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TECHNOLOGICAL INFRASTRUCTURE AND KNOWLEDGE MANAGEMENT PRACTICES IN ALGERIAN HIGHER EDUCATION

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ABSTRACT

This article aims to examine the contribution of technological infrastructure to knowledge management practices in Algerian higher education institutions. The study began with a review of the relevant literature, which provided the basis for developing a structured questionnaire. A quantitative approach was then adopted, and the questionnaire was administered online to academic staff at several Algerian universities, yielding 105 valid responses. The collected data were analyzed using SPSS v.22. The findings indicate that technological knowledge management infrastructure has a positive and significant effect on overall knowledge management practices, including knowledge creation, storage, transfer, and application. The strongest impact was observed in knowledge storage, whereas the weakest effect was observed in knowledge creation. The study contributes empirical evidence on knowledge management practices in the Algerian higher education context and highlights the strategic role of technological infrastructure in supporting knowledge management. It recommends further investment in digital technologies and collaborative platforms to strengthen organizational learning and academic performance.

1 INTRODUCTION

Since the 1990s, knowledge as an economic resource has become a decisive asset for businesses; as a result, the economy has entered a new era described by Peter Drucker as the post-modern or knowledge era (Prax, 2003). Knowledge management, more commonly known by the acronym "KM", has gradually established its place as a discipline within management and organizational sciences. It has progressively developed to become a field with its own issues, methods, and tools. It encompasses all techniques used to identify, analyze, organize,

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store, and share knowledge among the various members of an organization. This discipline concerns not only explicit knowledge, which can easily be found in documents, but also, and above all, tacit knowledge, which consists of the skills and know-how retained and internalized by an organization's employees.

In the knowledge era, organizational success increasingly depends on the effective use of information and knowledge resources. To remain competitive in a dynamic environment, organizations must learn from past experiences and avoid repeating previous mistakes. KM facilitates this process by enabling the creation, sharing, and application of knowledge. Its role is particularly important in knowledge-intensive organizations, where performance relies heavily on the ability of employees and professionals to generate and utilize knowledge.

Higher education institutions are inherently knowledge-intensive organizations composed of highly qualified experts and academics. As a result, knowledge management has become an increasingly important area of interest within universities, many of which are actively implementing KM-related initiatives to improve learning, research, and organizational effectiveness (Yazdani et al., 2020).

In educational settings, knowledge management can be viewed as a systematic approach that enables teachers to create, share, and utilize knowledge to improve teaching practices and learning outcomes. Beyond facilitating collaboration and resource exchange, KM helps preserve professional expertise, strengthen teaching effectiveness, support knowledge communities, and foster a culture of continuous learning within schools (Cheng, 2013)

According to Sahidi(2026), in higher education, institutional performance largely depends on the effectiveness and well-being of academic staff. Previous studies show that continuous professional development and supportive management practices enhance teaching quality, academic productivity, and overall institutional performance. Recent studies have shown that human knowledge and competencies constitute the organization's intellectual capital and represent the "basic software" component of its knowledge resources. Academic staff play a central role in creating, sharing, and applying knowledge. Therefore, human capital serves both as a means and an objective for building and sustaining an effective knowledge management strategy. By fostering continuous learning, skill development, and knowledge exchange, institutions can strengthen their capacity for innovation, organizational learning, and long-term performance.

Problem Statement

The rapid digital transformation of higher education has positioned technological infrastructure as a fundamental driver of knowledge creation, storage, and dissemination within universities. Modern information systems, collaborative platforms, and digital learning environments increasingly shape how academic communities generate and share knowledge. As institutions rely more heavily on technology to support research, teaching, and administrative processes, understanding its strategic contribution becomes essential.

This raises the question of research**:**

RQ: What is the impact of technological infrastructure on knowledge management in higher education?

The relationship between technological infrastructure and knowledge management practices deserves particular attention in higher education, where knowledge creation, storage, transfer, and application constitute the core of academic and institutional activities. While technological infrastructure provides the tools and systems required to manage knowledge, its actual contribution to these processes may vary across institutional contexts. Therefore, examining this relationship in Algerian higher education is important to determine whether existing technological capabilities effectively support knowledge management practices and, ultimately, contribute to improving institutional learning and academic performance.

2 RESEARCH METHODOLOGY

Previous studies conducted in countries such as Indonesia, Malaysia, India, Nigeria, Mexico, and South Africa further confirm that effective KM practices enhance teaching quality, administrative efficiency, curriculum planning, and organizational performance, even in resource-constrained educational settings (Nkambule, 2023). However, despite this growing body of evidence, empirical research examining how technological infrastructure influences specific knowledge management practices in higher education institutions, particularly in Algeria, remains limited.

This study adopts a mixed research approach combining both theoretical and empirical perspectives. The research is structured into two main parts: a theoretical review of Knowledge Management and its technological infrastructure, followed by an empirical investigation.

