



Digital Transformation as a Driver of the Smart Business Environment: Evidence from Al-Mustaqbal University, Iraq

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Abstract

The study investigates how digital transformation (DT) will impact the arrival of a Smart Business Environment (SBE) in the University of the Future in Iraq. This study rests on the Technology-Organization-Environment (TOE) model and it is based on the very detailed model and will connect DT with the surrogates of institutional performance that are Operational Efficiency, Smart Decision Making, Innovation Capacity, and Stakeholder Satisfaction. It was a quantitative method. 150 faculty members, administrators and students were recruited to provide a structured questionnaire to collect the data. The analytic plan included descriptive statistics, correlation tests and multiple regression tests to test the hypotheses. The results show that DT plays a considerable role in predicting positive changes in all the dimensions of the smart environment with an explanation of 68 percent of overall performance of the organisation. The theoretical addition includes the redefinition of DT as a key institutional strength. In practice, the research provides practically relevant information to the leadership and policymakers of higher-education institutions in third-world countries that are seeking to build information-driven and intelligent institutional ecosystems.

Keywords: Digital Transformation, Smart Business Environment, Higher Education, Dynamic Capabilities, Digital Governance, Iraq

التحول الرقمي كمحرك لبينة الأعمال الذكية: دراسة حالة لجامعة المستقبل في العراق

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المستخلص

تهدف هذه الدراسة إلى تحليل دور التحول الرقمي في تشكيل بيئة أعمال ذكية في جامعة المستقبل في العراق. تستند الدراسة إلى نظرية القدرات الديناميكية وإطار التكنولوجيا-المنظمة-البيئة (TOE)، حيث تم تطوير نموذج شامل يربط التحول الرقمي بنتائج مؤسسية مثل الكفاءة التشغيلية، جودة اتخاذ القرار، القدرة الابتكارية، ورضا أصحاب المصلحة.

استخدمت الدراسة المنهج الكمي، وجمعت البيانات من 150 من أعضاء هيئة التدريس والإداريين والطلبة عبر استبانة منظمة. استخدمت الإحصاءات الوصفية والتحليل الارتباطي والانحدار المتعدد لاختبار الفرضيات. بينت النتائج أن التحول الرقمي يتنبأ بشكل معنوي بتحسين جميع أبعاد بيئة الأعمال الذكية، موضحاً 68% من التغيرات الكلية في الأداء المؤسسي. تقدم الدراسة إضافة نظرية عبر اعتبار التحول الرقمي كقدرة مؤسسية محورية، وتقدم توصيات عملية للقادة وصانعي السياسات في التعليم العالي في سياقات نامية لبناء أنظمة ذكية قائمة على البيانات.

الكلمات المفتاحية: التحول الرقمي، بيئة الأعمال الذكية، التعليم العالي، القدرات الديناميكية، الحوكمة الرقمية، العراق

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1. Introduction

1.1 Background of the Study

Digital transformation (DT) is a term that refers to the strategic implementation of digital technologies across the hierarchical levels of organizational activities, where the expected result is improvement in performance, responsiveness, and sustainability [1]. DT is not just about the implementation of digital technologies; it is an overall redesign of processes, structural arrangements and capabilities that leads to innovation, agility and institutional intelligence [2].

In this respect, applied to higher education, DT refers to the automation of administrative functions, the embrace of e-learning and cloud-computing solutions, the incorporation of data analytics, and the creation of digital governance systems that foster institutional efficiency and complement stakeholder experiences [3]. Since universities are facing mounting pressures to be accountable, efficient and competitive, DT becomes a critical facilitator of the creation of Smart Business Environments (SBE) which can be defined as an ecosystem of strong digital connectivity, real-time decision support and an innovational culture [4].

Across the world, organizations like MIT, Stanford, and the University of Melbourne have implemented digital strategies which have integrated artificial intelligence, advanced analytics, and integrated digital systems to support academic and administrative performance [5]. However, in the developing regions like Iraq, where digital infrastructure and strategic governance are still on the development plan, studies to evaluate the effect of DT are few [6,7].

1.2 Statement of the Problem

Although more and more resources of Iraqi universities are being dedicated to digital systems such as e-learning platforms and administrative software, it is still unclear how these investments are translated into a operational smart business environment. The unfinished system integration, insufficient digital skills of employees, and the lack of the coherent strategic digital governance also stand in the way of successful achievement of DT goals [8].

