Arabian Gulf Journal of Humanities and Social Studies

ISSN: 3080-4086

Vol 5 - Issue 13 || Issued Date: 20-04-2026

Digital Transformation And Its Impact On Enhancing Green Innovation: The Innovative Work Environment As A Mediating Variable

An Exploratory Study Of The Opinions Of A Sample Of Employees In Public And Private Banks In Basra Governorate

التحول الرقمي واثره في تعزيز الابتكار الاخضر بيئة العمل الابتكارية متغيرا وسيطا دراسة استطلاعية لاراء عينة من العاملين في المصارف الحكومية والخاصة في محافظة البصرة

Esraa Ali Madhloom Al-Mansouri [1] - Ass. Prof. Dr Layla Laftah Ali[2]

الاستاذ المساعد الدكتور ليلى لفته علي - الباحثة اسراء علي مظلوم

Management Technical College, Southern Technical University, Iraq

DOI: https://doi.org/10.64355/agjhss51324

Abstract:

In light of the increasing challenges facing modern institutions, many organizations have adopted digital transformation strategies with the aim of improving environmental performance and promoting sustainable practices through a work environment that fosters innovation.

This study aims to identify the impact of digital transformation, with its various dimensions, on green innovation, through the mediating role of the innovative work environment. The study was conducted on Sample of public and private bank of Basra Governorate To achieve this objective, the descriptive-analytical method was adopted, and a questionnaire was designed and distributed to a sample of 150 employees, of which 131 were retrieved, achieving a response rate of 87.3%.

The results of the statistical analysis revealed a high level of awareness among the banks regarding the importance of digital transformation and its dimensions, as well as its role in enhancing green innovation.

The study recommended that banks should focus on vision and strategic planning, and develop clear digital strategies that reflect management directions and contribute effectively to performance improvement.

Keywords: Digital Transformation, Green Innovation, Innovative work Environment.

الملخص:

في ظل التحديات المتزايدة التي تواجه المؤسسات الحديثة، اعتمدت العديد من المنظمات استراتيجيات التحول الرقمي بهدف تحسين الأداء البيئي وتعزيز الممارسات المستدامة من خلال بيئة عمل تُحفّز الابتكار.

تهدف هذه الدراسة إلى التعرف على أثر التحول الرقمي بأبعاده المختلفة في الابتكار الأخضر، من خلال الدور الوسيط لبيئة العمل الابتكارية. وقد أُجريت الدراسة على عينة من البنوك الحكومية والخاصة في محافظة البصرة. ولتحقيق هذا الهدف، تم اعتماد المنهج الوصفي التحليلي، حيث صُممت استبانة ووزعت على عينة مكونة من 150 موظفًا، تم استرجاع 131 منها، بنسبة استجابة بلغت 87.3%.

وأظهرت نتائج التحليل الإحصائي وجود مستوى عالٍ من الوعي لدى البنوك بأهمية التحول الرقمي وأبعاده، وكذلك دوره في تعزيز الابتكار الأخضر.

وأوصت الدراسة بضرورة تركيز البنوك على الرؤية والتخطيط الاستراتيجي، وتطوير استراتيجيات رقمية واضحة تعكس توجهات الإدارة وتسهم بفعالية في تحسين الأداء.

الكلمات المفتاحية : التحول الرقمي، الابتكار الأخضر، بيئة العمل الابتكارية.

Introduction

In light of the rapid developments taking place in the world of digital business and the increasing reliance on technology to quickly adapt to environmental changes, institutions have begun to enhance their ability to sustain and compete. Digital transformation has become a crucial component of institutional strategies aimed at developing services, improving overall performance, and advancing operational efficiency.

Digital transformation contributes to accelerating business processes and completing tasks in a shorter time. In other words, the shift from traditional operations to digital operations has become essential for institutions—including banks—in order to automate tasks, reduce errors, and preserve customer confidentiality. It also increases the ability to process data and utilize artificial intelligence technologies, which leads to time-saving and greater flexibility in banking operations.

Industrial companies, various administrative bodies, educational institutions, the financial sector, and others are all witnessing digital changes that significantly impact them. The financial sector, in particular, is considered one of the main drivers of digital economic development, ranking second only to the telecommunications sector.

The core process of digital transformation in financial service systems is embodied in financial technology (FinTech)—a revolutionary wave of innovation introduced by new market entrants that challenge the position of traditional financial institutions. Specifically, retail banks were at the forefront of this technological revolution, which was marked by the rapid deployment and innovation of digital services, an intense pace of change, and groundbreaking developments that have reshaped traditional banking practices.

One of the main problems facing the banking sector is that traditional financial service providers have not yet fully implemented comprehensive digitization. As a result, they often offer an incomplete set of services and encounter strategic and operational obstacles in the digital transformation process, unlike more established digital service providers (Diener & Špaček, 2021:2.)Amid these developments, institutions are also facing environmental challenges, which has led to growing interest in green innovation as a means to improve environmental performance and reduce the negative impacts of institutional activities. In this context, providing a work environment that is stimulating and innovative has become increasingly important .It acts as an influential factor in strengthening the relationship between digital transformation and green innovation by encouraging employees to be creative and embracing new ideas within a stimulating organizational environment.

The selection of this topic stems from the importance of digital transformation across all sectors, particularly the banking sector, in order to keep pace with global developments and address environmental and societal challenges by adopting digital solutions aligned with modern changes. By implementing this concept, a massive amount of data and information will be generated, which can support decision-makers in banks to improve strategic vision, enhance strategic planning, boost operational efficiency, improve customer experience, gain the trust of investors and customers, reduce paper usage, and provide electronic services that increase customer loyalty.

Based on the above, the study aimed to explore the nature of the relationship between digital transformation and green innovation, as well as their impact on evaluating the innovative work environment, within a sample of both public and private banks in the province.

One of the main challenges faced by the researcher was the difficulty in obtaining responses from the banks to fill out the questionnaire, due to concerns related to the confidentiality and privacy policies of the banks. This required an increased number of field visits, which demanded significant effort in terms of time and cost. Nevertheless, the determination to reach results that could be generalized across the banking sector in Basra Governorate served as the primary motivation behind this endeavor.

This study recommends that bank management adopt strategic planning mechanisms to monitor the progress of their strategic vision and focus on vision and strategic planning through the development

Arabian Gulf Journal
Humanities and Social Studies

of clear digital strategies. These strategies should reflect the direction of bank management and enhance their operations effectively.