The empirical study was conducted within the context of Algerian higher education, focusing on public universities across Algeria. Data were collected through an online structured questionnaire administered to university faculty members. The questionnaire was designed to measure Technological Knowledge Management Infrastructure and Knowledge Management Practices.

The data collected were processed using SPSS v.22 to support the empirical analysis and test the research hypotheses. In the context of higher education, technological infrastructure enables academic institutions to manage large volumes of knowledge and improve collaboration among stakeholders. Systems such as databases, learning management systems, and collaborative platforms contribute to better knowledge dissemination and utilization. Based on this theoretical foundation, it is assumed that technological infrastructure positively influences Knowledge Management practices.

Figure 1 presents the study conceptual model.

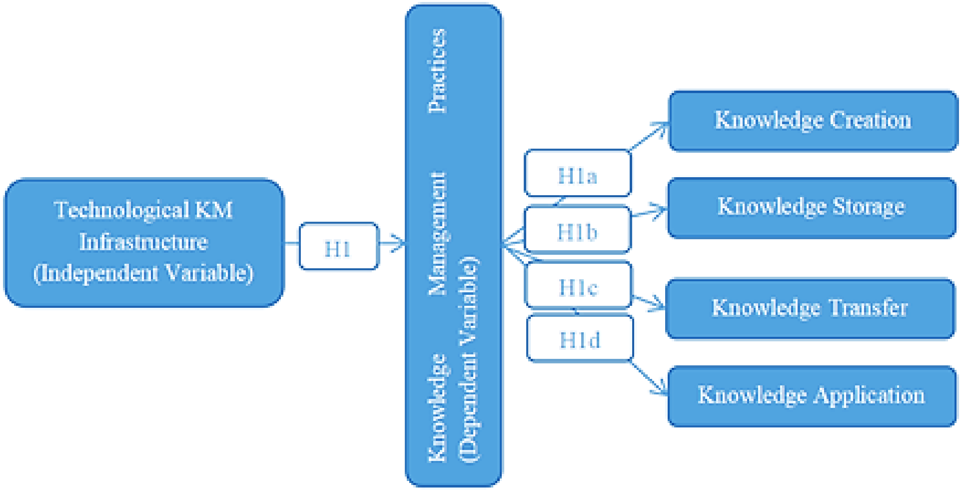

Figure 1. *Conceptual Model of the Study*

Source: Authors' research

Main Hypothesis

H1: Technological Knowledge Management Infrastructure has a positive and significant impact on Knowledge Management Practices.

Sub-Hypotheses

Given that KM practices can be decomposed into several dimensions, the following hypotheses are proposed:

H1a: Technological KM Infrastructure positively influences knowledge creation.

H1b: Technological KM Infrastructure positively influences knowledge storage.

H1c: Technological KM Infrastructure positively influences knowledge transfer.

H1d: Technological KM Infrastructure positively influences knowledge application.

3 THEORETICAL FRAMEWORK

3.1 Definition of KM

Although knowledge management is often perceived as a modern concept, many scholars argue that it represents a new label for practices that information and library professionals have long performed. Over the past decades, KM has evolved into a significant field of study concerned with the creation, development, storage, and utilization of knowledge within organizations.

Beyond its academic dimension, KM provides practical benefits by promoting organizational learning, innovation, and continuous improvement (Ali & Daud, 2015; Taherdoost & Madanchian, 2023)

Knowledge management is defined as a systematic and integrative process of coordinating organization-wide activities of acquiring, creating, storing, sharing, developing, and deploying knowledge, valuable information, and expertise by individuals and groups in pursuit of organizational goals. (Cheng, 2013). Knowledge can also be viewed as a combination of experience, values, contextual information, and intuition that enables individuals to interpret information and make informed decisions. (Aviv et al., 2021)

KM is not only about the mechanical organization of knowledge; nor is it solely about the content or its availability (Dermol, 2011). It is a lot more challenging to define knowledge: it is defined, for example, as a "mix of fluid experiences, values, contextual information and intuition that provides a structure to evaluate and incorporate raw experiences and information. This is why, before going any further, it is essential to understand the meaning of the terms: data, information, and knowledge.

Data constitutes the most basic element of knowledge management and generally refers to raw facts, observations, records, or symbols describing a particular domain of interest. At this stage, data are unprocessed and lack context or interpretation, making them insufficient to support meaningful understanding or decision-making (Wolski & Gomolińska, 2020; Dammann, 2019). Figure 2 displays a framework for transitions from data to knowledge, and what the arrival at each new stage is good for.

Information, on the other hand, is generated when data is processed, organized, and interpreted within a specific context to provide meaning and support decision-making. Rather than being simple answers to questions such as who, what, where, or when, information derives its value from contextualization and interpretation. Therefore, while all information originates from data, data becomes information only after being transformed into meaningful and understandable content (Dammann, 2019; Boell & Cecez-Kecmanovic, 2015).

