

*The impact of Transformational Leadership on  
Knowledge Management Effectiveness: the Potential  
Mediating Role of Digitalisation in Mascara University*

*L'impact du leadership transformationnel sur l'efficacité de la  
gestion des connaissances : le rôle médiateur potentiel de la numérisation  
à l'université de Mascara*

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**Abstract:**

*This study aimed to identify the impact of transformational leadership on the knowledge management effectiveness at the University of Mascara and the extent of Digitalisation mediation. PLS-SEM was used with 104 valid questionnaires. Using Smart PLS 4, it was found that transformational leadership has a significant impact on the effectiveness of knowledge management, with no mediating role for Digitalisation.*

**Keywords:** Leadership, Transformational Leadership, Knowledge Management, Digitalisation, University.

**Jel Classification Codes:** M12, M54, O31, M15, I23.

**Résumé:**

*Cette étude visait à identifier l'impact du leadership transformationnel sur l'efficacité de la gestion des connaissances à l'université de Mascara et l'étendue de la médiation de la numérisation. Le PLS-SEM a été utilisé avec 104 questionnaires valides. À l'aide de Smart PLS 4, il a été constaté que le leadership transformationnel a un impact significatif sur l'efficacité de la gestion des connaissances, sans rôle médiateur de la numérisation.*

**Mots clés:** Leadership, leadership transformationnel, gestion des connaissances, numérisation, université.

**Jel Classification Codes:** M12, M54, O31, M15, I23.

## **1. INTRODUCTION**

The higher education sector is being transformed dramatically due to intensified competition, limited budgets, and emerging technologies. A new era of online learning and remote work has been triggered by the COVID-19 pandemic. In less developed countries, gaps in digital infrastructure can be more clearly observed. In response to these challenges, several digital initiatives have been introduced by the Algerian Ministry of Higher Education. Furthermore, the mediating role of knowledge management between big data and institutional performance has been increasingly highlighted in the literature (Birasnav et al., 2013; Marchena Sekli & De La Vega, 2021; Vyas, 2024). The implementation of knowledge management practices in developing countries is challenging due to the absence of formal strategies (Masa'deh et al., 2017; Veer Ramjeawon & Rowley, 2018). Recent studies, such as Sobaih et al. (2025) have demonstrated the importance of transformational leadership in enhancing its effectiveness. The problem addressed in this study is the following question: Does transformational leadership affect the effectiveness of knowledge management at the University of Mascara, and does digitalisation play a mediating role in this relationship?

## **2. Literature Review and Hypotheses Development.**

### **2.1 Knowledge Management in Higher Education Institutions**

Knowledge management plays an important role in higher education institutions, influencing their performance. A study conducted on 265 participants from universities ranked as the best in Latin America according to the QS 2021 ranking showed that knowledge management processes have a significant impact on the organizational performance of higher education institutions. and also play an intermediary role in the relationship between big data analytics and organizational performance (Marchena Sekli & De La Vega, 2021). A study conducted on employees of three European university libraries, namely the University of Stuttgart Library in Germany, the Autonomous University of Barcelona Library in Spain, and the University of Eastern Finland Library, showed that the application of knowledge management led to improved management and increased employee involvement in service development (Balagué et al., 2016).

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According to (Veer Ramjeawon & Rowley, 2018), knowledge management processes are linked to the main roles of the university, which are research, teaching, and community service. For this reason, the focus has been on knowledge creation, knowledge sharing, and knowledge transfer. In addition, knowledge management through its processes plays an important role in higher education institutions. Based on our review of many previous studies, we find that in recent years there has been a greater focus on knowledge sharing than on other knowledge management processes in institutions. Numerous studies have demonstrated its importance in institutions and examined it from several angles, sometimes as an independent variable, sometimes as an intermediate variable, and sometimes as a moderator. A study conducted on 357 faculty members in higher education institutions in Pakistan found that knowledge sharing moderates the relationship between work pressure associated with the COVID-19 pandemic and innovative work behavior, and partially mediates the relationship between transformational leadership and innovative work behavior (Rafique et al., 2022).

