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The role of the entrepreneurial mindset in enhancing digital transformation: An exploratory study of the opinions of a sample of administrative leaders at the University of Kirkuk

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Abstract
The purpose of this study is to investigate the potential mediation of the entrepreneurial mindset in the impact of digital transformation, and its dimensions (digital infrastructure and digital leadership), in the university of Kirkuk on administrative leaders. The descriptive-analytical research method was used and the data was gathered by means of a questionnaire that was given to a number of university administrators. Data analysis was conducted by SPSS software and the findings indicated that all factors of the entrepreneurial mindset correlate positively with digital transformation. But there were two aspects of this transformation that were most strongly and consistently enhanced by both risk taking propensity and ambiguity tolerance. By comparison, despite the nonsignificant relationship, opportunity recognition exerted no significant direct impact on overall digital transformation, suggesting that having readiness for execution and acceptance of ambiguity are more important than the degree of perceptions of opportunity. In addition, the results demonstrated digital leadership as the aspect of transformation achieving the best ratings, suggesting a certain degree of managerial understanding on the relevance of the technology. The researchers also suggested the creation of training courses to promote entrepreneurial mindset and digital skills on leaders.

Keyword: Entrepreneurial mindset, opportunity recognition, risk-taking propensity, tolerance for ambiguity, digital transformation, digital infrastructure, digital leadership, University of Kirkuk, administrative leadership, entrepreneurial thinking

Introduction

The business environment today is rapidly changing due to technological innovation and digitalization and this makes the institutions especially universities have to develop new strategies in line with the changes. One of these key strategies is digital transformation, which has greatly evolved into a core enabler of institutional effectiveness and performance. In this challenging environment, entrepreneurship stands out as an important driver of change and technology adoption which determines how successful institutions are in adjusting to change and seeking new technology. This entrepreneurial mindset gives leaders the ability to act with flexibility and courage in the presence of ambiguity and uncertainty to increase the success of digital transformations. Therefore, the importance of this research is embedded in its striving to clarify the correlation between the entrepreneurial mindset and digital transformation dimensions in an academic setting (represented by the University of Kirkuk in this case).

This research consists of four sections: the first section contains methodological procedures; the second presents the theoretical literature of the main research variables and sub-variables; the third explains the research application and statistical analysis conducted and the last presents the conclusions and recommendations.

Chapter One
Research Methodology
First: Research Problem

In spite of reform initiatives for digital transformation implemented by some Iraqi