Evidence, in general, refers to information that supports or verifies the truth of a given proposition based on recognized criteria or standards. The U.S. Office of Management and Budget officially defines evidence as "the available body of facts or information indicating whether a belief or proposition is true or valid" (Salafsky et al., 2019)

In an academic context, information becomes evidence when it can be used to confirm or challenge a specific assumption or research claim. For example, data showing improved teaching performance after the implementation of a digital learning platform may serve as evidence of the effectiveness of technological tools in higher education. When such evidence is consistent, reliable, and supported by analysis, it contributes to the development of valid knowledge.

Knowledge originates from individuals, who serve as the primary creators, holders, and users of knowledge through their experiences, ideas, beliefs, and expertise. However, knowledge extends beyond personal beliefs, as it must be supported by evidence, validated through experience, and consistently demonstrates its usefulness in practice. In this sense, knowledge can be understood as evidence-based understanding that has been tested, shared, and recognized as reliable within a community or organization. (Dammann, 2019; Rezaei et al., 2025)

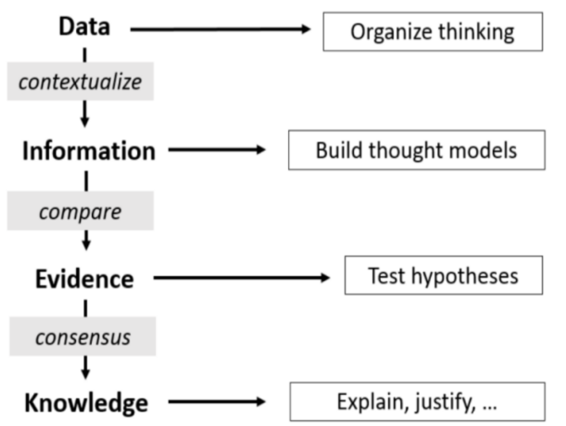

Figure 2. *Framework for the transition from data to knowledge (left) and what each level is good for*
Source: (Dammann, 2019)

Beyond this perspective, knowledge can also be viewed as actionable information enriched by experience and practical application. Unlike information, knowledge involves understanding, judgment, and the ability to make informed decisions based on learning, experience, and contextual interpretation (Idhalama & Ugiagbe, 2021).

3.2 Types of KM

Organizational knowledge consists of accumulated experiences, values, expertise, and contextualized information that support organizational activities and decision-making. It is embedded in both individual and organizational assets, including documents, policies, routines, and procedures, and can be shared through communication, training, learning programs, and other knowledge management practices (Alves et al., 2024).

To better understand organizational knowledge, it is essential to distinguish between its two main forms: explicit and tacit knowledge. Explicit knowledge refers to codified, formalized, and easily articulated knowledge that can be documented, stored, and transmitted through various media such as manuals, reports, textbooks, and databases (Idhalama & Ugiagbe, 2021). It is also understood as knowledge that can be reported and used for reasoning or justifying behavior (Weinberger & Green, 2022). Because it is accessible and structured, this form of knowledge supports reasoning, decision-making, and learning, while its effective use depends largely on its perceived usefulness and relevance (Zhang, 2026). In contrast, tacit knowledge is highly personal and experience-based, encompassing individual skills, expertise, beliefs, insights, and mental models. Unlike explicit knowledge, it is difficult to articulate, codify, or transfer, as it resides mainly in individuals and is acquired through experience and practice (Adesina & Ocholla, 2024; Oranga, 2023). Although distinct, explicit and tacit knowledge are complementary, as effective organizational knowledge management requires the interaction of both forms to facilitate knowledge creation, sharing, and application (Idhalama & Ugiagbe, 2021).

According to Sultan et al. (2017), the effectiveness of tacit knowledge transfer depends on its degree of tacitness. Their framework suggests that experts should first assess how tacit knowledge is and then select the most appropriate transfer method. Less tacit knowledge can be communicated through formal documentation, whereas highly tacit knowledge requires more interactive and experience-based approaches. Figure 3 illustrates how tacit knowledge can be transformed into explicit knowledge using different knowledge extraction methods.

