World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 50, September, 2025
ISSN: 2749-3628

THE IMPORTANCE OF TECHNOLOGICAL CREATIVITY IN ENHANCING KNOWLEDGE MANAGEMENT AND COMPETITIVE ADVANTAGE AS A DEFENSIVE DIMENSION IN PRODUCTIVE COMPANIES-AN APPLIED STUDY AT THE GENERAL COMPANY FOR GAS FILLING AND SERVICES - BABYLON BRANCH

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Article history:
Received: 20th July 2025
Accepted: 14th August 2025

Abstract:
A company's ability to withstand competition is closely linked to improved information technology and effective knowledge management. These elements are essential to enhancing an organization's ability to maintain and grow its competitive advantage. This study aims to examine the impact of technological innovation on enhancing knowledge management and an organization's competitive advantage.
This study, which used knowledge management as an intervening variable, relied on a field survey methodology, with the participation of department heads and employees at the Sadah Gas Plant in Babil Governorate. The sample size was (100) individuals. Data were collected using a questionnaire and analyzed using SPSS to assess the relationships between variables. The results indicate that technological innovation has a significant positive impact on knowledge management.
These findings underscore the importance of adopting robust IT and knowledge management practices, alongside improving IT infrastructure, as key strategies for boosting a company's competitive edge. Consequently, the laboratory should prioritize investments in knowledge management systems and IT infrastructure to strengthen its position in the market.

Keywords: Technological creativity - Knowledge Management - Competitive Advantage - Sadah Gas Plant

1. INTRODUCTION

Companies seek to achieve knowledge advantages over their competitors, not just reactive ones. Knowledge is a fundamental resource that intersects with competitive advantages. Information technology is a key element in analyzing the competitive advantages that can be achieved through adopting IT (Douiri et al., 2020).
To improve how competitive businesses and public organizations are, it's important to put into place good knowledge management along with managing skills that match what the organization needs and what it is good at. This kind of knowledge needs to be planned and carried out carefully. (Williams Jr et al., 2021) The way organizations interact with different stakeholders takes a lot of time and is complicated. "(Eray et al., 2021) So, when knowledge is handled properly, it can really help in enhancing the organization's competitive advantage. (Azeem et al., 2021)".
"Managers regard knowledge as a fundamental resource that propels the organization forward, helping it sustain competitiveness and effectiveness in the marketplace "(Azeem et al., 2021b)". When an employee leaves, the organization must" acknowledge the significant loss of critical knowledge they carry with them, which plays a vital role in its" success (Serenko, 2022)".
Information technology and knowledge management play a significant role in strengthening competitive advantage by impacting critical success factors such as "new product development, innovation, and technological capabilities within" an organization. These aspects serve as vital contributors to fostering organizational growth and progress.
Information technology and knowledge management are primarily approaches "that can be integrated into business practices, whether they focus on technology or product development (Idris et al., 2023). However, the role of information technology is critical to the effectiveness of any knowledge management initiative. Information technology creates the foundation, or enterprise architecture, that facilitates the creation and organization of knowledge within an organization (Kotusev & Kurnia, 2021).

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This research aims to explain the importance of information technology in knowledge management and define the importance of information technology (Lam et al., 2021)".
The researchers selected the Baghdad Institute of Education as the study's subject due to its ongoing commitment to enhancing knowledge management and increasing its competitiveness in line with evolving business trends.
It aims to develop the competencies of its employees and build a professional and highly skilled workforce, which represents a key advantage and enhances the Institute's competitiveness and successfully maintains its presence in Baghdad.
In this context, this research aims to explore the most important technological information in enhancing knowledge management and competitiveness.

