work Behavior

In the context of Yunnan province universities in China, innovation work behavior encompasses the actions undertaken by individuals or groups within the organization to generate, develop, and implement innovative ideas, or to establish new working processes and create new products or services (Liu et al., 2023). In Yunnan universities, teachers play a crucial role as they engage in scientific research and deliver courses to students, thus serving as human capital that generates value through course delivery and innovative research. Consequently, universities aspiring to achieve high rankings and excellence in scientific research must bolster the innovation capabilities of their human capital and foster their productivity in innovation. This explains the contemporary universities' emphasis on motivating innovation and attracting highly qualified human capital (Yang, 2023).

As a frequently discussed mediating variable, innovation work behavior is often examined in conjunction with other factors influencing organizational innovation performance. To assess organizational or individual innovation work behaviors, this study adopts the dimensions proposed by Scott and Bruce, which delineate the innovation work behavior process as involving (1) idea generation, (2) coalition building, and (3) implementation (Scott & Bruce, 1994; Jong & Hartog, 2010).

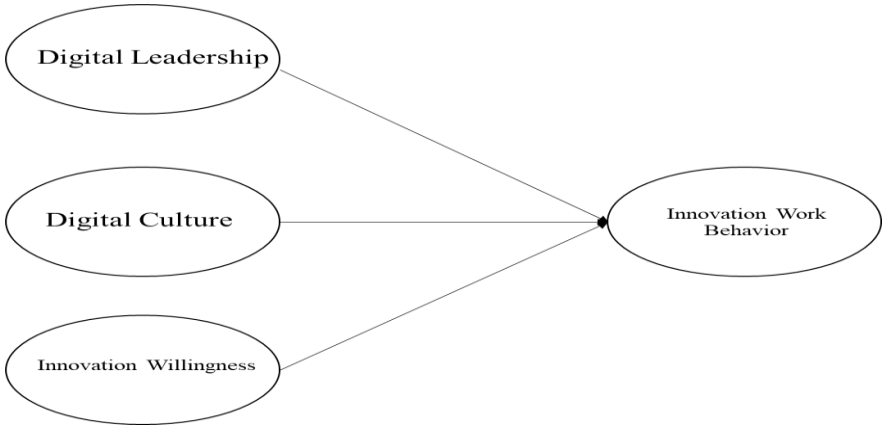

Figure 1 Conceptual Framework

Methodology

This study was designed to quantitative research in order to digital leadership, digital culture and innovation willingness effects on innovation work behavior of universities in Yunnan Province, China. A descriptive predictive design was used in this study.

Population and Sample

In determining the sample size, because the true population was unknown, the researcher used criteria the barest minimum is to include in the regression equation and a ratio of 40 to 1 for stepwise (Tabachnick and Fidell, 2000). In this study, eight parameters of two variables were used to predict the dependent variable. Therefore, the sample size for this study was 400.

Research Instruments

Instruments used in this study included:

1. A demographic data form including gender, age, educational level, experience, professional title, and faculty.

2. The 15 item digital leadership developed by Oberer & Erkollar (2018); Teichert (2019), and Baba et al. (2019). This questionnaire uses a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree, and is comprised of digital capability and execution (5 items), digital visionary (5 items), and transformation leadership (5 items).

3. The 15 item digital culture developed by Hou & Lu (2018); Azeem et al (2021), and Ren (2023). This questionnaire uses a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree, and is comprised of open culture (5 items), collaboration (5 items), and innovation culture (5 items).

4. The 15 item innovation willingness developed by Rong & Feng (2017); Gao (2017), and Yin (2023). This questionnaire uses a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree, and is comprised of individual's subjective values (5 items), subjective norms of conducts (5 items), and self- perception (5 items).

5. The 15 item innovation work behavior developed by Rong & Feng (2017); Gao (2017), and Yin (2023). This questionnaire uses a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree, and is comprised of idea generation (5 items), coalition building (5 items), and idea implementation (5 items).

Data Collection

Data collected by using the online survey technique. Validity and reliability, based on the reliability coefficient of the questionnaire form was (80.8%), according to the Cronbach Alpha equation.