The present study aimed to examine the role of digital transformation in the banks under study, in addition to assessing the extent to which green innovation is achieved as a dependent variable through the mediating role of the innovative work environment. The goal is to build a conceptual model that enables the achievement of the core objective, which is to identify the extent to which the management of the studied banks is aware of the concept of digital transformation and the level of its availability.

Chapter One: Study Methodology

This chapter discusses the research methodology, which represents the field path of the study and the scientific approach used to define the research problem in order to achieve its objectives and clarify its significance. The chapter includes an overview of the study methodology, covering the following components: (problem, objectives, significance, ...), as follows:

First: Research Problem

The world today is witnessing a rapid acceleration in technological developments, which has led to the reinforcement of the concept of digital transformation as a fundamental strategy for improving institutional performance, particularly in service sectors such as banking. Banks are increasingly facing challenges related to enhancing the efficiency of banking services, such as providing digital services and implementing electronic payment methods, among others.

Accordingly, the problem of this study lies in analyzing the impact of digital transformation on enhancing green innovation in the context under study, while examining the mediating role of the innovative work environment in this relationship. The study aims to explore the interactive relationships among these variables and identify ways to maximize the benefits of digital transformation.

Hence, the research problem can be formulated in the following main question:

To what extent does digital transformation impact the enhancement of green innovation through the mediating role of the innovative work environment in the banks under study?

From this main question, several sub-questions emerge:

1. To what extent is the management of the banks aware of the concept of digital transformation, and what is the level of its implementation?
2. What is the availability level of digital transformation dimensions (technology, digital strategy, digital transformation culture) in the banks under study?

Second: Research Objectives

The main objective of this research is to identify the extent of the impact of digital transformation on green innovation, as well as the quality of the innovative work environment as a mediating variable. This is achieved through a set of sub-objectives:

1. To determine the extent to which the management of the bank under study understands the concept of digital transformation and the level of its availability.
2. To explore the availability of the dimensions of digital transformation in the banks.

Third: Research Significance

The significance of this study lies in its exploration of emerging concepts in modern management, particularly in the fields of digital transformation, green innovation, and the quality of the innovative work environment. The study offers both scientific and practical value, which can be highlighted as follows:

1. The study contributes to building knowledge and practical insights that assist the top management of the organization under study in recognizing modern tools and technologies that can help it become a successful organization
2. The scarcity of studies, to the best knowledge of the researcher, that combine the three variables (digital transformation – green innovation – quality of the innovative work environment).

Fourth: Research Methodology

The study adopted the descriptive-analytical approach, where the descriptive approach refers to the process of describing and defining the research variables and their dimensions. This was done by relying on the scientific and intellectual foundations presented by various researchers, based on theoretical literature relevant to the study variables. Furthermore, the study explores the relationships between the variables as identified in previous research, using both Arabic and foreign sources, and according to the chronological development of the related concepts.

Fifth: Research Hypotheses

The main hypotheses of the study contribute to solving the research problem and achieving its objectives by examining the relationships among the study variables. The study is based on a number of hypotheses, as follows:

Main Hypothesis (H1): There is a statistically significant correlation between digital transformation and green innovation.

Main Hypothesis (H2): There is a statistically significant impact of digital transformation on green innovation.

Main Hypothesis (H3): There is a statistically significant indirect impact of digital transformation on green innovation through the mediating role of the innovative work environment.

Sixth: The Hypothetical Research Model

The study provides a comprehensive framework of the research variables in their overall form to measure both correlation and causal relationships, either separately or collectively. This model reflects the research problem and the objectives expected to be achieved.

The model consists of the independent variable, represented by digital transformation, which is addressed through the following dimensions:

(Technology , Digital Strategy , Digital Transformation Culture) The mediating variable is the quality of the innovative work environment, which includes the following dimensions: (Leadership ,Work Practices

,Physical Work Environment)

The dependent variable is green innovation, which comprises the following dimensions:Green Products, Green Processes, Technological Innovation ,Environmental Innovation

Figure (1) illustrates the hypothetical research model.