2- ROLE TECHNOLOGICAL CREATIVITY IN KNOWLEDGE MANAGEMENT

Information technology serves as a cornerstone in the creation, analysis, storage, transfer, and sharing of knowledge. As highlighted by (Vusumzi Neville Funda in 2019), the IT industry provides valuable tools and technologies that aid in gathering information, analyzing available data, and improving organizational knowledge. With the capabilities offered by IT applications, organizations can efficiently collect, transfer, and distribute information.
IT stands out as a significant enabler of knowledge management processes, enhancing how organizations acquire, process, and apply knowledge to boost overall operational efficiency. In today's dynamic and competitive environment, the continuous advancement and evolution of IT systems have propelled various business applications and knowledge management strategies forward. Innovations such as internet technologies, digitalization, and automation across business operations contribute significantly to refining and supporting knowledge management activities.
Knowledge management involves an array of tasks and processes that require specialized technologies to fulfill specific objectives. The progress in IT has notably expanded the storage capacity of computers and servers, facilitating the analysis of large data sets and enabling the generation of reliable insights from substantial quantities of information .
Recognizing the strategic value of IT, top management increasingly focuses on leveraging its potential to uncover new opportunities and gain a competitive edge. Information technology enables seamless integration of data systems, helping organizations identify diverse prospects. Strategic IT systems further empower management by supporting long-term growth initiatives while mitigating competitive pressures and adapting to changes within the organization's microenvironment. "(Wu J., Lo M.F., Ng A.W, 2019)".

3. KNOWLEDGE MANAGEMENT AND COMPETITIVE ADVANTAGE

"Knowledge management consists of several processes including the production of new knowledge, making knowledge accessible from external sources, applying knowledge in processes, products or services, transferring existing knowledge in the organization, applying existing knowledge in decision making and knowledge management impact (Masadeh et al., 2017)".
Because of the difficulties that organizations face in the knowledge economy, they are always pushed to operate in a manner that preserves their competitive edge "(Kasemsap, 2015; Torres et al., 2018)". They must learn to distinguish between implementing and applying growth strategies simultaneously, which may be either for the long haul or for a shorter duration; knowledge management strategies are aimed at being long-lasting and effective (Bazrkar et al., 2018). It is important to foster both innovation and risky ventures in a balanced way. Intense rivalry, shifts in technology, changes in customer preferences and needs, along with the emergence of new business models compel organizations to reassess their activities and processes, particularly in terms of knowledge management "(Nowacki & Bachnik, 2016)". Many organizations primarily concentrate on addressing issues and shortcomings in their systems and processes to improve their effectiveness and ultimately remain competitive in the global trading landscape "(Bazrkar & Iranzadeh, 2017)".

4-KNOWLEDGE MANAGEMENT APPLICATIONS

The four key applications of knowledge management focus on the fundamental goal of distributing knowledge across the organization. This ensures that every individual or team can grasp the information with enough depth and just the right amount of context to effectively utilize it for "decision-making and driving innovation These four applications of knowledge management are":

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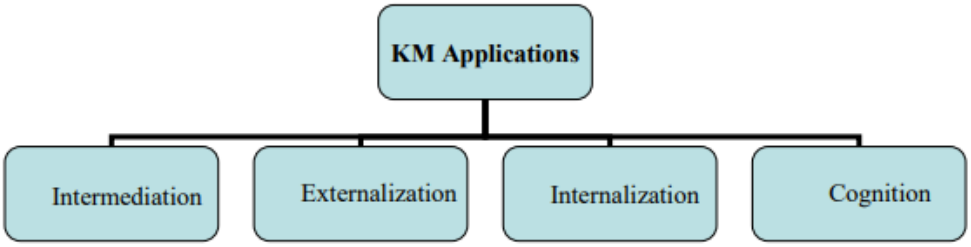

Figure.1: Types of four KM Applications

These applications span across all areas of knowledge, ranging from explicit to tacit understanding. While each application is designed with a specific focus, its effectiveness is achieved through integration with the others.