Data Analysis

After the researcher scrutinized the data, they were analyzed using the SPSS program (version 23.0). The analysis included four main methods: 1) Analyze the demographic data using descriptive statistics; 2) Analyze DL, DC, IW and IWB using means and standard deviation; 3) Test correlation, Person's correlation; 4) Test multicollinearity, the underlying assumption for multiple regression. The value of the variance inflation factor (VIF) in table 5 ranged from 1.345 to 1.593, which indicated no multicollinearity among the predictors; and 5) Apply multiple regression analysis. The hypothesis model is present in Tabel 1

Table 1 hypothesis model for study

Hypothesis	Content of Hypothesis
1	Digital leadership has a positive and significant influence on innovation work behavior.
2	Digital Culture has a positive and significant influence on innovation work behavior.
3	Innovation willingness has a positive and significant influence on innovation work behavior.

Results

Table 2 shows the demographic variables while Table 2 shows the results of this factor analysis. The demographic distribution of the participants is as follows: 51.25% of the survey participants were women and 48.75% were men. 26.50% of the participants were 20-35 years

old, 58.00% were 36-50 years old, and 15.50% were 41-65 years old. The highest education degrees of the participants were bachelor's degree at 6.75%, master ‘s degree at 22.50%, and doctoral degree at 70.75%. The experience of the participants were 1-5 years old at 22.50%, 6-10 years old at 39.25%, 11-20 years old at 25.25%, and above 20 years at 13.00%. The professor's title of the participants was entry level at 30.25%, intermediate level at 38.75%, junior level at 4.75%, and senior level at 26.25%. Lastly, the final demographic focuses on the faculty of the participants were economics and management at 26.75%, language and culture at 23.75%, regarding others at 18.25%, and science and technology at 31.25%

Table 2 Descriptive statistical sample (N=400)

Demographic		Frequencies	Percentage
Gender	Male	195	48.75
	Female	205	51.25
Age	20-35 years old	106	26.50
	36-50 years old	232	58.00
	41-65 years old	62	15.50
Education	Bachelor's degree	27	6.75
	Master ‘s degree	90	22.50
	Doctoral degree	283	70.75
Experience	1-5 years old	90	22.50
	6-10 years old	157	39.25
	11-20 years old	101	25.25
	Above 20 years	52	13.00
Profess title	Entry level	121	30.25
	Intermediate	155	38.75
	Junior	19	4.75
	Senior	105	26.25
Faculty	Economics and management	107	26.75
	Languages and culture	95	23.75
	Others	73	18.25
	Science and technology	125	31.25

Table 3 shows the values obtained as a result of the reliability analysis performed for these scales whose structural validity was established. The reliability test returned a Cronbach's alpha of 0.702-0.927.

Table 3 Reliability Analysis

	Cronbach's Alpha	N of Items
Digital Leadership	0.723	15
- Digital Capability and Execution	0.927	5
- Digital Visionary	0.872	5
- Transformation Leadership	0.740	5
Digital Culture	0.727	15
- Open Culture	0.765	5
- Collaboration	0.922	5
- Innovation Culture	0.895	5
Innovation Willingness	0.811	15
- Individual's Subjective Values	0.830	5
- Subjective Norms of Conducts	0.916	5
- Self- Perception	0.924	5
Innovation Work	0.702	15
- Idea Generation	0.920	5
- Coalition Building	0.887	5
- Idea Implementation	0.875	5

The mean score, standard deviation, and interpretation for each item are shown in Table 4. It can be observed that participants held a high regard for the majority of items on which they were asked to comment.

Table 4 Mean and Standard Deviation of Variables (N-400)

	Mean	Standard Deviation	Interpretation
Digital Leadership	4.61	0.28	Strongly Agree
- Digital Capability and Execution	4.52	0.54	Strongly Agree
- Digital Visionary	4.64	0.42	Strongly Agree
- Transformation Leadership	4.68	0.34	Strongly Agree
Digital Culture	4.51	0.36	Strongly Agree
- Open Culture	4.64	0.38	Strongly Agree

	Mean	Standard Deviation	Interpretation
- Collaboration	4.43	0.62	Strongly Agree
- Innovation Culture	4.46	0.51	Strongly Agree
Innovation Willingness	4.47	0.38	Strongly Agree
- Individual's Subjective Values	4.62	0.43	Strongly Agree
- Subjective Norms of Conducts	4.39	0.57	Strongly Agree
- Self- Perception	4.41	0.57	Strongly Agree
Innovation Work	4.55	0.31	Strongly Agree
- Idea Generation	4.52	0.51	Strongly Agree
- Coalition Building	4.47	0.48	Strongly Agree
- Idea Implementation	4.66	0.41	Strongly Agree

Table 5 shows the results of the correlation analysis between this study's dependent and independent variables. As the results in the table indicate, our analysis showed a lowly significant positive relationship between innovation willingness and innovative work behavior. We found that innovation work behavior had moderately significant positive relationships with digital leadership and digital culture.