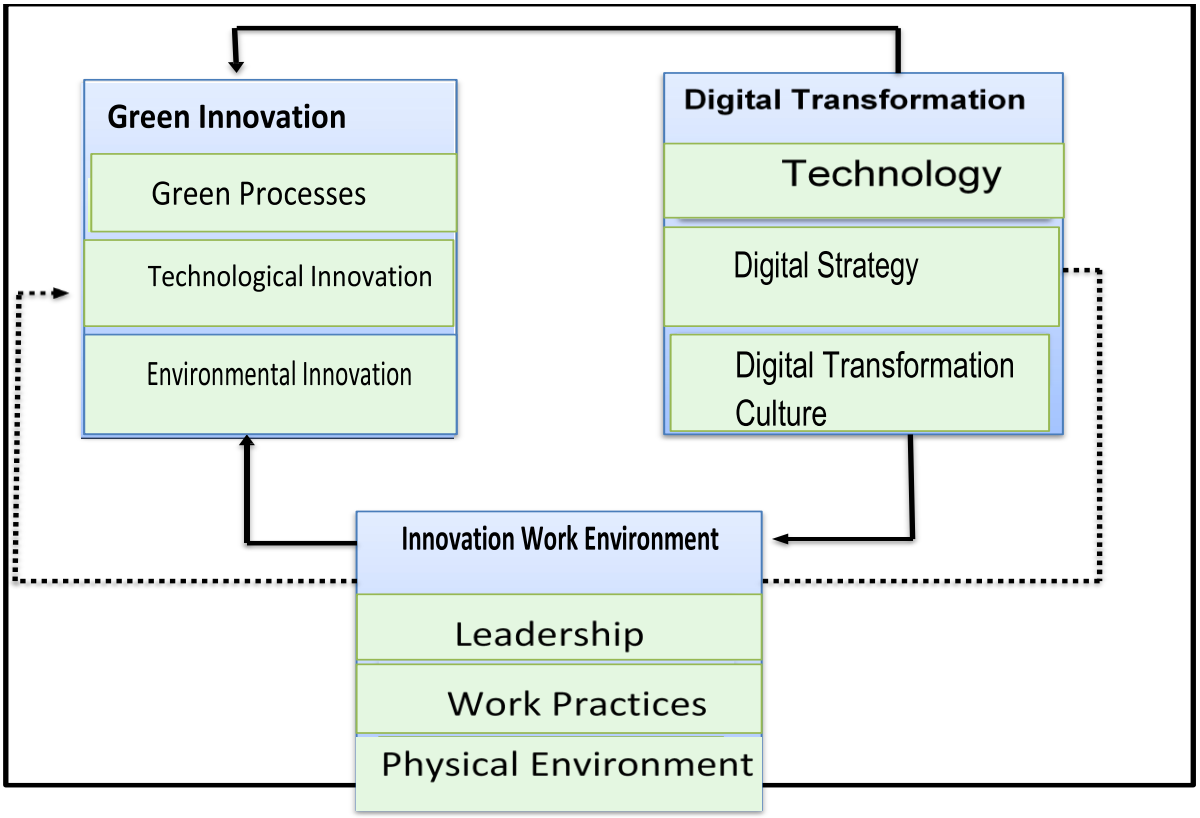


Figure (1): The Hypothetical Research Model

Source: Prepared by the Researcher

Seventh: Study Population and Sample

Given the critical importance of the banking sector in which this study is conducted, and in order to test the research hypotheses in a practical manner, a sample of both public and private banks in Basra Governorate was selected as the field for conducting the study. The study population consists of employees working in these banks, who fall into four main categories: managers, department heads, division officers, and administrative staff. Due to the diversity of these categories and the differing roles they play in the work environment, a purposive sampling method was adopted. Individuals with relevant experience and knowledge related to the study topics were deliberately selected to ensure balanced and effective representation of all components of the studied community. This approach enhances the reliability of the findings and their potential for generalization.

Eighth: Study Boundaries

1. Subject Boundaries:The study focuses on three main variables: Independent Variable , Digital Transformation Mediating Variable, Innovative Work Environment Dependent Variable, Green Innovation.
2. Spatial Boundaries:The study is limited to a sample of public and private banks in Basra Governorate, namely :Al-Rafidain Bank, Al-Rasheed Bank, Cihan Bank for Investment and Finance, Iraqi National Bank, Development Bank, and Baghdad Bank.
3. Human Boundaries:The study includes employees from the aforementioned banks holding various functional positions, namely: managers, department heads, division officers, and administrative staff. These individuals were selected using purposive sampling, ensuring the inclusion of various perspectives relevant to the study topic.
4. Temporal Boundaries:The study covers the period dedicated to data collection and analysis, leading to the formulation of results. This period spans from March 1, 2025, to June 1, 2025.

Ninth: Data Collection Sources

The study relied on several tools for data and information collection to comprehensively address the research topic:

1. Theoretical Aspect :The theoretical aspect was covered through both Arabic and foreign sources available in public and electronic libraries. These included books, theses, dissertations, and academic journals. Additionally, the researcher utilized the international internet network to access research papers, conference proceedings, and articles relevant to the research topic.
2. Practical Aspect :The study employed several tools as follows:Unstructured Interviews:

A. Interviews were conducted with a number of managers, department heads, division supervisors, as well as administrative staff affiliated with the organization under study. These interviews took place with members of the research sample and others involved in the matter both before and during the distribution of the questionnaire. The purpose was to collect additional information and respond to inquiries related to the questionnaire items.

B. Questionnaire:The questionnaire was the primary tool used to collect data related to the practical aspect of the study, with the aim of testing the research hypotheses and reaching conclusions. A

five-point Likert scale was adopted, ranging from (5) Strongly Agree to (1) Strongly Disagree, to measure respondents' answers.The questionnaire consisted of three main sections :Section One: Presented personal information of the respondents.Section Two: Included the main questionnaire items. This section contained:

- Digital Transformation Dimensions (Items 1–19), with 6 items for each dimension.
- Innovative Work Environment Quality Dimensions (Items19–37), with 6 items for each dimension.
- Green Innovation Dimensions (Items 37–54), also with 6 items for each dimension.

Chapter Two: First Section

Digital Transformation

1.2 The Concept of Digital Transformation

Digital transformation is an integral part of any organization's strategy to adapt to changes and enhance service quality in a creative manner. According to (Reis & Melao , 2023), digital transformation is defined as a process that encodes or converts analog tasks and information into a digital format, allowing computers to store, process, or transmit information without altering the value-generating activities.(Akter et al. 2024) define digital transformation as a process aimed at improving an entity by making significant changes to its characteristics through a combination of information, computing, and communication technologies.(Kahveci 2025) describes it as a radical change achieved by creating new business designs through the application of digital technologies. The researcher defines digital transformation as the utilization of technological methods and the information and communication revolution to enhance competitive advantage by streamlining processes and improving service quality.

Dimensions of Digital Transformation

Digital transformation relies on three key dimensions that help banks deliver effective value to customers, as follows:

1. Technology: Digital transformation heavily depends on technology. The impact of emerging technologies on changing organizational structures and design has been the subject of many studies. These studies aim to identify the opportunities and challenges posed by emerging digital technologies. To achieve tangible gains in business performance, optimal use of IT investments is required. As a result, digital technologies not only contribute to the development of new business models but also serve as a communication channel between companies, stakeholders, and customers. Organizations can utilize these technologies to automate many of their operations, expand or redefine their traditional business models.(Kraus et al., 2021: 9)

2. Digital Transformation Culture: Numerous studies have proven that the extent to which contemporary information technologies are adopted and used efficiently is directly linked to the success of digital transformation in the cultural domain. Given the recognized impact of culture on the development of IT, its developers, mechanisms, and users, the importance of cultural orientations in supporting digital transformation efforts has long been emphasized. In the current digital age, leaders must consider the cultural dimension not only at the organizational level but also across the wider ecosystem, including partners and the surrounding environment. Neglecting the cultural aspects of digital transformation can significantly hinder the success of such initiatives in traditional institutions. A culture that does not align with digital transformation requirements demands the strengthening of integration and trust within the company and among its partners, all of whom operate with modern technologies and digital platforms .(Butt et al., 2024: 6). The application of digitization has led to a fundamental transformation in organizational culture, including the values, beliefs, attitudes, and behaviors that shape an institution's identity. In today's dynamic and evolving market environment, it has become essential for organizations to recognize the deep impact of digital transformation on their internal culture, thereby enhancing their adaptability and long-term success. One of the key features of this transformation is the shift in communication methods, where digital tools such as email, instant messaging, and video conferencing have replaced traditional face-to-face interactions. This has facilitated faster and more accessible information exchange, while still necessitating the preservation of human connection and the sense of belonging within the workplace .(Deep et al., 2023: 1).