## **2.2 Leadership types, transformational leadership, and knowledge management in higher education institutions**

A study conducted on a sample of 398 knowledge workers and their immediate colleagues in four research institutes in southwestern China revealed the relationship between transformational leadership and creative performance. It is mediated by both perspective taking and boundary crossing (Wadei et al., 2021). Because the effectiveness of knowledge management is influenced by many aspects in higher education institutions, as in other institutions, the most important of which is leadership, as many studies have shown its important role in higher education institutions and its impact on university performance. One study showed that knowledge-oriented leadership has a direct and positive impact on organizational performance, with partial mediation of knowledge management and innovation processes (Rehman & Iqbal, 2020). Another study conducted on 295 professors, department heads, and administrative staff at Chinese universities confirmed that responsible leadership positively affects

knowledge-sharing behavior (Haider et al., 2022). In addition, another study showed the important relationship between leadership and knowledge management and its role in improving the performance of higher education institutions. A study conducted on 248 faculty and administrative staff members in higher education institutions in Pakistan showed that knowledge-oriented leadership, as one of the facilitating factors of knowledge management, affects knowledge management processes and the productivity of knowledge workers (Sahibzada et al., 2021). Another study conducted on 234 academics in higher education institutions in Pakistan showed that promoting the value of knowledge management by senior management in higher education institutions, along with promoting a knowledge-oriented culture and implementing a knowledge-based reward system, are all factors that enhance the speed and quality of innovation in higher education institutions (Iqbal, 2021). Because leadership in higher education institutions plays an important role in influencing and guiding employees and gaining their satisfaction in order to achieve positive results, a study conducted on 536 academic and administrative employees from a number of Chinese higher education institutions proved that employee satisfaction with knowledge plays an important and key role in the impact of knowledge management processes on organizational performance, without which this impact is negated (Sahibzada et al., 2020). Because knowledge sharing is one of the processes of knowledge management, there are many studies that confirm its important role in higher education institutions. This has been confirmed by a recent study, which pointed out that most previous studies have focused on knowledge transfer and exchange as strategies to enhance the performance of higher education institutions, as there is a clear relationship between employee performance and the performance of higher education institutions. The study also showed that knowledge exchange is essential for improving work performance (Vyas, 2024).

### **2.3. Digital transformation and its relationship to transformational leadership and knowledge management in higher education institutions**

Digital transformation in higher education involves the intentional use of technological advancements to improve efficiency, enhance the student

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experience and create new working methods (Carmo et al., 2025). While studies show that this change relies on technologies such as artificial intelligence, cloud computing and big data, there are still significant discrepancies in the application of these technologies in universities (Carmo et al., 2025). Studies show that educational institutions, like industries and commercial organizations, need to undergo digital transformation to keep pace with industrial changes and modern trends, as it can be applied to multiple dimensions including teaching, pedagogy, learning and curricula, infrastructure, management, and leadership (Alenezi, 2021). Studies have also shown that digital transformation promotes innovation by leveraging internal and external knowledge, and that the digital knowledge of senior management particularly enhances this relationship (Jiang et al., 2025). The absorption of knowledge from the top down and vice versa also contributes to adapting to AI-driven digital transformation (Gering et al., 2025). This requires a genuine adaptation of leadership in higher education institutions, as recent studies in American universities confirm that rapid technological advances make it necessary for leadership to be adaptable, professionally flexible, critical thinkers, and innovative by focusing on competency-based education models (Daher-Armache et al., 2025). Furthermore, other studies have provided a framework that enables institutions to respond dynamically to educational disruptions by supporting leadership and improving digital infrastructure, with the aim of enhancing resilience and sustainability in the context of digital transformation (Flori et al., 2025). The recent trend toward studying transformational leadership in higher education institutions highlights its importance and ability to respond effectively to rapid changes and increasing challenges, making it a pivotal element in ensuring the success of digital transformation and achieving institutional effectiveness.

Based on the above, the following hypotheses can be proposed:

H1: Digitalisation has a direct effect on knowledge management effectiveness.

H2: Transformational leadership has a direct effect on Digitalisation.

H3: Transformational leadership has a direct effect on knowledge management effectiveness.

H4: Digitalisation mediates the relationship between transformational leadership and knowledge management effectiveness.