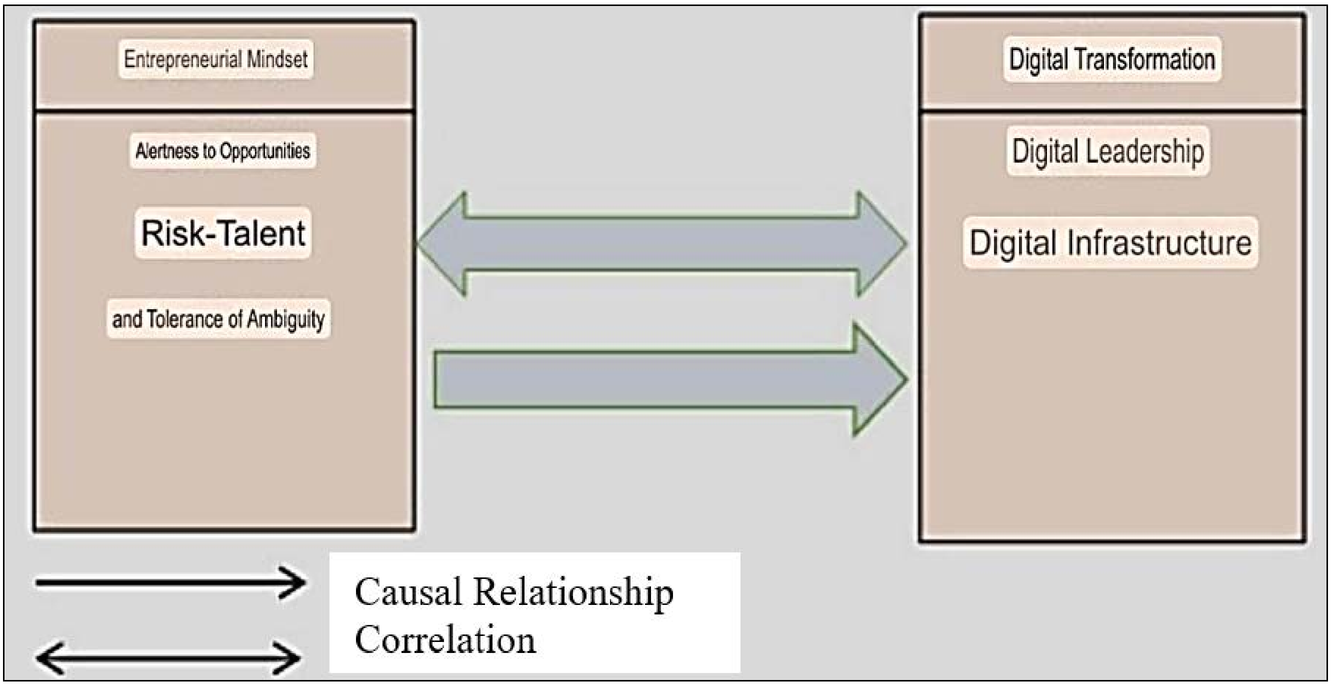
the pace of digital transformation is sluggish in some universities expressing problems associated with managerial thinking and institutional culture. Thus, the research question is as follows:
How does the entrepreneurial mindset (with its dimension's opportunity recognition, risk- taking propensity, & tolerance for ambiguity) contribute to strengthening the digital transformation (digital infrastructure and digital leadership) at the University of Kirkuk?
From this central question, several sub-questions arise:
1. What is the level of availability of entrepreneurial mindset dimensions among the administrative leaders at the University of Kirkuk?
2. To what extent have the dimensions of digital transformation developed at the university from the perspective of administrative leaders?
3. Is there a statistically significant relationship between the entrepreneurial mindset and digital transformation?
4. Which dimensions have the greatest influence in enhancing digital transformation?

Second: Research Importance
The relevance of this research is grounded in that it is related to two key drivers of contemporary development, the entrepreneurial mentality and digital transformation, two aspects which are crucial for the success of universities and enable them not to fall behind the fast technological and economic pace. Importance of the study are included:
A. Theoretical Importance
1. This research contributes to enriching the scientific literature related to the entrepreneurial mindset and digital transformation, particularly in the context of higher education.
2. It highlights the relational and influential connection between the entrepreneurial thinking style of administrative leaders and their ability to adopt and support digital transformation within the university.

B. Practical Importance
1. The study helps identify gaps and obstacles that may hinder the integration of entrepreneurial thinking with digital programs, thereby contributing to the improvement of educational performance.
2. It provides practical, applicable recommendations for university administrations in Kirkuk.

Third: Research Objectives
This study seeks to achieve the following objectives:
1. Diagnose the level of entrepreneurial mindset dimensions among administrative leaders at the University of Kirkuk.
2. Determine the extent of availability and development of digital transformation dimensions at the university.
3. Analyze the nature of the relationship between the entrepreneurial mindset and digital transformation.
4. Test the effect of entrepreneurial mindset dimensions on overall digital transformation.
5. Propose practical recommendations to enhance digital transformation through the development of entrepreneurial thinking.

Fourth: Research Hypothetical Framework
The research framework provides a fundamental outline of the role of the entrepreneurial mindset, with its dimensions (opportunity recognition, risk-taking propensity, and tolerance for ambiguity), in enhancing digital transformation with its dimensions (digital infrastructure and digital leadership) at the University of Kirkuk. Both the independent and dependent variables were selected due to their importance and relevance to the nature and scope of the present study, as well as their ability to accurately represent the aspects of the phenomenon under investigation, as illustrated in Figure (1).



Source: Prepared by the researchers.

Fig 1: The Hypothetical Framework of the Study

Based on the above hypothetical framework, the following hypotheses can be derived:

1. First Main Hypothesis (H1)

There is a significant correlation between the dimensions of the entrepreneurial mindset (opportunity recognition, risk-taking propensity, and tolerance for ambiguity) and the dimensions of digital transformation (digital infrastructure and digital leadership) at the University of Kirkuk.

Sub-hypotheses

- **H1:** There is a significant correlation between opportunity recognition and digital infrastructure.
- **H1:** There is a significant correlation between risk-taking propensity and digital leadership.
- **H1:** There is a significant correlation between tolerance for ambiguity and overall digital transformation.