3. Digital Strategy:

Digital strategy is defined as "an organizational strategy that is developed and implemented by leveraging digital resources with the aim of creating differential value".

In light of the accelerating challenges organizations face in the digital environment, thoughtful strategic thinking becomes a crucial starting point for navigating the digital race. According to (Turuk 2020: 64), developing a digital strategy is based on three main components:

- The ability to systematically plan future digital activities, ensuring that the organization has a clear and structured roadmap for its digital initiatives.
- The ability to effectively implement those activities in alignment with the evolving dynamics of the technological environment, ensuring operational efficiency and adaptability.
- The ability to quickly respond to digital opportunities and threats, thereby maintaining the organization's position within the competitive landscape.

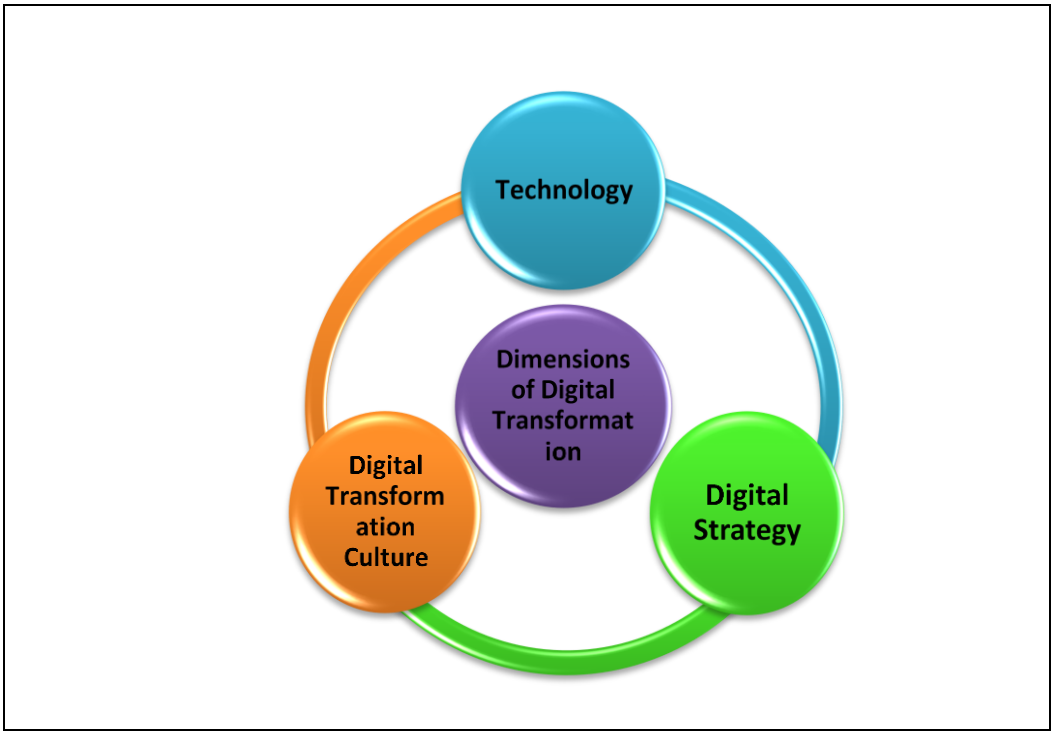


Figure (2) illustrates the dimensions of digital transformation

Source: Prepared by the researcher

Section Two: The Innovative Work Environment

2.3.2 The Concept of Work Environment and Innovative Work Environment

A- Work Environment :The work environment is defined as "everything surrounding the employee that affects their ability to perform assigned tasks." According to the organization's vision and mission, the workplace is "a space where multiple teams exist, supported by the necessary facilities to achieve goals." Employees feel comfortable in their workplace, which influences their level of engagement and may motivate them to perform better due to the encouraging atmosphere.(Badrianto & Ekhsan, 2019: 65)

B- Innovative Work Environment: The term "innovative work environment" refers to a specific type of environment that fosters creative thinking and innovative work. It is a workplace that encourages employees to adopt new ways of thinking and promotes a culture that supports innovation.(Abun et al., 2023: 381)

Dimensions of Innovative Work Environment:

Researchers differ in defining the exact dimensions of an innovative work environment, as these dimensions vary depending on the nature and size of the work and the employees within each organization. However, they all agree on the common goal of implementing such environments —

which is to satisfy individual needs, enhance their satisfaction and creativity, and ultimately help the organization achieve success. In light of this, the dimensions of the variable "Innovative Work Environment" can be addressed as follows:

- **Leadership:** Leadership is viewed as the ability to motivate, empower, or influence others to work toward the success and effectiveness of the organization. It is the individual's ability to turn visions into realities. Leadership is fundamentally about the influence one has on others — it is a process through which an individual can impact others to maximize their efforts in achieving shared goals. Leadership has always been a topic of enduring importance, both in the past and for the future. It refers to a social influence process by which leaders seek to motivate and empower their followers to contribute toward collective objectives. Leaders are seen as dynamic and visionary individuals who formulate a clear strategy for the future and inspire others to follow it. Those who inspire, engage, or encourage others through their actions are recognized as leaders, regardless of their formal titles. (Liden et al., 2025)

- **Work Practices:** Work teams have become an urgent necessity due to the volume of administrative tasks in organizations and the rapid changes in the business environment. Teams are essential for enabling communication and collaboration among group members who aim to work together and support one another.