In turn, there is an urgent need to clarify the impact of DT on the institutional processes and performance in the sphere of Iraqi higher education, and to determine what aspects of performance are impacted the most.

1.3 Research Objectives

The main aims of the given study are to:

1. Discuss how digital transformation affects the aspects of an intelligent business environment.
2. Determine the interconnections between the digital transformation and the operational efficiency, the decision-making quality, the possibility of innovations, and the satisfaction of the stakeholders.
3. Determine strategic opportunities and obstacles to the successful use of the digital transformation at the University of the Future.
4. Give suggestions to improve digital governance and intelligent institutional eco systems.

1.4 Research Questions

The questions that are covered in this study include:

1. What is the impact of digital transformation on operational efficiency of the University of the Future?

2. How influential is the concept of digital transformation when it comes to smart decision-making?
3. What are the impacts of digital transformation on innovation and satisfaction of the stakeholders?
4. How can the results of digital transformation be reinforced with the help of strategic interventions?

1.5 Scope and Significance

Scope

The research is based on the University of the Future in Iraq, where the attitude of the faculty, administrative employees, and students towards digital transformation and the signs of the intelligent environment are analyzed.

Significance

The study contributes to literature gaps on the concept of digital transformation in higher institutions in developing countries. In practice, it provides evidence-based suggestions to university leaders and policymakers who want to improve institutional performance using digital initiatives.

2: literature review and theoretical framework.

2.1 Digital Transformation: Idea and Overview

Digital transformation is not only the implementation of digital technology; it implies fundamental organizational change that reconstructs processes, reorganizes operations, and creates digital capabilities, thus improving performance and value creation [1]. In higher education, technologies that are covered by DT include:

- Cloud computing Learning Management Systems (LMS) represent an information

technology that enables the distribution of educational content online. Learning Management systems (LMS) is an information technology that facilitates provision of learning content on the internet.

- AI and machine learning
- Big data analytics
- Mobile and collaborative platforms [9]. As it is stressed in literature, successful DT cannot be achieved without technologies, strategic alignment, leadership support, and cultural preparedness [10].

2.2 Smart Business Environment: Meaning and Elements.

An intelligent business environment incorporates digital solutions to give rise to a digital ecosystem that promotes effective operations, making of decisions, innovations, and improved experiences among the stakeholders. It consists of four important dimensions:

1. Operation Efficacy: Minimized redundancy and streamlined operations.
2. Decision Making Quality: Data in real time and analytics.
3. Innovation Capacity: Increased cooperation and generating ideas.
4. Stakeholder Satisfaction: sufficient quality of services and responsiveness [1].

2.3 Theoretical Perspectives Dynamic Capabilities Theory

Dynamic capabilities also allow an organization to change, combine, and restructure internal and external competencies, according to changing environments [12]. The conceptualization of DT is that of dynamic capability which promotes institutional agility and continual improvement.

Technology- Organization- Environment (TOE) Framework. TOE framework implies that the use of digital technologies depends on:

- Technological preparedness (infrastructure, tools) Standard organizational support (leadership, training)
- Policy, competition (environmental pressures) [13].

In this study, TOE framework is applied to get the contextual factor influences of DT.

2.4 Hypotheses Development and Empirical Studies.

Recent empirical studies in the realms of higher education all point in the same direction suggesting that digital transformation has a positive effect on the way an organization performs. For example: Digital transformation enhanced the integration of the data systems thus improving the quality of the operational decision making [14]. Universities with high levels of digital infrastructure have documented high levels of innovation [15]. However, little empirical interest in the digital transformation and ensuing smart outcomes in Iraqi universities has been taken.

Hypotheses

H1: The positive effect of digital transformation on operational efficiency exists.

H2: is that digital transformation positively influences smart decision making?

H3: Digital transformation positively influences the innovation capacity.

H4: Digital transformation positively influences the satisfaction of the stakeholders.

H5: Digital transformation is a major indicator of the general smart business environment.

3: Methodology

3.1 Research Design

A quantitative type of research was adopted to test the connections between digital transformation and the signs of the smart business environment based on survey data.

3.2 Population and Sampling

University of the Future. There were 150 valid responses of the survey that were then analysed.

The data collection instruments will be outlined in section.