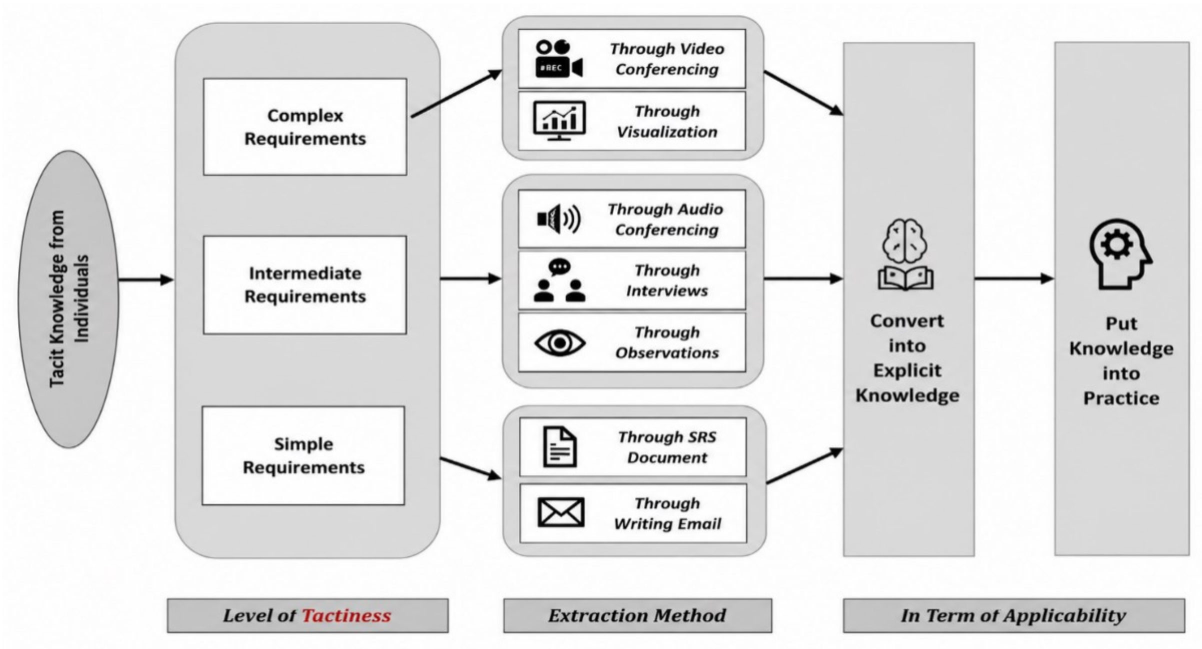

Figure 3. *The two categories of Knowledge*

Source: (Sultan et al., 2017)

3.3 KM Practices

Knowledge management creation: Goi et al. (2023) describe the cyclic knowledge management model as a continuous process involving knowledge creation, storage, transfer, and application through successive stages of identification, collection, distribution, utilization, and updating. Within this cycle, knowledge creation represents the first and fundamental stage. It involves developing new knowledge or enriching the organization's existing explicit and tacit knowledge base, primarily through research and development (R&D) (Donate & de Pablo, 2015). Thus, knowledge is created when there is a transformation of tacit knowledge of individuals into explicit knowledge at the group and organizational level, and each member of such groups internalizes it, making it tacit knowledge again (Martínez-León et al., 2011).

Knowledge management storage: Storage is considered one of the factors of big data analytics in enabling knowledge management practice (Rafhi & Rahman, 2017). While organizations create knowledge and learn, they may forget or lose track of their acquired knowledge. Thus, KM storage activities, which include the organization, structuring, and retrieval of organizational knowledge, allow the firm to maintain an organizational memory, which encompasses knowledge that resides in various forms such as written documentation, information stored in electronic databases, codified human knowledge stored in expert systems, documented organizational procedures, and processes or tacit knowledge acquired by individuals and networks of individuals (Donate & de Pablo, 2015).

Knowledge management transfer: KM transfer activities permit organizational members to share, disseminate, and replicate information, spreading this information to locations that need and can put to good effect the company's existing knowledge. To do so, the organization should establish communication channels, which may be informal, formal, personal, or impersonal. (Donate & de Pablo, 2015). Knowledge transfer refers to the process through which knowledge and experience are shared among individuals, groups, and organizational units, resulting in changes in knowledge or performance. It occurs at multiple organizational levels and plays a vital role in disseminating expertise while ensuring the protection of valuable organizational knowledge (Pereira et al., 2021).

The effectiveness of knowledge transfer depends on employees' willingness to collaborate, exchange expertise, and learn from one another. By facilitating the sharing of best practices, organizational learning, and service improvement, effective knowledge transfer contributes significantly to overall organizational performance (Kejžar et al., 2023).

Knowledge management application: knowledge application implies the integration of knowledge from different sources to develop organizational capability through mechanisms based on routines, norms, or decision-making in specific situations. KM application practices should thus focus on making the integration and application of existing knowledge to organizational activities and problem solving easier and more effective for the firm. (Donate & de Pablo, 2015). Overall, the literature consistently demonstrates that knowledge management application has become a strategic approach for improving educational performance.(Nkambule, 2023)

3.4 Technological KM Infrastructure

Knowledge management is inherent to the core missions of higher education institutions, including teaching, research, and community service. To remain competitive in the knowledge economy, HEIs must adopt structured KM strategies that facilitate knowledge creation, sharing, and transfer. Effective KM systems enhance institutional performance by supporting research, teaching, administration, and strategic decision-making while promoting the management of both tacit and explicit knowledge. Within this context, knowledge in HEIs comprises both academic and organizational knowledge, which is generated and shared by faculty members, students, researchers, and administrators to improve institutional effectiveness (Baptista Nunes et al., 2017). Successful management of this knowledge requires an appropriate technological infrastructure capable of supporting knowledge-related activities.