  Teamwork involves a group of individuals leveraging the diverse human resources available in the organization — including various skills and knowledge — to perform unified tasks that contribute to achieving the organization's goals and employee satisfaction.Work teams are composed of employees with a high degree of autonomy who share a common goal and collectively make decisions to achieve it through unified collaboration. Today's organizations rely on work teams that embrace a culture of creativity. (Sheran et al., 2024: 97)

- **Physical Environment:** The physical environment includes various elements that directly or indirectly impact overall health and well-being. Several aspects of the physical work environment — such as air and water quality, noise pollution, exposure to hazardous materials, housing conditions, indoor spaces, and access to open/green spaces and recreational areas — all contribute to human health. Therefore, gaining a comprehensive understanding of how these elements interact with behaviors and health outcomes is critical. (Yang et al., 2024: 1)

Arabian Gulf Journal
Humanities and Social Studies

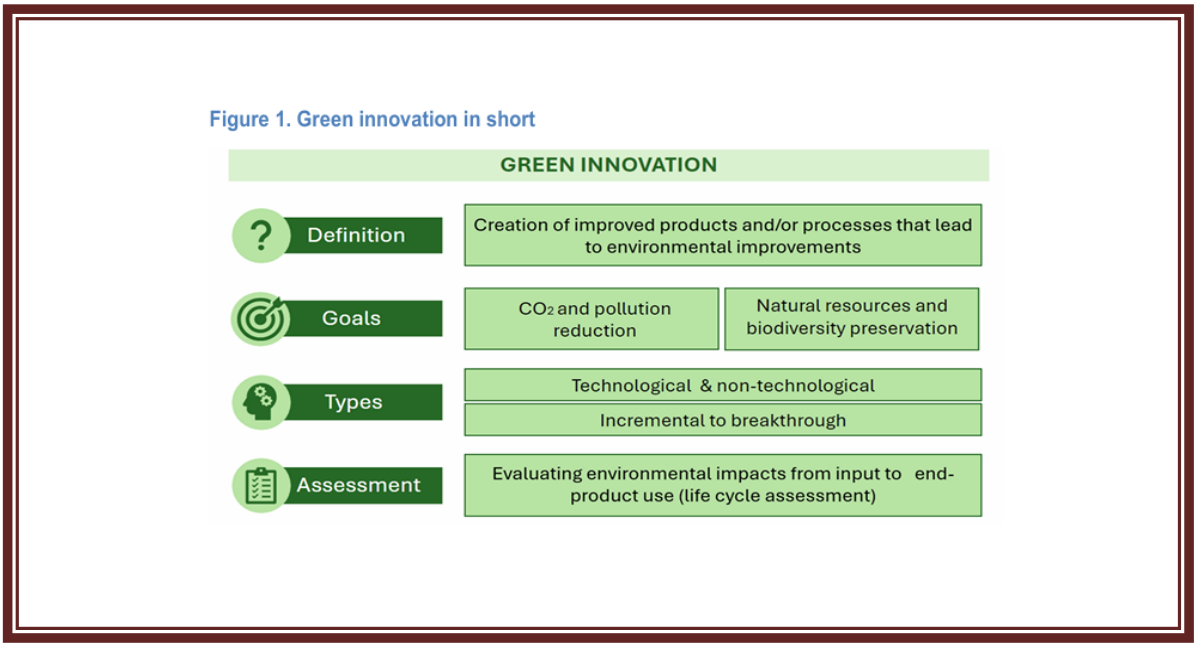
Chapter Three: Green Innovation

The Concept of Green Innovation

Green innovation refers to the process of developing sustainable products and processes through the use or adoption of environmentally friendly raw materials during the stages of manufacturing or design (Guinot et al., 2022). It is defined as the development of new products, processes, or technologies that protect the ecological environment by combating pollution, recycling waste, conserving energy, and reducing emissions (Liana et al., 2022)

Green innovation has also been defined as a process that contributes to the development of operations, products, and services aimed at reducing negative environmental impact. It minimizes waste and harmful emissions, improves energy consumption, and integrates sustainability with economic performance, thereby enhancing competitive advantage.

Figure (3): An Overview of Green Innovation



Paunov, C., Rochell, C., Labrue, L., & Planes-Satorra, S. (2025). What is unique about green innovation?: Evidence from green hydrogen, green steel, batteries and electric vehicles (No. 2025/05). OECD Publishing.

Dimensions of Green Innovation

Green innovation aims to achieve sustainable development and is considered one of the modern concepts for adopting environmentally friendly technologies and business practices. It is an urgent necessity in light of economic and environmental challenges. Researchers such as Li et al. (2022: 4) and Rodrigues & Franco (2023: 3) agree that green innovation can be analyzed through the following key dimensions:

1. Green Process Innovation :

Due to increasing environmental pressures, investment in infrastructure has become one of the most strategic tools for achieving environmental success in organizations and communities. In the past, environmental activities were not deemed necessary investments. However, strict environmental regulations now aim to change environmental realities and competitive patterns in organizations that are environmentally conscious. Top management support—through aligning and implementing knowledge management with organizational performance—is an essential factor in developing green processes. This includes building resources and capabilities, as well as fostering a green corporate culture among employees and managers. Establishing a Green Management System (GMS) and enhancing its performance are fundamental components in this context.Moreover, the organizational framework—commonly referred to as "regulatory pressure"—is one of the essential influences on environmental policies. Regulations and customer requirements have been identified as key factors influencing the adoption of green processes (Takalo et al., 2021: 5)

2. Green Technological Innovation:

With the aim of reducing environmental pollution and conserving energy and resources, green innovation in institutions involves improving technologies and processes. Replacing conventional technologies with new ones can yield additional environmental benefits, such as adopting waste treatment or eco-friendly recycling processes. This shift can significantly reduce pollution emissions and improve resource efficiency. Moreover, the development and accumulation of new technologies can lead to changes in organizational management policies and promote green awareness and sustainability concepts.

3. Green Environmental Innovation:

Green innovation is not limited to internal activities within the organization, as technologies, products, and institutions alone cannot fully represent its scope. Studies have shown that green innovation has external spatial effects, with a particular focus on environmental impact. Some scholars argue that green innovation is synonymous with ecological innovation, sustainable innovation, and environmental innovation. This study identifies green environmental innovation as one of the key dimensions of green innovation within an organization. It emphasizes that these external impacts and effects are reflected in the direct performance of green innovation, which serves as a measure of the extent and contribution of green innovation efforts by the institution.