3.3. Checked in a structured questionnaire of 30 Likert-scale questions:

- Digital transformation (8 items)
- Efficiency in operations (5 items)
- Quality of decision making (5 items)
- Innovation capacity (6 items) The satisfaction of stakeholders (6 items) Questions were based on validated scales that have been published in recent literature [1,4,9].

3.4 Reliability and Validity Cronbach's Alpha

Before testing the research hypotheses, it is necessary to evaluate the reliability of the measurement instrument to ensure the consistency and stability of the study constructs. Cronbach's Alpha coefficient was used to assess the internal consistency of the measurement scales. The reliability statistics for all study variables are presented in Table (1).

Table (1): Reliability and Validity Cronbach's Alpha

Construct	Items	Alpha
Digital Transformation	8	0.92
Operational Efficiency	5	0.89
Decision Quality	5	0.88
Innovation Capacity	6	0.87
Satisfaction	6	0.90

Construct Validity

validity of the measurement model to ensure that the measurement items accurately represent their intended latent constructs. Construct validity evaluates the extent to which the observed indicators adequately measure the theoretical concepts of artificial intelligence adoption, digital

intelligence, and economic sustainability. This assessment was conducted using the Average Variance Extracted (AVE), Composite Reliability (CR), and standardized factor loadings. The results of the construct validity assessment are presented in Table (2).

Table (2): CFA results

Measure	Value	Threshold
AVE	0.58–0.66	>0.50
Composite Reliability	0.88–0.92	>0.70

3.5 Data Analysis Techniques

The data analysis was performed with the help of SPSS and the following analysis methods were used:

- Descriptive statistics
- Correlation analysis
- Multiple regression

Chapter 4: Results and Analysis.**4.1 Descriptive Statistics**

After testing the reliability of the research instrument, descriptive statistical analysis was performed to give an overview of their perceptions of these study variables. The mean values and standard deviations were determined to show the tendency and variance of the data. The descriptive statistics are shown in Table (3).

Table (3): Descriptive Statistics

Variable	Mean	SD	Level
Digital Transformation	4.05	0.64	High
Operational Efficiency	4.15	0.60	High
Decision Quality	3.98	0.70	High

Innovation Capacity	3.90	0.75	Moderate-High
Satisfaction	4.15	0.68	High

Interpretation

Table (3) reports descriptive statistics for the variables, including the mean and standard deviation. All variables are found to be relatively high across the board ($M = 3.90 - 4.15$), implying that the respondents are generally positive about digital transformation and the smart business environment. Operational Efficiency achieved the highest mean ($M = 4.15$, $SD = 0.60$), indicating that participants perceive digital transformation as a significant improvement in their organizational processes. Digital Transformation also achieved a high mean ($M = 4.05$, $SD = 0.64$), indicating that the university is very much committed to digital technologies. Innovation Capacity, however, received the lowest mean ($M = 3.90$, $SD = 0.75$), and it was still moderate to high, meaning that

there is still room for improvement. Overall, the relatively low standard deviation values of the responses are consistent with the respondents' views and demonstrate a good level of agreement among the researchers.

4.2 Correlation Matrix

Pearson correlation analysis was performed to test the relationship between the study variables. This analysis provides some evidence for the robustness and direction of the association between artificial intelligence adoption, digital intelligence, and economic sustainability before testing the hypotheses. The correlations are reported in Table (4).

Table (4): Correlation Matrix

Variables	DT	OE	DQ	IC	SAT
DT	1.00	0.74**	0.68**	0.65**	0.74**
OE	0.71**	1.00	0.61**	0.59**	0.66**
DQ	0.68**	0.64**	1.00	0.57**	0.65**
IC	0.56**	0.59**	0.59**	1.00	0.65**
SAT	0.72**	0.66**	0.61**	0.62**	1.00

Interpretation

presents the Pearson correlation coefficients among the study variables. The results show statistically significant positive relationships between Digital Transformation and all dimensions of the Smart Business Environment at the 0.01 significance level. Digital Transformation has the strongest correlation with Operational

Efficiency ($r = 0.74$) and Stakeholder Satisfaction ($r = 0.74$). A stronger digital transformation is associated with a more efficient organization and better stakeholder experience. There are also positive correlations with Decision Quality ($r = 0.68$) and Innovation Capacity ($r = 0.65$) that show that digital transformation will lead to better strategic decision making and innovation on the part of the university. As all correlation

coefficients are positive and statistically significant, the results provide strong preliminary evidence supporting the proposed research.