### **3. Methodology and tools**

This study relies on the descriptive analytical approach and structural equation modeling to examine the impact of transformational leadership on knowledge management effectiveness and the extent to which Digitalisation plays a mediating role in this impact. The study uses the following tools and methods:

#### **3.1 Study Tool, Sample and Sampling Technique**

This study was conducted using a two-part questionnaire. The first part concerned personal characteristics, and the second part concerned the three study variables. The questions were taken from three previous studies: Items of digitalisation from (Pettersson et al., 2024), Items of knowledge management Effectiveness were adapted from (Sobaih et al., 2025), and Items of transformational leadership from (Carless et al., 2000). The questionnaires were distributed to employees of the University of Mascara in various departments and faculties. Due to difficulties in distribution and the lack of response from many employees to the questionnaire, a convenience sampling method was used, as in many studies, such as the study by (Kaur et al., 2024), the study by (Park et al., 2020) and the study by (Peterson & Merunka, 2014). A total of 122 questionnaires were distributed during the first three months of 2025, and 113 were returned. Of these, 104 were valid for analysis.

#### **3.2 Measurement Methods and Instruments**

The reliability and validity of the study model using Structural Equation Modelling (SEM) were assessed using diverse statistical methods. These methods are based on calculating factor loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE). For evaluating discriminant validity, we used the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. The explanatory ability of the model was evaluated by calculating the coefficient of determination ( $R^2$ ) and effect size ( $F^2$ ). The intensity and direction of the effect between independent and dependent variables were identified using path coefficients, T-values and P-

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values.. Finally, we employed the PLSpredict Analysis to evaluate the predictive capability of the model.

This study used SPSS version 26 to derive descriptive statistics concerning the sizes of industrial enterprises (study sample), as well as to compute the arithmetic mean and standard deviation. At the same time, other statistical analyses were conducted using Smart PLS 4.

## 4. Results

### 4.1. descriptive statistics

Table 1 presents respondents' characteristics, including gender, age, educational level, occupational role, workplace, and years of experience. It reveals that the percentage of women equals the percentage of men. The majority belong to age groups of 31 to 40 and 41 to 50. The majority have a university level (above 65%). Concerning occupational roles, the administrative category has the first rank, at 29.8 %, followed by the service category, which has 30.8 %. The other three categories together total 39.5%. In addition, respondents are distributed as follows: 20.2 % at the faculty of law, 22.1% at the central university administration, 18.3% at the faculty of economics, business and management sciences, 27.9% at the faculty of science, and 11.5% at the main library. Most respondents have more than 10 years of experience, above 70 %. These characteristics show that the respondents are a Homogeneous mixture of men and women. Most respondents are young; They have held administrative and service occupations at diverse faculties for over 10 years.

**Table N°1: Demographic Profile**

Variable	Category	Frequency	Percentage (%)
Gender	Male	52	50.0
	Female	52	50.0
Age	20–30 years	4	3.8
	31–40 years	45	43.3
	41–50 years	40	38.5
	Above 50 years	15	14.4

Variable	Category	Frequency	Percentage (%)
Educational Level	Bachelor's Degree	36	34.6
	Master's Degree	31	29.8
	Doctorate	2	1.9
	Other Academic Qualifications	35	33.7
Occupational Role	Administrative	31	29.8
	Senior Technician	6	5.8
	Service	32	30.8
	Engineer	16	15.4
	Library Staff	19	18.3
Workplace	Faculty of Law	21	20.2
	Central University Administration	23	22.1
	Faculty of Economics, Business and Management Sciences	19	18.3
	Faculty of Science	29	27.9
	Main Library	12	11.5
Years of Experience	Less than 3 years	3	2.9
	3–5 years	9	8.7
	6–10 years	19	18.3
	11 years or more	73	70.2

**Source:** own study.

#### **4.2 Constructs' reliability and validity**

Based on Table 2, The reliability and convergent validity analyses of the three hidden concepts of Digitalisation, knowledge management effectiveness, and transformational leadership show that all data measures are within the acceptable ranges set by methodological literature. For each construct, the Average Variance Extracted (AVE) surpassed the recommended threshold of 0.50, as established by Hair et al. (2019). It was