Chapter Three: Statistical Analysis Methodology as a Practical Framework for the Study

Introduction:

In the previous chapters, the theoretical foundations and conceptual frameworks of the study variables and their dimensions were thoroughly discussed. Based on that foundation, this chapter aims to empirically validate those concepts and theories. This represents a critical and fundamental step in verifying the accuracy of the proposed hypotheses and the perspectives offered by previous studies, specifically within the population and sample of the study in the Iraqi context (both public and private

Arabian Gulf Journal
Humanities and Social Studies

banks in Basra Province To address the research problem practically, it is essential to collect data directly from the field. This step is crucial for building conclusions and offering realistic recommendations grounded in scientific and empirical evidence. Accordingly, a questionnaire was used as the primary data collection tool, employing the five-point Likert scale to examine the nature of the relationships between the variables:Digital Transformation as the independent variable,Green Innovation as the dependent variable, Quality of Innovative Work Environment as the mediating variable.The hypotheses were tested using a set of statistical software programs, including SPSS v.25, AMOS v.25, and SmartPLS.

Pearson Correlation Coefficient for Study Variables:

A set of statistical techniques was used to verify the normal distribution of the data. Assuming a linear relationship between the study variables (digital transformation, innovative work environment, and green innovation), Pearson correlation analysis was applied. Although correlation analysis does not establish causality, it helps in identifying the direction and strength of the relationship, as well as how much a change in variable X might influence variable Y.The results of the analysis, as illustrated in Table (), indicated the following :

1. Pearson correlation coefficients between the sub-dimensions of the independent variable (digital transformation culture, technology, and digital strategy) and the mediating variable showed strong positive correlations, with values ranging from(0.628 to 0.736) at a significance level of (p-value ≤ 0.01)
2. Similarly, the Pearson correlation between the sub-dimensions of digital transformation (culture, technology, digital strategy) and the dependent variable (green innovation) revealed strong positive relationships at the same level of significance (p-value ≤ 0.01). The correlation values were 0.744, 0.725, and 0.696, respectively, indicating a linear and strong association between the variables.
3. On the other hand, the correlation between the sub-dimensions of the mediating variable (leadership, work practices, and physical environment) and the dependent variable (green innovation) also showed strong positive correlations at a significance level of (p-value ≤ 0.01). The correlation values were 0.74, 0.607, 0.738, and 0.635, respectively, supporting the assumption of linear relationships between these variables.

Table (1): Pearson Correlation Analysis between Digital Transformation and Study Variables

INNG	QIWE	DIT	ENI	TEI	GRO	PHE	WWP	LED	DIS
									1
								1	.736**
							1	.659**	.595**
						1	.624**	.590**	.703**
					1	.653**	.612**	.674**	.679**
				1	.691**	.697**	.699**	.614**	.628**
			1	.654**	.745**	.594**	.632**	.746**	.662**
		1	.735**	.667**	.587**	.589**	.711**	.667**	.747**
	1	.580**	.659**	.733**	.689**	.580**	.651**	.737**	.736**
1	.644**	.742**	.697**	.673**	.709**	.635**	.738**	.607**	.696**

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

Direct Effect Hypothesis Testing between the Study Variables

After conducting a series of tests to verify the nature of the data and the scale of the study, in addition to performing various descriptive analyses and correlation tests between the study variables, it was deemed appropriate to examine the causal relationships between these variables. To this end, Structural Equation Modeling (SEM) was used to test the direct effect hypotheses. These hypotheses are presented as follows:

H1: There is a statistically significant direct effect of digital transformation on green innovation.

From this main hypothesis, the following sub-hypotheses are derived:

There is a statistically significant effect of technology on green innovation.

There is a statistically significant effect of digital strategy on green innovation.

There is a statistically significant effect of digital transformation culture on green innovation.

H2: There is a statistically significant direct effect of the innovative work environment on green innovation.

From this main hypothesis, the following sub-hypotheses are derived:

There is a statistically significant effect of leadership on green innovation.

There is a statistically significant effect of work practices on green innovation.

There is a statistically significant effect of the physical environment on green innovation.

As illustrated in Figure () below, the results indicate a high level of model fit, with the following fit indices:

RMSEA = 0.042; Ratio = 2.018; p-value ≤ 0.000; GFI = 0.912; CFI = 0.929; IFI = 0.934.

This model integrates the three main variables to test the direct effect on the dependent variable (green innovation). The analysis outputs indicate a statistically significant direct effect of the independent variable (digital transformation) on the dependent variable, with a path coefficient of ($\beta = 0.223$)

In contrast, the analysis results for Hypothesis H2, which tests the effect of the innovative work environment on green innovation, also revealed a statistically significant effect, with a path coefficient of ($\beta = 0.360$)

The results of the sub-hypotheses tests are shown in Table (), and all were found to be statistically significant.

Table (2): Testing the Main and Sub-Hypotheses of the Impact of Strategic Implementation on the Quality of the Entrepreneurial Environment (QEP)

P	C.R.	S.E.	Estimate	Model 1		
***	6.969	0.032	0.223	**INNG**	<---	**TECH**
***	4.674	0.043	0.201	**INNG**	<---	**DTC**
***	4.611	0.054	0.249	**INNG**	<---	**DIS**
P	C.R.	S.E.	Estimate	**Model 2**		
***	10.914	0.035	0.382	**INNG**	<---	**LED**
***	15.167	0.024	0.364	**INNG**	<---	**WWP**
***	16.286	0.021	0.342	**INNG**	<---	**PHE**