Technology refers to the availability of reliable information technology infrastructure that facilitates knowledge sharing and collaboration (Alves et al., 2024). Likewise, Gold et al. (2001) emphasize that technology represents a fundamental component of organizational infrastructure by integrating information and knowledge flows, improving communication across departments, and supporting knowledge creation, storage, and sharing. Therefore, organizations should invest in comprehensive technological infrastructures that effectively support critical knowledge management processes. By strengthening these capabilities, technological infrastructure contributes to the development of intelligent organizations that are capable of operating efficiently, adapting to environmental changes, and leveraging knowledge to improve innovation and organizational performance. Such organizations are characterized by operational flexibility, continuous environmental scanning, the ability to detect early signals of change, and the capacity to develop and implement knowledge-based solutions that generate sustainable value (Adamczewski, 2018).

In higher education, these technological capabilities are increasingly supported by digital learning approaches. The Learning Organization emphasizes personal mastery, shared vision, team learning, and systems thinking, whereas Connectivism highlights the importance of digital networks and collaborative environments for continuous learning and knowledge exchange (Romero-Ochoa et al., 2025). In the same context, Open Educational Practices (OEP) promote openness, accessibility, and collaborative learning by enabling educators and students to co-create, adapt, and share educational resources through digital platforms. Likewise, information and communication technologies (ICT) enhance teaching, communication, course management, and access to educational resources through tools such as email, discussion forums, videoconferencing, and digital repositories, thereby fostering innovative and flexible learning environments (Romero-Ochoa et al., 2025).

Nevertheless, technological infrastructure alone cannot ensure effective knowledge management. Its success largely depends on the people who create, share, and apply knowledge within the institution. In higher education, knowledge is primarily generated through human expertise, research, teaching, innovation, and continuous learning (Dhamdhere, 2015). Accordingly, qualified and experienced academic staff constitute the primary drivers of knowledge creation and sharing. Effective human resource management practices, including recruitment, training, and continuous professional development, strengthen KM capabilities, improve research performance, and enhance educational quality (Santos et al., 2024). Furthermore, trust, a supportive organizational culture, and appropriate incentive mechanisms encourage knowledge sharing and strengthen research collaboration across higher education institutions (Dermol, 2011).

Previous studies have highlighted the important role of technological infrastructure and ICT in supporting knowledge management in higher education institutions. Omona et al. (2012) demonstrated that ICT can facilitate knowledge creation, sharing, and dissemination in higher education, emphasizing the role of technological tools as enablers of KM processes. Similarly, studies on knowledge management in higher education have emphasized the importance of technological infrastructure, databases, communication networks, and digital platforms in supporting institutional knowledge processes. Alves et al. (2024), focusing on a public higher education institution, further showed that organizational and technological factors can contribute to the development of KM practices. More recently, Bouaissa et al. (2025), in the Algerian university context, examined the relationship between digital transformation, knowledge management, and educational performance. Although these studies provide valuable evidence on the role of technology in knowledge management, limited attention has been given to the specific contribution of technological infrastructure to the four core KM dimensions: knowledge creation, storage, transfer, and application, among academic staff across Algerian universities. This gap provides the basis for the present study, which empirically examines this relationship in the Algerian higher education context.

4 RESULTS AND DISCUSSION

The empirical data for this study were collected through a structured online questionnaire administered to academic staff from several Algerian universities. The survey was distributed online over the period from November 7, 2025, to January 30, 2026, resulting in a total of 105 valid responses.

The questionnaire was composed of three main sections. The first section gathered general information. The second section focused on measuring the dependent variable, Knowledge Management Practices, and consisted of 20 items covering key dimensions; this section was adapted from the scale developed by María Jesús Donate and Juan Diego Sánchez de Pablo (2015). The third section aimed to assess the independent variable, Technological Knowledge Management Infrastructure, through 7 items adapted from the work of Andrew H. Gold, Arvind Malhotra, and Albert H. Segars (2001). All items were measured using a five-point Likert scale. The data collected were analyzed using SPSS v22 to support empirical analysis and test the research hypotheses.

Table 1. Results of the Cronbach's Alpha Coefficient

Variables	Items	Alpha de Cronbach
All Items	27	0.942
Creation	5	0.816
Storage	5	0.783
Transfer	5	0.803
Application	5	0.815
Technological KM Infrastructure	7	0.874

Source: Authors' results obtained from SPSSv22

The reliability test shows that the measurement instrument used in this study is highly consistent. Overall Cronbach's alpha for all 27 items is 0.942, which indicates excellent internal consistency. This means that the questionnaire items are strongly coherent and suitable for measuring the study constructs. At the dimensional level, the alpha coefficients are also satisfactory. The values are 0.816 for knowledge creation, 0.783 for knowledge storage, 0.803 for knowledge transfer, 0.815 for knowledge application, and 0.874 for technological KM infrastructure. Overall, these results support the stability and credibility of the instrument adopted in the empirical part of the study.