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clear that the models were correct because Digitalisation had a value of 0.546, Knowledge Management Effectiveness had a value of 0.848, and Transformational Leadership had a value of 0.787. The Composite Reliability (CR) values were more than the minimal value of 0.70 or 0.60 in exploratory research (Hair et al., 2017), ranging from 0.920 to 0.968. That is proof that things are pretty much the same. For Digitalisation, Cronbach's Alpha ( $\alpha$ ) number was 0.916; for Knowledge Management Effectiveness, 0.964; and for Transformational Leadership, 0.954. There was a big difference between these numbers and the accepted amount of 0.70 or 0.60 in exploratory research (Hair et al., 2019). The item loadings for Digitalisation were between 0.661 and 0.818; for Knowledge Management Effectiveness, they were between 0.900 and 0.942; and for Transformational Leadership, they were between 0.759 and 0.939. It means all loadings were higher than the allowed level of 0.70 (Hair et al., 2017), meaning the constructs are valid and convergent. It is clear from these data that the constructs are dependable and valid. It means that they can be used in the proposed theoretical model.

**Table N°2: Constructs' reliability and validity**

Constructs	Outer Loading	$\alpha$	CR	AVE
Digitalisation		0,916	0,920	0,546
DIG1	0,766			
DIG2	0,741			
DIG3	0,682			
DIG4	0,683			
DIG5	0,661			
DIG6	0,686			
DIG7	0,781			
DIG8	0,777			
DIG9	0,794			
DIG10	0,818			
DIG11	0,717			

Knowledge Management Effectiveness		0,964	0,968	0,848
KNE1	0,910			
KNE2	0,929			
KNE3	0,926			
KNE4	0,921			
KNE5	0,900			
KNE6	0,942			
Transformational Leadership		0,954	0,961	0,787
TL1	0,759			
TL2	0,892			
TL3	0,886			
TL4	0,939			
TL5	0,915			
TL6	0,900			
TL7	0,907			

**Source:** Own study

### **4.3 Discriminant validity**

The discriminant validity of the three latent constructs—Digitalisation, knowledge management effectiveness, and transformational leadership—was evaluated using the HTMT ratio and the Fornell-Larcker criterion, as shown in Table 3. With values of 0.493 between Digitalisation and Knowledge Management Effectiveness, 0.569 between Digitalisation and Transformational Leadership, and 0.790 between Knowledge Management Effectiveness and Transformational Leadership, the HTMT values demonstrated adequate conceptual distinctiveness among the constructs. Each number was below the recommended cutoff of 0.85 (Henseler et al., 2016). Each construct's square roots of the Average Variance Extracted (AVE) outperformed its corresponding inter-construct correlations, with values of 0.739 for Digitalisation, 0.921 for Knowledge Management Effectiveness, and 0.887 for Transformational Leadership. It satisfies the Fornell-Larcker criterion for discriminant validity (Fornell & Larcker,

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1981). These results validate the proposed model's robustness and ability to discriminate among the investigated theoretical constructs.

**Table N°3: Discriminant validity**

Constructs	DIG	KNE	TL
HTMT			
Digitalisation			
Knowledge Management Effectiveness	0,493		
Transformational Leadership	0,569	0,790	
Fornell-larker criterion			
Digitalisation	0,739		
Knowledge Management Effectiveness	0,472	0,921	
Transformational Leadership	0,540	0,770	0,887

**Source:** Own study

#### **4.4 Variance inflation factor (VIF) of inner model, $f^2$ and $R^2$**

The inner model's variance inflation factor (VIF), effect size ( $f^2$ ), and coefficient of determination ( $R^2$ ) are all shown in Table 4. The VIF values were between 1.000 and 1.411, which is a lot lower than the proposed limit of 3.3 (Diamantopoulos & Sigauw, 2006). This suggests that the independent variables did not have any concerns with multicollinearity. Transformational leadership has a substantial effect on both Digitalisation (0.411) and knowledge management effectiveness (0.929), according to well-known standards (Cohen, 1988), Digitalisation, on the other hand, did not have much of an effect on how well knowledge management worked, with a  $f^2$  value of 0.011, which suggests it had no effect. The  $R^2$  values for transformational leadership and Digitalisation's capacity to describe how well knowledge management worked were 0.597 and 0.291, respectively. This suggests that they were good at explanations (Hair et al., 2019). These

results indicate how crucial transformational leadership is in the model for changing how well Digitalisation and knowledge management work.