Source:Outputs of Amos v.25 Softwar

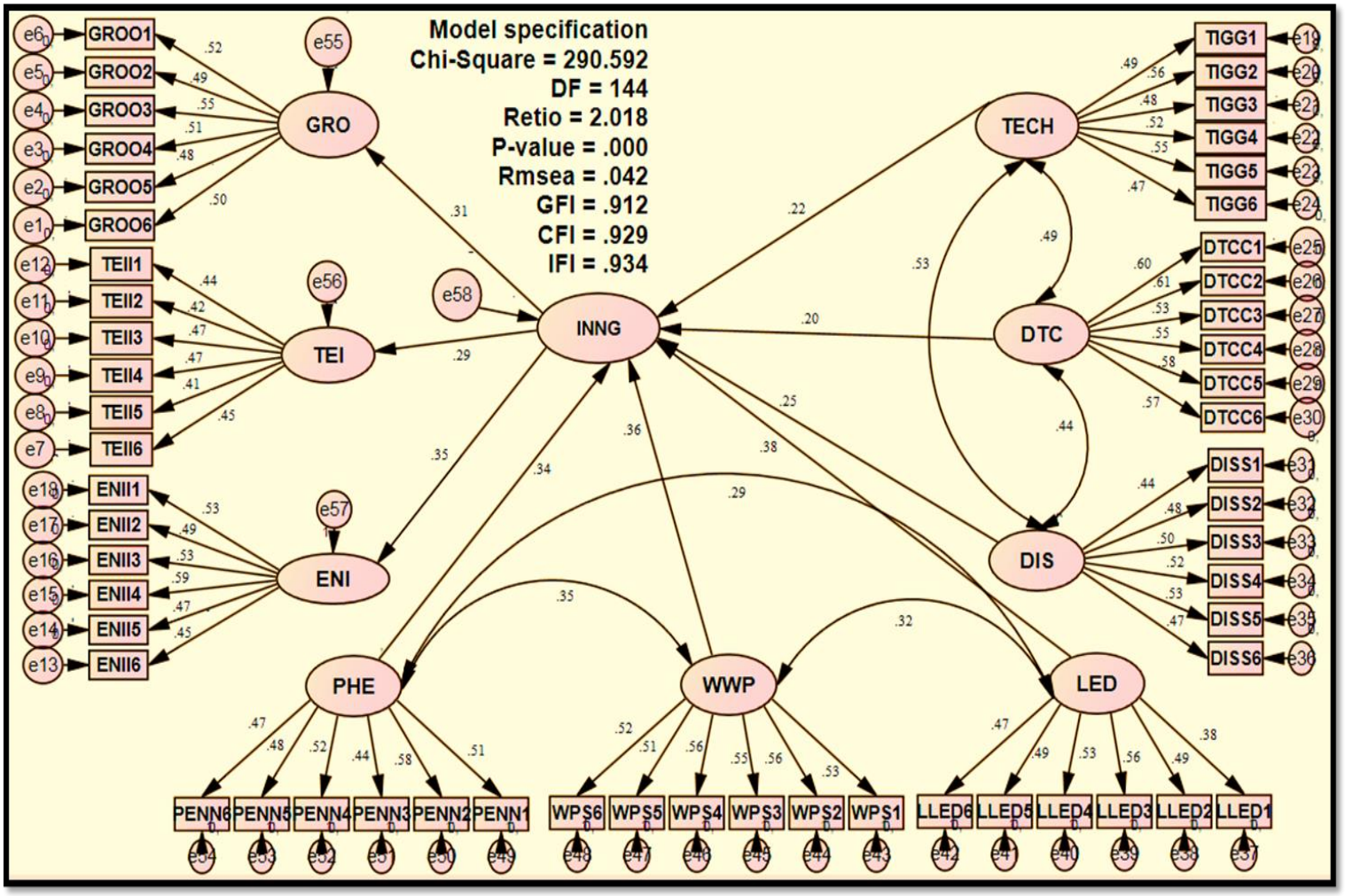


Figure (4): Hypotheses H1 and H2 for the Direct Effect on Green Innovation

H3: There is a statistically significant effect of digital transformation on the innovative work environment.

From this main hypothesis, the following sub-hypotheses are derived:

There is a statistically significant effect of technology on the innovative work environment.

There is a statistically significant effect of the digital strategy on the innovative work environment.

There is a statistically significant effect of digital transformation culture on the innovative work environment.

The results of the hypothetical model, based on Structural Equation Modeling (SEM), demonstrated a good model fit, with the following indices:

RMSEA = 0.056; Ratio = 2.129; p-value ≤ 0.000; GFI = 0.944; CFI = 0.959; IFI = 0.954.

The path coefficient for the main hypothesis was (β = 0.413), indicating a significant effect.

As for the sub-hypotheses, the results at a significance level of (p-value ≤ 0.01) support the acceptance of the alternative hypotheses.

Further details are presented in Table () below.

Table (3): Testing the Impact of Digital Transformation on the Innovative Work Environment

P	C.R.	S.E.	Estimate	Model 3		
***	4.358	0.081	0. 335	**QIWE**	**<---**	**TECH**
***	6.233	0.073	0.455	**QIWE**	**<---**	**DTC**
***	6.448	0.097	0.432	**QIWE**	**<---**	**DIS**

Source:Outputs of Amos v.25 Software

Testing the Hypothesis of the Indirect Effect (Mediated Relationship):

The Bootstrapping analysis was used to test the indirect effect of the relationship that links the three study variables.

According to hypothesis H3, there is a statistically significant indirect effect of digital transformation on green innovation through the mediating role of the innovative work environment.