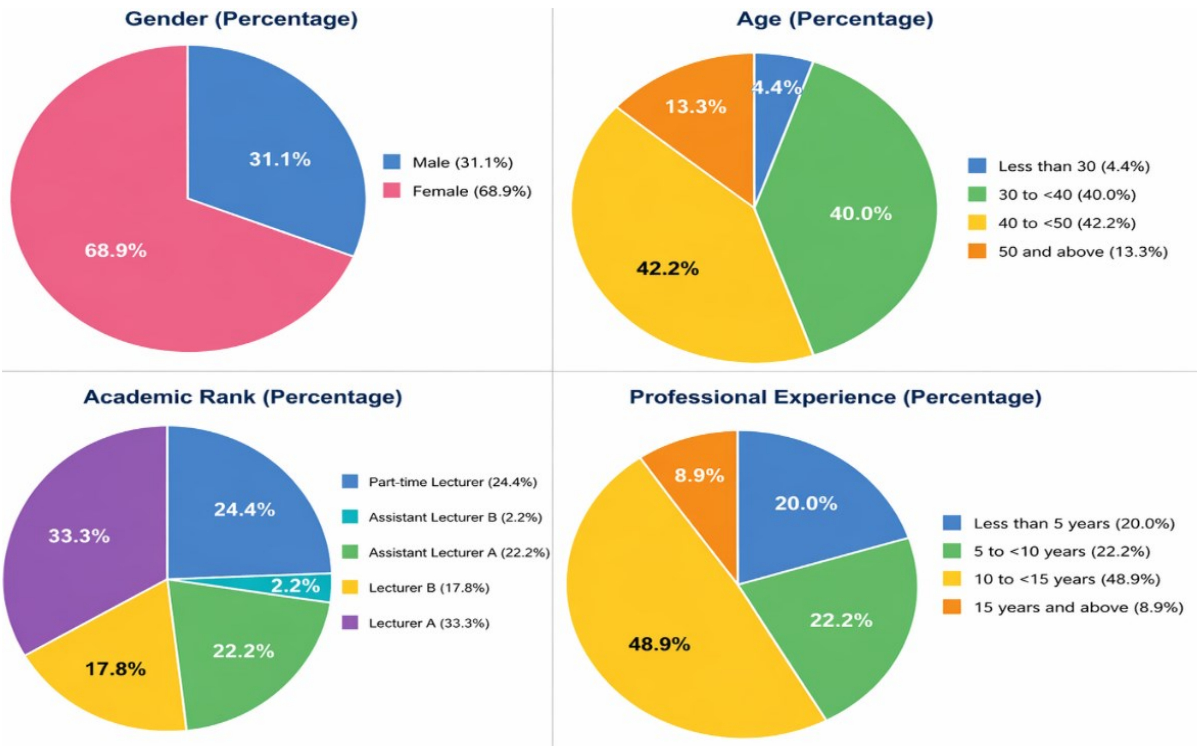

Figure 4. General information

Source: Authors' results obtained from SPSSv22

The demographic results in Figure 4 indicate that the sample is dominated by female respondents, who represent 68.9% of the participants, while males account for 31.1%. Regarding age, the largest group belongs to the 40 to less than 50 years category with 42.2%, followed by the 30 to less than 40 years category with 40.0%. Respondents aged 50 years and above represent 13.3%, whereas those under 30 years old account for only 4.4%. This distribution suggests that the sample is mainly composed of mature academics in the middle stages of their careers. In terms of academic rank, the most represented category is Lecturer A with 33.3%, followed by Part-time Lecturers with 24.4%, and Assistant Lecturer A with 22.2%. Lecturer B represents 17.8%, while Assistant Lecturer B accounts for only 2.2%. This profile indicates that the sample includes a broad range of academic positions, although senior and intermediate ranks are more represented. As for professional experience, the largest proportion of respondents falls within the 10 to less than 15 years category, representing 48.9% of the sample. This is followed by 5 to less than 10 years with 22.2%, and less than 5 years with 20.0%. Only 8.9% of respondents have 15 years of experience and above. These findings show that most participants have a moderate to substantial level of professional experience, which strengthens the relevance of their responses.

Table 2. *What is the level of awareness of knowledge management practices and technological infrastructure among academic staff in Algerian universities?*

What is the level of awareness of knowledge management practices and technological infrastructure among academic staff in Algerian universities?	Mean	Standard Deviation	Rank
Creation	4.0889	0.81191	High
Storage	3.8578	0.91216	High
Transfer	3.3111	0.90006	Moderate
Application	3.8533	0.82396	High
Technological KM Infrastructure	3.6000	0.90433	High

Source: Authors' results obtained from SPSSv22

The data in Table 2 shows that four out of the five dimensions, namely knowledge creation (M = 4.08), knowledge storage (M = 3.85), knowledge application (M = 3.85), and technological KM infrastructure (M = 3.60), with mean scores ranging from 3.60 to 4.08, indicated that respondents agreed on a high level of knowledge management practices and technological support within the institution, while the remaining dimension, knowledge transfer (M = 3.31), indicated a moderate level of agreement. The overall mean scores suggest that, on the whole, respondents perceive a strong presence of knowledge management practices, although knowledge transfer remains comparatively less developed. The standard deviation values for all dimensions range from 0.81 to 0.91, indicating that respondents' opinions are relatively consistent and not widely dispersed.