RESEARCH MODEL AND HYPOTHESES5-

According to the theoretical foundations of the research and identifying the main variables of the research, the conceptual model of the research and the hypotheses proposed below have been formulated

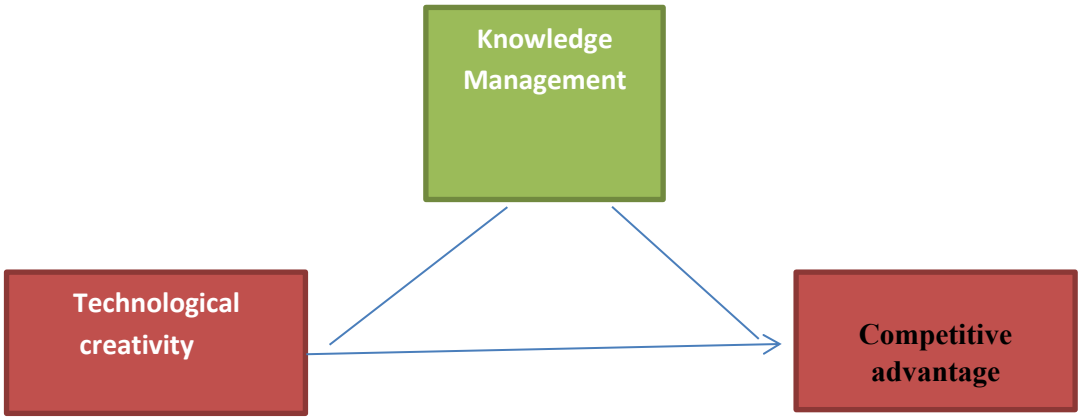

Figure.2 Research model and hypotheses

H-1 The Impact of Technological creativity on Competitive Advantage through Knowledge Management as a Mediating Variable.
H2-The Impact Technological creativity on Knowledge Management
H3-The Impact of Technological creativity on Competitive Advantage
H4-The Impact of Knowledge Management on Competitive Advantage

6- MATERIALS AND METHOD

"Research type, data collection method, and population"

This study relied on a descriptive survey approach to collect data, describe the variables required in the statistical sample under study, and develop applied knowledge about the quality of relationships and the impact of three variables: information technology, knowledge management, and competitive advantage. The study's statistical community consisted of managers of administrative units and information technology employees at the (Al-Saddah Gas) Plant in Babil Governorate.

The data collection method relies on survey techniques, through the direct distribution of questionnaires. Questionnaires are used in the form of pre-prepared written questions that participants are required to answer, usually with "clearly defined options "(Sekaran & Bougie, 2017)". In this study, employees' responses were recorded using a "Likert scale". The population is a generalizable area consisting of elements" with specific characteristics and attributes for the study, and thus conclusions can be drawn (Sugiyono, 2003).

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The sample in this study was taken from the workers in the (Al-Saddah gas) plant, so that the total number of respondents reached (200) individuals due to the administrative position and work in the field of technology in the information and communications department in the plant, which provides the information required for the study.

7- ANALYSIS AND FINDINGS

The company is one of the most important pillars of the Ministry of Oil, and aims to contribute to supporting the national economy in the oil sector "by operating gas plants, filling liquefied gas cylinders, and supplying gas to consumers" in full. The company currently owns (44) outlets for supplying liquefied gas to vehicles, and (23) workshops for adding the system in Baghdad and all governorates.

Image (1) Al-Saddah Gas Plant

We explained the demographic characteristics of the survey participants, who numbered (200) individuals, and to obtain a comprehensive view of the research results, the gender, age, and educational level of the workers were examined.

Table (1) shows the frequency and percentage by gender

Gender		Frequency	Percent
Valid	Male	79	79
	Female	21	21
	Total	100	100.

The table above shows that the majority of the study population are males (79%) and females (21%).

Table (2) shows the frequency and percentage for age

Age		**Frequency**	**Percent**
Valid	20-29	11	11
	30-39	40	40
	40-49	45	45
	50-60	4	4
	Total	100	100.0

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The table above shows that the majority of the study population are aged (40-49) (45. %).

Table (3) shows the frequency and percentage of educational level

educational level		Frequency	Percent
Valid	High School	30	30
	Diploma	22	22
	Bachelor's degree	45	45
	Postgraduate	3	3
	Total	100	100

The table above shows that the majority of the sample members hold a Bachelor's degree.(45. %).