2. Second Main Hypothesis (H2)

The dimensions of the entrepreneurial mindset (opportunity recognition, risk-taking propensity, and tolerance for ambiguity) have a significant effect on the dimensions of digital transformation (digital infrastructure and digital leadership) at the University of Kirkuk.

Sub-hypotheses

- **H2:** Opportunity recognition has a significant effect on digital leadership.
- **H2:** Risk-taking propensity has a significant effect on digital leadership.
- **H2:** Tolerance for ambiguity has a significant effect on digital leadership.
- **H2:** The dimensions of the entrepreneurial mindset collectively have a significant effect on overall digital transformation.

Chapter Two
Theoretical Framework
First: Entrepreneurial Mindset
1. The Concept of Entrepreneurial Mindset

The entrepreneurial mindset is defined as a mental state that facilitates the analysis of the environment and the identification of possibilities (opportunities) within it. Possessing an entrepreneurial mindset means having the ability to perceive and engage in confronting uncertain circumstances (Makgeledisa, 2021:11) [24]. It can also be considered a mental state that transforms an individual into an entrepreneur, enabling them to analyze the world and the opportunities and possibilities it offers. This mindset reflects an understanding of how an individual can contribute to the development and advancement of the economic and social system of which they are a part, and how to transform ideas into action to achieve goals (Farida *et al*., 2022:3) [5].

According to Maqbool *et al*. (2021:682) [25], the entrepreneurial mindset relies on three factors:

a) The ability to sense opportunities.
b) The ability to mobilize resources, even under unstable conditions.
c) The ability to act quickly or respond decisively (capacity for rapid action).

Dhakal *et al*. (2022:5) conclude that the mindset is not innate but acquired, shaped by prior knowledge and by interaction with the current environment in response to decision-making under uncertainty. Chang *et al*. (2022:3) define the entrepreneurial mindset as a cognitive perspective that helps individuals create value by recognizing opportunities, acting upon them, and making decisions despite limited information, while remaining adaptable and flexible in uncertain and complex conditions.

2. Antecedents of the Entrepreneurial Mindset

The entrepreneurial mindset is viewed as a way of thinking in business that is capable of dealing with uncertainty, enabling entrepreneurial leaders to make confident decisions in the face of continuous environmental change. There are numerous antecedents to the entrepreneurial mindset, which can be classified into individual-level and environmental-level factors (Shahriar *et al*., 2024:3) [32].

A. Individual-Level Antecedents

The antecedents of the entrepreneurial mindset at the individual level can be explained through the following elements highlighted by several researchers (Daspit *et al*., 2021:9; Lindqvist & Michael, 2022:20) [11, 22]:

- **Self-Efficacy**
  Self-efficacy is a fundamental cognitive basis linked to entrepreneurship, essential for the development of an entrepreneurial mindset. It provides entrepreneurs with confidence in their ability to acquire and utilize resources to ensure the success of new ventures. Sources of self-efficacy include knowledge of a particular industry, the ability to initiate new beginnings without prior expectations of success, and perseverance in the face of challenges.
- **Opportunities and Experiences**
  Experiences, particularly during early life, influence the mindset of entrepreneurs. Entrepreneurial thinking often depends on self-exploration, reflecting on past experiences, and evaluating personal values and goals. Self-exploration is directly related to the development of an entrepreneurial mindset, as it is shaped by triggering events such as discovering a new business idea, achieving a personal goal, being laid off from a job, or other influencing factors.

B. Environmental-Level Antecedents

The complexity, dynamism, and uncertainty of the environment in which entrepreneurs compete affect the entrepreneurial mindset. It becomes evident when entrepreneurs are able to successfully mobilize and utilize their resources despite uncertain conditions. According to Neumann (2017), adaptive thinking is closely related to the entrepreneurial mindset in dynamic environments (Ahsan *et al*., 2022:7) [3].

3. Types of Entrepreneurial Mindset

The mindset is not a fixed concept, nor is it a sequential process. Rather, there are multiple entrepreneurial mindsets, not a single one, which may be associated with initiating a venture, such as an executive mindset or a planning mindset. Conceptually, the entrepreneurial mindset is regarded as a multidimensional construct composed of both a fixed mindset and a growth mindset (Abdullah *et al*., 2024:116) [1].