Table 3. *Pearson Correlation Matrix of Study Variables*

Variables	1	2	3	4	5	6
1. KM Practices	1	0.872 (p < .001)**	0.904 (p < .001)**	0.865 (p < .001)**	0.881 (p < .001)**	0.660 (p < .001)**
2. Creation	0.872 (p < .001)**	1	0.732 (p < .001)**	0.628 (p < .001)**	0.732 (p < .001)**	0.477 (p < .001)**
3. Storage	0.904 (p < .001)**	0.732 (p < .001)**	1	0.725 (p < .001)**	0.713 (p < .001)**	0.737 (p < .001)**
4. Transfer	0.865 (p < .001)**	0.628 (p < .001)**	0.725 (p < .001)**	1	0.676 (p < .001)**	0.591 (p < .001)**
5. Application	0.881 (p < .001)**	0.732 (p < .001)**	0.713 (p < .001)**	0.676 (p < .001)**	1	0.502 (p < .001)**
6. Technological KM Infrastructure	0.660 (p < .001)**	0.477** (0.001)	0.737 (p < .001)**	0.591 (p < .001)**	0.502 (p < .001)**	1

Note: ** Correlation is significant at the 0.01 level (2-tailed).

Source: Authors' results obtained from SPSSv22

Table 3 presents the Pearson correlation matrix for the study variables. The results indicate that all variables are positively and significantly correlated, with correlation coefficients ranging from 0.477 to 0.904. The significance levels are below 0.01 for most relationships, indicating statistically significant associations between the variables.

The correlation between overall Knowledge Management (KM) Practices and Technological KM Infrastructure is positive and statistically significant ($r = 0.660$, $p < 0.001$). This indicates a moderate-to-strong positive relationship, suggesting that higher levels of technological infrastructure are associated with greater implementation of KM practices.

Table 4. *Simple Linear Regression Analysis*

Hypothesis	Relationship Tested	Bêta	R^2	F	Sig.	Decision
H1	Tech KM Infrastructure → KM Practices	0.660	0.436	33.189	$p < 0.001$	Supported
H1a	Tech KM Infrastructure → Creation	0.477	0.227	12.644	0.001	Supported
H1b	Tech KM Infrastructure → Storage	0.737	0.543	51.165	$p < 0.001$	Supported
H1c	Tech KM Infrastructure → Transfer	0.591	0.349	23.099	$p < 0.001$	Supported
H1d	Tech KM Infrastructure → Application	0.502	0.252	14.457	$p < 0.001$	Supported

Source: Authors' results obtained from SPSSv22

According to the results in Table 4:

- Technological KM infrastructure has a positive and significant effect on KM practices ($\beta = 0.660$, $p < 0.05$; $R^2 = 0.436$).
- Technological KM infrastructure has a positive and significant but moderate effect on knowledge creation ($\beta = 0.477$, $p < 0.05$; $R^2 = 0.227$).
- Technological KM infrastructure has a strong and significant effect on knowledge storage ($\beta = 0.737$, $p < 0.05$; $R^2 = 0.543$).
- Technological KM infrastructure has a positive and significant effect on knowledge transfer ($\beta = 0.591$, $p < 0.05$; $R^2 = 0.349$).
- Technological KM infrastructure has a positive and significant effect on knowledge application ($\beta = 0.502$, $p < 0.05$; $R^2 = 0.252$).

Taken together, the regression findings show that technological KM infrastructure significantly affects all dimensions of knowledge management as well as KM practices overall. However, the strength of this effect varies across dimensions.

The strongest impact is found on knowledge storage ($\beta = 0.737$), followed by knowledge transfer ($\beta = 0.591$), knowledge application ($\beta = 0.502$), and finally knowledge creation ($\beta = 0.477$). This distribution reveals that technological infrastructure is especially effective in supporting technical and system-based KM processes, particularly the storage and organization of knowledge. By contrast, knowledge creation appears to depend not only on technological resources but also on human, organizational, and cultural factors such as creativity, collaboration, motivation, and academic freedom. In this sense, technology serves as a strong enabler of KM, but its influence is not equally strong across all KM dimensions.

The results of the simple linear regression analysis also allow the estimation of the regression equations associated with the study variables. Table 5 presents the estimated regression equations illustrating the relationship between technological KM infrastructure and each dependent variable of the study, namely knowledge management practices, knowledge creation, storage, transfer, and application.

In the regression equations shown in Table 5, ε_i denotes the random error term capturing the influence of factors not included in the regression model.