8-RELIABILITY MEASUREMENT

"Reliability measurement using the Average Variances Extracted (AVE) method and composite reliability which measures a construct can be evaluated with two kinds of measures, namely internal consistency and Cronbach's alpha. It is explained in table 4 that the value or coefficient of Average Variances Extracted (AVE), internal consistency and Cronbach's alpha of The variables of knowledge management, Technological creativity , and competitive advantage are all greater than 0.70 and can therefore be declared reliable".

Table 4 AVE and Composite Reliability, (N=100)

Variables	AVE	Internal Consistency	Cronbach Alpha	Description
The importance of Technological creativity	0.74	0.79	0.89	Reliable
Knowledge Management	0.73	0.80	0.80	Reliable
Competitive advantage	0.77	0.79	0.86	Reliable

Source: Data processed, 2025

9-TEST OF MULTICOLLINEARITY

shows the results of multicollinearity using the variance inflation factor (VIF)Test of Multicollinearity

Table 5 the results of multicollinearity using the variance inflation factor (VIF)Test of Multicollinearity

Variables	Variance Inflation Factors(VIF)
The importance of Technological creativity	1.67
Knowledge Management	1.55
Competitive advantage	1.68

The multicollinearity test is performed by looking at the value of the full linear variance coefficient, as shown in Table 5, where all the values of the full linear variance coefficient for the variables of "knowledge management, Technological creativity , and competitive advantage are less than 2.5", and therefore, the model is valid for using the regression process.

10-TESTING HYPOTHESIS

"Based on the guidelines established by Baron and Kenny (1986), several conditions must be met to assess the presence of mediation. These conditions include": the significant impact of Technological creativity on competitive advantage, and the significant impact of knowledge management on Technological creativity .

. Technological creativity plays a crucial role in shaping competitive advantage. Complete mediation takes place when the presence of a mediating variable ensures that knowledge management continues to have a significant influence on competitive advantage. Table 6 illustrates that the path coefficient for the impact of information technology reveals a significant effect on competitive advantage, validating the full mediation observed in this study. Consequently, Hypothesis H1 is confirmed.

Table 6 Path Analysis Results

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Testing Hypothesis	Path Analysis	P-value	t-statistics	Verification
H1	The Impact Importance of Technological creativity - Knowledge Management Competitive Advantage	0.02	8.182	Accepted
H2	The importance of Technological creativity knowledge management	0.010	2.205	Accepted
H3	The Impact of Technological creativity Competitive Advantage	0.04	4.726	Accepted
H4	The Impact of Knowledge Management Competitive Advantage	0.016	2.732	Accepted

* and ** are significant at 5% and 1%, respectively

The findings outlined in Table 6 highlight the positive influence of Technological creativity on both knowledge management and competitive advantage, as evidenced by a standardized coefficient of 0.02, thereby supporting the first hypothesis. Furthermore, the importance of Technological creativity demonstrates a noteworthy positive impact on knowledge management, reflected in a standardized coefficient of 0.10, which validates the second hypothesis . Additionally, the significant role of Technological creativity in shaping competitive advantage is confirmed with a standardized coefficient of 0.04, supporting the validity of Hypothesis 3. Similarly, the relationship between knowledge management and competitive advantage is verified, with a standardized coefficient of 0.016 affirming Hypothesis 4.

11-CONCLUSION AND RECOMMENDATION

Knowledge management involves a range of processes such as generating new insights, accessing knowledge from external sources, and integrating this knowledge into processes, products, or services.

The results of this study indicate that Technological creativity has a positive impact on enhancing knowledge management and competitive advantage, with a standard coefficient of (0.02). Thus, the first hypothesis was confirmed.

Technological creativity plays a crucial role in enhancing knowledge management, as evidenced by its positive impact with a standardized coefficient of 0.10. This finding supports the confirmation of the second hypothesis.

We advise the management of the Sadah Gas Plant to focus on increasing its focus on information technology and knowledge management to meet the demands of the labor market.

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