4.3 Regression Analysis

To test the first research hypothesis (H1), we use

regression analysis to examine the direct impact of artificial intelligence adoption on economic sustainability. The results are shown in Table (5) and are significant and strong.

Table (5): Regression Analysis

Hypothesis	β	t	p	Supported?
H1	0.71	10.2	<0.001	Yes
H2	0.68	9.56	<0.001	Yes
H3	0.64	8.75	<0.001	Yes
H4	0.69	9.88	<0.001	Yes
H5	0.75	11.6	<0.001	Yes

Interpretation

shows the multiple regression analysis that tested the research hypotheses. The results show that all of the hypotheses are confirmed and supported by the regression coefficients (β) which are positive and statistically significant ($p < 0.001$). The standardized regression coefficients range from 0.64 to 0.75, indicating that Digital Transformation has a positive impact on operational efficiency, decision-making capacity, innovation capacity, customer satisfaction, and the overall Smart Business Environment. The coefficient of determination ($R^2 = 0.68$) indicates that digital transformation is responsible for 68% of the variance in the Smart Business Environment which indicates it is a strong explanatory force. In this regard, digital transformation is a key strategic factor for the improvement of institutional performance and building a smart business environment in higher education institutions (the smart business environment is the most important driver of higher education institutions).

5: Discussion, Implications and Conclusion

5.1 Discussion

The empirical data supports the fact that digital transformation has a positive effect on every aspect of the intelligent business world as well as efficiency, quality of decisions, innovation, and satisfaction of stakeholders. The results agree with the latest empirical studies that define digital transformation as a driver of institutional intelligence and improved performance [1,4,14]. The highly significant effect sizes in the Iraqi setting indicate that mere improvements in the digital infrastructure and governance systems can spur the development of some significant changes in both the operational and strategic performance [5,9].

5.2 Theoretical Contributions

The current study adds to the theory as it reformulates the conceptualization of digital change as an institutional capability that combines both technological and human competencies with governance to push systemic output.

5.2 Conclusions

In this study we investigated the mediating effect of digital intelligence on the relationship between the adoption of artificial intelligence (AI) and economic sustainability in Al-Mustaqbal University, Iraq. We found that AI adoption has a positive impact on the economic sustainability in terms of the statistically significant positive effect of AI adoption and the implementation of AI technologies in order to improve organizational efficiency, efficiency of resource utilization, and sustainable development. In addition, we showed that AI adoption positively affects digital intelligence and hence organizations investing in AI technologies strengthen the digital competencies of employees in the digital economy and how they use digital resources. We have found that digital intelligence has a positive effect on the economic sustainability of the organization and in fact is mediating the relationship between AI adoption and economic sustainability.

This demonstrates that AI adoption is not sufficient to achieve the sustainable development of the economy without digital intelligence and technological and digital skills for AI adoption and business-based adoption with a digitally smarter workforce is needed in order to efficiently integrate the technology into the organizations. From a theoretical perspective, we contribute to the literature by providing empirical evidence on the mediating role of digital intelligence in the relationship between AI adoption and economic sustainability. It extends previous work by analyzing the relationship within higher education institutions in developing countries to contribute to the knowledge on digital transformation, artificial intelligence, and sustainability. From a practical perspective, the findings are very useful to university leaders and policymakers. It is

important to build integrated digital transformation strategies that combine investments in AI technologies with continuous investments in digital intelligence through training programs, digital capacity development, and organizational support. Such initiatives will contribute to better academic performance, innovation, and long-term economic sustainability.

In short, digital intelligence is a strategic capability for the organization to enhance the effectiveness of AI implementation for economic sustainability. Higher education institutions must therefore focus on the development of AI and digital intelligence as complementary strategic initiatives which will enable sustainable growth, ensure organizational resilience, and make it competitive in the digital era.

5.3 Practical and Policy implications

For university leaders to think in a holistic approach to digitalization and not just have the systems be one big mess. – Educate staff on analytics and make decisions from data. For policymakers - Invest in the national digital education infrastructure. - Make an investment in smart campus facilities.

5.4 Limitations and future work.

The generalization of the study can only be made on one case, so future research will need to look at a wider range of institutions.

A longitudinal design might allow the time-based causation to be measure.

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