Table 5 Summary for the Matrix for Correlation of the Four Variables (N-400)

Variable	DL	DC	IW	IWB
DL	1			
DC	.504**	1		
IW	.341**	.495**	1	
IWB	.786**	.531**	.383**	1

Code. DL = Digital Leadership; DC = Digital Culture; IW = Innovation Willingness; IWB = Innovation Work Behavior; * significant at the .05 level (2-tailed), ** significant at the .01 level (2-tailed).

Table 6 shows the results of the multiple regression analysis conducted using the backward method. As these results indicate, our analysis determined that 64.4% of the changes in the innovation work behavior were explained by the changes in the four dimensions. According to these results, the value innovation work behavior can be formulated as follows: "Innovation Work Behavior = 5.960 + (0.756 x digital leadership) + (0.129 x digital culture) + (0.062 x innovation willingness developed)"

Table 6 Regression Analysis

R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
0.646	0.644	0.18614	1.914

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	0.202	0.166		1.217	0.224		
DL	0.756	0.038	0.685	19.661	0.000	0.735	1.361
DC	0.129	0.033	0.148	3.918	0.000	0.628	1.593
IW	0.062	0.028	0.076	2.199	0.028	0.744	1.345

a. Predictors: (Constant), IW, DL, DC

b. Dependent Variable: IWB

Discussion

In the era of economic globalization and the advent of Industry 4.0, the impact of modern social information technology and the new economic landscape affects all enterprises and organizations. The prevailing themes of the knowledge economy and digitalization compel organizations not only to revise their perspectives and overhaul systems but crucially to innovate in management practices to maintain competitiveness (Cao, 2023).

The consensus in society on the significance of innovation work behavior is well-established, with abundant research exploring its influencing factors. Both domestic and foreign studies currently affirm that digital capability and execution, digital visionary, and transformational leadership are key factors. In the context of Industry 4.0, leaders are required to seamlessly integrate technology and novel organizational models into innovation and business transformation for success. Emerging digital leadership styles are seen as beneficial for fostering employee innovation behavior. This evolving leadership style, termed digital leadership, can be defined as the amalgamation of leaders' digital technology capabilities and their overall management skills to add value and drive transformation within an organization (Guan, 2023). The findings of this study align with previous research conducted by Oberer & Erkollar (2018), Teichert (2019), and Baba et al. (2019).

Furthermore, the study discovered that digital culture fosters innovation by establishing openness, cooperation, teamwork, and knowledge-sharing within the organization and teams. It facilitates learning opportunities for employee development, contributes to the establishment of a learning culture within the organization, helps in achieving consensus on the corporate vision, and encourages cross-departmental and cross-disciplinary communication and collaboration. These factors collectively motivate employees to employ new ideas for problem-solving, thereby stimulating innovation behavior. The findings of this study align with the conclusions drawn in previous research by Hou & Lu (2018), Azeem et al. (2021), and Ren (2023).

Finally, an individual's inclination towards innovation contributes to the development of innovative behaviors and organizational innovation performance. Drawing from research by Hu (2013), innovation willingness is characterized by the likelihood of innovation stemming from the encouragement of beliefs and attitudes among knowledge-generating employees. The significance of innovation willingness has garnered attention, focusing on its impact on innovation behaviors and performance. Both domestic and international studies have affirmed that the examination of innovative intentions is predominantly influenced by three factors: innovation attitude, subjective norm, and perceived behavior control. In the context of human capital, innovation attitude can be defined as an endogenous assessment of how much an individual likes or dislikes engaging in a specific behavior. The outcomes of this study align with the conclusions of previous research conducted by Rong & Feng (2017), Gao (2017), and Yin (2023).

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