A. Fixed Mindset

A fixed mindset refers to the belief that one's traits or characteristics are inherently static and unchangeable

(Mahammod, 2023:44) [39]. In other words, talents cannot be developed or grown. This mindset assumes that personal attributes are “carved in stone” and essentially permanent. As a result, individuals with a fixed mindset feel a persistent need to prove themselves repeatedly, rather than striving for change and growth (Damianus *et al*., 2022:79) [10].

B. Growth Mindset

The growth mindset stands in contrast to the fixed mindset, suggesting that success can be influenced by how individuals think about their abilities. Traits and talents are merely a starting point that can be developed over time. A growth minds*et al*lows individuals to recognize opportunities, provide solutions, overcome obstacles, and design strategies for implementation (Weritz *et al*., 2024:2) [37]. Creativity and the ability to think outside the box are essential for organizations to grow, succeed, and remain competitive. An individual may adopt either a fixed mindset or a growth mindset, but not both simultaneously. The fixed mindset represents the belief that one’s qualities are set in stone and unlikely to change, while the growth mindset is based on the belief that individuals can adopt a perspective that enables change and development through effort (Kouakou *et al*., 2019:118; Mohammed, 2024:201) [19, 6].

4. Dimensions of the Entrepreneurial Mindset

McMullen and Kier (2016) emphasize that the entrepreneurial mindset is the ability to identify and exploit opportunities regardless of the resources available. This implies that entrepreneurial activities inherently involve a certain degree of risk. From this definition, four dimensions of the entrepreneurial mindset can be identified, as highlighted by several researchers (Nooh, 2022:181; Marjerison *et al*., 2021:3; Adomako & Ahsan, 2022:123; Cui *et al*., 2019:7-9) [29, 26, 2, 9], which are as follows:

A. Opportunity Recognition

Opportunity recognition is a cognitive entrepreneurial process that relies on vigilant observation, searching, connecting the dots insightfully, evaluating, and forming judgments regarding information about potential opportunities. This means that opportunity recognition is the ability to possess sharp insight in identifying entrepreneurial opportunities. Entrepreneurship itself begins with recognizing opportunities, but prior to that, one must pay attention to them. The higher an individual’s attention, the greater the likelihood of identifying opportunities, even if they are not actively or deliberately searching for them. Therefore, attentiveness to opportunities is considered a critical and essential element of the entrepreneurial mindset.

B. Risk-Taking Propensity

Risk-taking propensity refers to an individual’s tendency or willingness to take risks or avoid them. It plays a significant role in opportunity recognition and the success of entrepreneurial activities. Entrepreneurs with a higher inclination toward risk find it easier to perceive overall opportunities in their environment. Studies have shown that risk propensity affects entrepreneurial decision-making and is considered a pivotal element of the entrepreneurial mindset. Risk-taking is not a fixed trait; it varies and is shaped according to different scenarios.

C. Tolerance for Ambiguity

Tolerance for ambiguity refers to the way individuals interpret, process, and respond to information in ambiguous situations characterized by complex, inconsistent, unfamiliar, or fragmented cues. Entrepreneurs must possess a high level of tolerance for ambiguity because entrepreneurial activities are inherently unpredictable. When an entrepreneur is tolerant of ambiguity, uncertain situations and conditions are perceived as promising scenarios with challenges rather than as sources of stress or disappointment. Accordingly, tolerance for ambiguity is considered an important element of the entrepreneurial mindset.

Second: Digital Transformation

1. Concept of Digital Transformation

Digital transformation refers to the integration of digital technology across all areas of business, fundamentally changing the way organizations operate. It is inevitable, regardless of whether an organization is willing to embrace it. Digital transformation encompasses more than just technology; it includes strategy, processes, culture, behaviors, and employees (Haque *et al*., 2023:5) [16]. Jonathan *et al*. (2021:5) [18] explained that digital transformation is a clearly defined and implemented strategic function that involves the participation of leaders and other employees. Effective digital strategies require structures that facilitate knowledge sharing, skill development, effective decision-making, and comprehensive communication between IT and other organizational units. Udovita (2020:520) [35] noted that digital transformation refers to changes associated with applying digital technology across all aspects of human society, including moving away from paper-based processes, and that digital transformation represents the future of everything.