Table 5. *Estimated Simple Linear Regression Equations of the Study Variable*

	Estimated Regression Equation
Tech KM Infrastructure → KM Practices	KM Practices = 0.554 · Tech KM Infrastructure + 1.783 + ε_i
Tech KM Infrastructure → Creation	Creation = 0.428 · Tech KM Infrastructure + 2.548 + ε_i
Tech KM Infrastructure → Storage	Storage = 0.744 · Tech KM Infrastructure + 1.181 + ε_i
Tech KM Infrastructure → Transfer	Transfer = 0.588 · Tech KM Infrastructure + 1.193 + ε_i
Tech KM Infrastructure → Application	Application = 0.456 · Tech KM Infrastructure + 2.208 + ε_i

Source: Authors' results obtained from SPSSv22

As a further step, this study will employ hierarchical regression analysis to examine the following question: Does technological KM infrastructure remain a significant predictor of knowledge management practices after controlling demographic variables such as gender, age, academic rank, and professional experience?

Table 6. *Hierarchical Regression Results Predicting Knowledge Management Practices*

Model	Predictors Entered	R	R^2	ΔR^2	F / F Change	Sig.	Significant Predictor (s)
Model 1	Gender, Age, Academic Rank, Professional Experience	0.467	0.218	0.218	F = 2.792	0.039	None
Model 2	Gender, Age, Academic Rank, Professional Experience + Technological KM Infrastructure	0.670	0.449	0.231	F Change = 16.370	$p < 0.001$	Tech KM Infrastructure ($\beta = 0.692$, $p < 0.05$)

Variables	Model 1		Model 2	
	t	Sig.	t	Sig.
Gender	1.822	.076	-0.182	.856
Age	-1.567	.125	-0.302	.764
Academic Rank	0.751	.457	0.794	.432
Professional Experience	-0.428	.671	0.228	.821
Tech-KM-Infra	—	—	4.046	.000

Note: In Model 2, technological KM infrastructure emerged as the only significant predictor, while all demographic variables remained non-significant. No multicollinearity issue was detected (VIF = 1.309–2.071).

Source: Authors' results obtained from SPSSv22

In Model 1, the results show that these variables jointly explain 21.8% of the variance in KM practices ($R^2 = 0.218$), and the model is statistically significant ($F = 2.792$, $p = 0.039$). However, none of the individual demographic predictors reached statistical significance, indicating that their collective effect is relatively weak. In Model 2, the explanatory power increased substantially to 44.9% ($R^2 = 0.449$), meaning that the inclusion of technological infrastructure added an extra 23.1% of explained variance ($\Delta R^2 = 0.231$). This change is highly significant (F change = 16.370, $p < 0.05$), confirming that technological infrastructure provides substantial additional explanatory power beyond demographic characteristics.

Regarding individual predictors in Model 2, technological KM infrastructure emerged as the only significant predictor of KM practices ($\beta = 0.692$, $t = 4.046$, $p < 0.05$). In contrast, gender, age, academic rank, and professional experience all became non-significant predictors ($p > 0.05$). Furthermore, multicollinearity diagnostics indicate no serious collinearity problem, as all VIF values range between 1.309 and 2.071, which are well below the critical threshold.

Overall, these findings demonstrate that technological KM infrastructure remains a strong and robust determinant of KM practices even after controlling demographic factors. This result reinforces the central argument of the study that technology plays a decisive role in enhancing knowledge management within higher education institutions.

5 CONCLUSIONS

The present research sheds light on the contribution of technological infrastructure to knowledge management in the Algerian higher education context. The findings provide evidence that technological infrastructure has a positive and significant effect on the four dimensions of KM: knowledge creation, storage, transfer, and application. Among these dimensions, knowledge storage showed the strongest effect, highlighting the importance of digital repositories, institutional databases, learning management systems, and other digital platforms for preserving and organizing academic knowledge. In contrast, the weaker effects observed for knowledge creation, transfer, and application suggest that technology alone is insufficient and should be complemented by organizational and human factors such as collaboration, leadership, motivation, and knowledge-sharing practices.

These findings also contribute to addressing a gap in the existing literature. Previous research has generally examined ICT and digital transformation from a broad perspective, while the specific contribution of technological infrastructure to distinct KM processes remains less explored. In particular, empirical evidence simultaneously addressing knowledge creation, storage, transfer, and application among academic staff in Algerian higher education remains limited. By examining these four dimensions within the Algerian public higher education context, this study provides a more comprehensive view of how technological infrastructure supports KM practices. However, the study has some limitations. First, the relatively small sample size may limit the generalizability of the findings. Second, the focus on university faculty perceptions excludes other important stakeholders, such as students, administrators, and external partners, whose perspectives may provide additional insights into KM practices. Finally, the use of self-reported data may introduce response bias, as participants' perceptions may not fully reflect actual KM practices within their institutions.

A key contribution of this study lies in its empirical examination of KM among academic staff from different Algerian universities. The findings highlight the need to move beyond knowledge storage toward mechanisms that strengthen knowledge creation, transfer, and application. In particular, strengthening knowledge transfer requires effective mechanisms for converting tacit knowledge embedded in academics' experience and expertise into explicit knowledge that can be documented, shared, and reused. Overall, the study confirms that technological infrastructure represents a strategic enabler of KM and provides a foundation for strengthening knowledge-based practices in Algerian higher education.

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