**Table N°4: Variance inflation factor (VIF) of inner model,  $f^2$  and  $R^2$**

Hypothesis	VIF	$f^2$	Category	$R^2$	Category
DIG -> KNE	1,411	0,011	No effect		
TL -> DIG	1,000	0,411	Large effect	0,291	Moderate
TL -> KNE	1,411	0,929	Large effect	0,597	Moderate

**Source:** Own study

#### 4.5 Path coefficient

The significance of the direct and indirect effect was measured based on the results in Table 5 and fig 1, which contain the coefficients ( $\beta$ ), standard deviations (SD), T-values, P-values, and bootstrapped confidence intervals. They show the direct effect of transformational leadership on knowledge management effectiveness and the potential mediation of Digitalisation. The results show that Digitalisation did not have a statistically significant direct effect on how well knowledge management effectiveness worked. The path coefficient was 0.080, the P-value was 0.290, and the T-value was 1.057. Hypothesis H1 was rejected because the 95% CI (-0.062 to 0.231) included zero. On the other hand, transformational leadership had a significant and direct impact on both Digitalisation ( $\beta = 0.540$ ,  $T = 5.316$ ,  $P < 0.001$ ) and knowledge management effectiveness ( $\beta = 0.727$ ,  $T = 9.898$ ,  $P < 0.001$ ). This suggests that the hypotheses H2 and H3 were accepted. The results showed the non-statistical significant effect of transformational leadership on the effectiveness of knowledge management through Digitalisation (mediating path) ( $\beta = 0.043$ ,  $T = 0.920$ ,  $P = 0.357$ ), and hypothesis H4 was rejected. These results show how important transformational leadership is for enhancing Digitalisation and knowledge management effectiveness. However, the model does not support the notion that going digital is a good way to link transformational leadership and knowledge management effectiveness.

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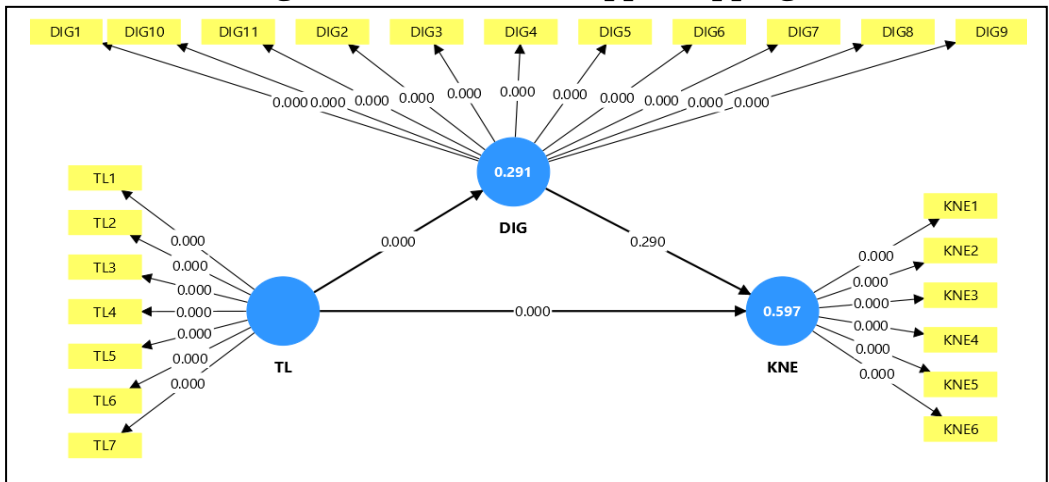
**Table N°5: Path coefficient**

Paths	$\beta$	SD	T value	P value	BC confidence intervals		Decision
					2.5%	97.5 %	
<b>Direct effect</b>							
DIG -> KNE	0,080	0,075	1,057	0,290	-0,062	0,231	H1 Rejected
TL -> DIG	0,540	0,102	5,316	0,000	0,316	0,715	H2 Accepted
TL -> KNE	0,727	0,073	9,898	0,000	0,553	0,845	H3 Accepted
<b>Indirect effect</b>							
TL -> DIG -> KNE	0,043	0,047	0,920	0,357	-0,033	0,150	H4 Rejected

Note.  $\beta$  = Path coefficient, SD= Standard deviation, DIG= Digitalisation, KNE= Knowledge Management Effectiveness, TL= Transformational Leadership.