Additionally, Mo and Deng (2022:9) [27] defined digital transformation as a process involving the use of various digital technologies to improve the efficiency and effectiveness of organizational operations. It can also help reshape the way business is managed. Digitization involves converting all types of information (textual, audio, visual, video, and other data from diverse sources) into digital form. Organizations can leverage the innovation ecosystem, redesign internal structures, and increase digital maturity to achieve digital transformation. Elia *et al*. (2024:382) [13] stated that digital transformation ensures the effective coordination of activities and people to achieve organizational objectives at both strategic and operational levels, avoiding partial achievement or failure to meet expected outcomes.

2. Importance of Digital Transformation Tools

The introduction of mobile technologies, cloud computing solutions, learning algorithms, and big data technologies has created new opportunities for organizations and accelerated digital transformation. Digitization is transforming businesses worldwide due to globalization (Wessel *et al*., 2021:5) [38]. The importance of digital transformation tools is highlighted by Al-Jubory (2022:6) [4] and Pereira *et al*. (2022:1-2) [31] as follows:

- Capturing and disseminating large volumes of data through digital tools can accelerate globalization processes. The processing of these data through

predictive algorithms enables the assessment of the organization's current conditions.
- Based on data volume, advanced data mining techniques, such as machine learning, can also be used to support decision-making.
- Digital tools, including artificial intelligence and statistical methods, can help organizations build more suitable globalization strategies.

3. Impacts of Digital Transformation
Digital transformation has created significant changes in organizational business models, enabling organizations to develop new business models and challenge existing ones. Business organizations use digital technology to influence multiple aspects, as follows (Alshammari, 2023:10) [5]:

- **Impact of Digital Transformation on Managerial Functions**
  Digital transformation allows organizational planning to respond effectively to its environment while also influencing it. Organizations must be capable of responding rapidly to the business environment, particularly to technological advancements. This requires effective forecasting of the digital context, access to real-time data, the use of advanced analytical tools, and expertise in new technologies. Digital transformation supports organizations in collecting and analyzing data efficiently, making informed decisions, and improving processes by automating repetitive tasks, such as using cloud-based software tools to facilitate collaboration and communication among team members regardless of their locations (Ashrafi *et al*., 2025:112) [7].

Banciu *et al*. (2023:50-51) [8] indicate that digital transformation impacts management functions by enabling effective interaction with employees through new digital channels. In supervision, digital transformation helps organizations monitor and oversee performance in real-time using digital dashboards that track and analyze key performance indicators, providing managers with up-to-date information about organizational performance. Consequently, digital transformation affects managerial functions, including foresight, planning, organizing, leading, and supervising, which are interconnected and interdependent.

- **Impact of Digital Transformation on Organizational Culture**
  Scholars agree that organizational culture contributes to creating a positive mindset among leaders and employees for adopting change. Organizations with cultures that recognize information technology as a driver of overall business strategy are likely to exhibit relational leadership, as managing organizational change is challenging and requires leadership skills capable of mobilizing the entire organization. Recent studies have found that organizational cultures encouraging conversational competencies and emotional intelligence are invaluable. Moreover, leaders in organizations with mature positions are known for promoting organizational cultures that reward digital engagement and commitment (Jonathan *et al*., 2021:6) [18].

Faisal *et al*. (2021:465) [40] also emphasize that culture is a facilitating factor in digital transformation. Cultural changes are associated with digital transformation initiatives, as these programs often disrupt organizational culture. Digital transformation significantly impacts organizational culture and leads to changes in thinking patterns.

- **Impact of Digital Transformation on Organizational Structure**
  The organizational structure is a key factor in enabling digital transformation. With digital transformation, organizations sometimes develop entirely new structures to become "digital organizations" that support the digital transformation of their business operations. Some organizations have delegated digital transformation responsibilities to department heads who established teams to support digital initiatives and monitor their implementation (Faisal *et al*., 2021:461-462). Kraus *et al*. (2021:7) [40, 20] note that organizational transformation is a complex, revolutionary, and ongoing process requiring fundamental changes in structures and organizational systems, leading to the reassessment of organizational norms and values. Often, organizations resist change, and employees may oppose digital initiatives, creating implementation challenges. Although technology provides competencies, innovation, and competitive advantage, the process should not be underestimated, as, like any organizational initiative, it carries inherent risks.