The outputs of the analysis confirmed this effect, as shown in Figure (5) below

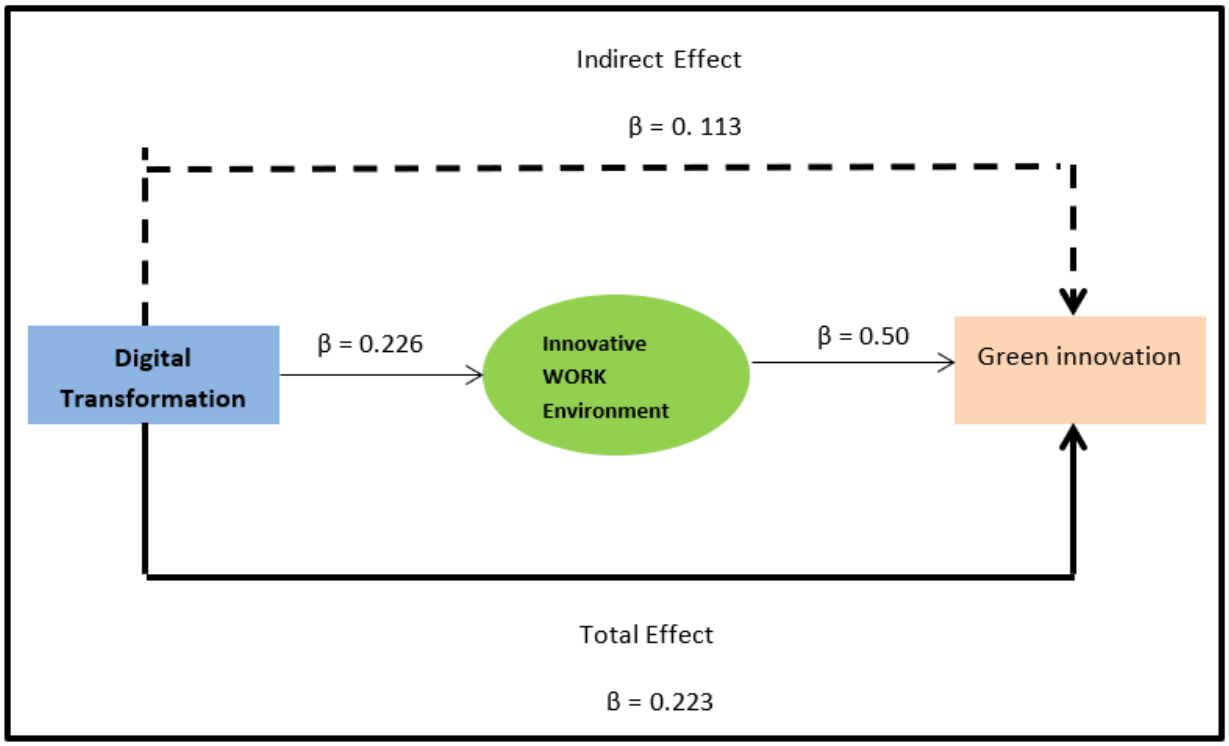


Figure (5) : The Indirect Effect on Green Innovation

At a significance level of (p-value = 0.01), the analysis results for the indirect effect of digital transformation on the dependent variable indicated a statistically significant effect.

As shown in Table ( ) below, the results point to a partial mediation of the relationship between the independent variable and the dependent variable, as illustrated below.

Table (4): Testing the Mediating Effect Hypothesis of the Innovative Work Environment

ULCI	LLCI	p	*t*	se	coeff	Model		
0.2476	0.0416	000	6.513	0.0347	0.226	QIWE	<---	**DIT**
0.9116	0.409	0000	11.933	0.0419	0.500	**INNG**	<---	**QIWE**
Bootstrapping test indirect effect								
Partially standardized indirect effect(s) of SSCI on PSO:								
BootULCI	BootLLCI	BootSE	Effect					
0.9411	0.1032	0.0261	0.113			**INNG**		

Source: Bootstrapping Analysis of the Indirect Effect

Findings

After analyzing the questionnaire and testing the research hypotheses using appropriate statistical methods to examine the relationships among the study variables, the following results were obtained:

1. The findings revealed that the dimensions of digital transformation—namely technology, digital strategy, and the dissemination of digital transformation culture—have a significant effect on enhancing green innovation in banking services, represented by its dimensions: green processes, technological innovation, and environmental innovation.
2. The study concluded that digital transformation has a positive impact on promoting green innovation.
3. The results confirmed a statistically significant effect of digital transformation on green innovation, with a standardized path coefficient of (0.223.)
4. The results, based on the average variance, indicated that the highest-ranking dimension of digital transformation was technology, reflecting the banks' particular focus on technological advancements in their service operations. This suggests a general perception that banks are seeking mechanisms to strengthen their competitive capabilities.
5. The statistical analysis revealed that the output of the study indicated a weakness in the digital strategy dimension, which suggests that banks need to strengthen the strategic planning aspect of digital transformation.

Recommendations

1. It is essential to strengthen the digital strategy dimension in banks by formulating clear visions and plans that support digital transformation.
2. The researcher emphasizes the importance of continuously supporting the technological dimension within banks to improve services and enhance customer experience.
3. Promote the culture of digital transformation among employees through workshops and continuous training aimed at effectively implementing digital tools.
4. It is necessary to focus on enhancing the dimension of environmental technological innovation by adopting eco-friendly technologies.
5. Encourage the maintenance of the current high level of green processes and strive to expand these practices while integrating them with technology to improve environmental performance efficiency.

List of Sources:

Diener, F., & Špaček, M. (2021). Digital transformation in banking: A managerial perspective on barriers to change. Sustainability, 13(4), 2032.

Reis, J., & Melão, N. (2023). Digital transformation: A meta-review and guidelines for future research. Heliyon, 9(1).

Akter, S., Biswas, K., Vrontis, D., Cooper, S. C. L., & Tarba, S. Y. (2024). Mastering digital transformation in workforce management. Production Planning & Control, 35(13), 1525-1532.

Kahveci, E. (2025). Digital Transformation in SMEs: Enablers, Interconnections, and a Framework for Sustainable Competitive Advantage. Administrative Sciences, 15(3), 107.

Kraus, S., Jones, P., Kailer, N., Weinmann, A., Chaparro-Banegas, N., & Roig-Tierno, N. (2021). Digital transformation: An overview of the current state of the art of research. Sage Open, 11(3), 21582440211047576.

Butt, A., Imran, F., Helo, P., & Kantola, J. (2024). Strategic design of culture for digital transformation. Long Range Planning, 57(2), 102415.

Deep, G. (2023). Digital transformation's impact on organizational culture. International Journal of Science and Research Archive, 10(2), 396-401.

Turuk, M. (2020). Digital strategy. International journal of contemporary business and entrepreneurship, 1(1), 62-76.

Badrianto, Y., & Ekhsan, M. (2019). The effect of work environment and motivation on employee performance of pt. Hasta multi sejahtera cikarang. Journal of Business, Management, & Accounting, 1(1).

Abun, D., & Ruadap-Macaspac, L. G. (2023). Promoting Innovative Work Behavior Through Innovative Work Environment. Divine Word International Journal of Management and Humanities, 2(3), 374-412.

Alharbi, I. B. A. (2021). Innovative leadership: A literature review paper. Open Journal of Leadership, 10(3), 214-229.

Liden, R. C., Wang, X., & Wang, Y. (2025). The evolution of leadership: Past insights, present trends, and future directions. Journal of Business Research, 186, 115036.

Sheran, H. R., Yass, H. A., & Hajim, Y. M. (2024).The impact of team practices on organizational creativity: An analytical study of the opinions of a sample of employees at the University of Tikrit. Khazayin of Economic and Administrative Sciences, (94), 94–108.

Yang, C., & Liu, Q. (2024). Driving Green Innovation Through Digital Transformation: Empirical Insights on Regional Variations. Sustainability, 16(23), 10716.

Paunov, C., Rochell, C., Labrue, L., & Planes-Satorra, S. (2025). What is unique about green innovation?: Evidence from green hydrogen, green steel, batteries and electric vehicles (No. 2025/05). OECD Publishing.