Source: Own study

**Fig N° 1: The result of bbootstrapping**



Source: Own study

#### 4.6 The predict ability

In Table 6, the results from PLSpredict (Sharma et al., 2021) are summarized and shown, assessing the performance of the model on data not included in the estimation sample. Specifying, we descriptively analyze the PLS-SEM model prediction accuracy against two reference standards, a linear regression model (LM) and an indicator average (IA) method. The predictive quality was measured using  $Q^2_{predict}$ , RMSE, and MAE. At the construct level, the predictive power of the model and the Digitalisation construct yields a  $Q^2_{predict}$  of 0.258, which Shmueli et al. (2019) state surpasses the arbitrary limit of zero, hence having relevance beyond random chance. Similarly, the knowledge management effectiveness construct performed even better, achieving a  $Q^2_{predict}$  of 0.577, which suggests Hair et al. (2019) would regard it as having a solid predictive accuracy. In terms of prediction errors at the level of the indicator, the PLS-SEM model provided lower RMSE and MAE metrics than the LM and IA models, reinforcing the predictions regarding the model’s enhanced predictive capability (Shmueli et al., 2019). As an example, DIG1 reported an RMSE of 1.007 under PLS-SEM while LM and IA models recorded 1.042 and 1.105, respectively, earning a  $Q^2_{predict}$  value of 0.170, supporting modest standing estimation.

**Table N°6: PLSpredict Analysis**

Manifest Variable	PLS-SEM predictive errors of the model			LM predictive errors of the training sample naïve benchmark		IA predictive errors		LV (construct level) PLSSEM prediction summary		
	$Q^2_{predict}$	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE	IA_RMSE	IA_MAE	$Q^2_{predict}$	RMSE	MAE
DIG								0,258	0,88	0,62
DIG1	0,170	1,007	0,815	1,042	0,835	1,105	0,946			

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KNE								0,57 7	0,6 63	0,4 74
KNE 1	0,588	0,715	0,551	0,761	0,560	1,114	0,922			

Note. DIG= Digitalisation, KNE= Knowledge Management Effectiveness, LM: Linear Regression Model, LV: Latent Variable, IA: Indicator Average.

**Source:** Own study

**5. CONCLUSION**

The study's findings reveal the relationship between transformational leadership, digital transformation and the effectiveness of knowledge management in academic institutions. The first key point to make is that it cannot be expected by colleges that knowledge processes will be improved simply by embracing digital technology. The findings of the study imply that the efficacy of knowledge management is not influenced by digital transformation in a statistically significant manner. In accordance with preceding studies, these findings serve to reinforce the notion that knowledge-based strategies and strong leadership are of paramount importance for the enhancement of organisational performance through technological means (Carmo et al., 2025).

Secondly, the results showed that transformational leadership has a big effect on how well knowledge management and digital transformation work, and this shows how important it is for leaders to encourage change in their organisation. This corroborates other studies indicating that transformational leaders foster creativity, information exchange and flexibility in the workplace (Rehman & Iqbal, 2020; Sahibzada et al., 2021).

Finally, there was no evidence that digital transformation mediated the relationship between transformational leadership and the efficacy of knowledge management. This suggests that digital transformation is not a mechanism via which leadership influences knowledge management. On the contrary, knowledge management procedures are immediately improved by transformational leadership. This suggests that management vision and human elements are more crucial than adopting technology when it comes to increasing knowledge results.

It is recommended that higher education institutions allocate resources to developing transformational leadership competencies among administrators and department heads.

It is of utmost importance that institutions give high priority to developing an organizational culture that promotes knowledge sharing, collaboration, and innovation. In this way, the impact of transformational leadership on knowledge management effectiveness and the performance of higher education institutions will be enhanced.

It is essential that staff training programs focus on developing digital competencies and implementing effective knowledge management practices. This strategic approach ensures that employees are equipped with the skills necessary to use technology efficiently, facilitating their active participation in knowledge creation and transfer processes and, consequently, the contribution of digital competencies to the effectiveness of knowledge management.

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