5. Dimensions of Digital Transformation
Digital transformation is one of the most important contemporary trends in organizations. It helps achieve harmony at both operational and strategic levels and contributes to cost reduction by minimizing human errors. A review of various studies and research on the dimensions of digital transformation indicates that digital infrastructure and digital leadership are the most appropriate dimensions for the current study (Munsamy *et al*., 2023:4) [28].

a. Digital Infrastructure
Digital infrastructure constitutes an essential foundation for ensuring digital transformation in institutions seeking to enhance the capabilities of new digital technologies. It includes technical and organizational aspects, components, processes, and networks. It also encompasses the social environment of digital tool users, designers, and system developers (Hustad & Olsen, 2021:599) [17]. Li *et al*. (2024:2) [21] note that digital transformation enables the transfer of enhanced learning experiences, reduces challenges in information management, and supports smart learning strategies.

b. Digital Leadership
Digital leadership refers to the role of leaders in effectively employing information and communication technology to develop administrative practices, including planning, organizing, directing, and controlling, with the aim of advancing toward a knowledge-based society. It is manifested in leaders' ability to make effective decisions and motivate employees to address digital challenges efficiently (Turyadi *et al*., 2023; Pandey *et al*., 2023) [34, 30].

Chapter Three
Practical Aspect
1. Research Methodology
This study relies on the descriptive-analytical method, which is widely used in administrative and social sciences research due to its ability to describe phenomena as they exist in reality and analyze their dimensions and relationships. This method is suitable for the current study, which aims to diagnose the role of the entrepreneurial mindset dimensions (opportunity recognition, risk-taking propensity, and tolerance for ambiguity) in enhancing digital transformation dimensions (digital infrastructure and digital leadership) at the University of Kirkuk.

2. Research Instrument
A closed-ended questionnaire was used as the primary data collection tool. It was designed to align with the general and specific objectives of the study. The questionnaire items were developed based on a comprehensive review of previous studies and recent theoretical models related to the research variables, particularly those published between 2020 and 2024.

3. Population and Sample
- **Research Population**
  The research population consists of administrative leaders at the University of Kirkuk, including deans of colleges, department heads, directors of administrative units, and administrative assistants, as well as senior and middle management positions involved in decision-making and implementing digital transformation at the university. This population was selected because of its close relevance to the study topic, given its critical role in adopting entrepreneurial orientations and executing digital transformation strategies within the university.
- **Research Sample**
  The study relied on a field sample drawn from the research population. Participants were selected using stratified random sampling or simple random sampling, depending on accessibility and feasibility within the targeted administrative units. This sampling method ensures fair representation of all administrative categories, reducing bias and ensuring comprehensive results. The sample consisted of 60 individuals, and the questionnaire was distributed electronically. Respondents were instructed to complete all items to ensure the validity of the data for subsequent statistical analysis.

4. Validity and Reliability of the Research Instrument
- **Validity**
  The questionnaire items were developed based on recent theoretical literature (2020-2024) and standardized previous questionnaires. They were then reviewed by a panel of experts in management, statistics, and information technology to verify content validity, clarity, and proper phrasing. The experts generally agreed on the suitability of the items, indicating no need for major modifications, thereby supporting both face and content validity.
- **Reliability**
  Cronbach's Alpha coefficient was used to test the reliability (internal consistency) of the instrument for each construct. The obtained values were as follows:

Constructs	Number of Items	Cronbach's Alpha	Reliability Level
Opportunity Recognition	5	0.842	High
Risk-Taking Propensity	5	0.811	High
Tolerance for Ambiguity	5	0.829	High
Digital Infrastructure	5	0.857	High
Digital Leadership	5	0.866	Very High
Overall Total	25	0.902	Excellent Instrument Reliability

Table Prepared by the Researchers

Interpretation of the Above Table

The values indicate that all questionnaire constructs exhibit high reliability, as the Cronbach's Alpha for each exceeded 0.80, which is considered a strong indicator of the measurement tool's reliability. The overall value (0.902) suggests that the questionnaire is highly suitable for statistical analysis, with no need to remove any of the included items.

5. Descriptive Analysis of the Questionnaire Constructs

Table 1: Descriptive Analysis of the Opportunity Recognition Construct

Item Number	Item Text	Mean	Standard Deviation	Relative Importance (%)
1	I have a strong ability to notice subtle signals that may indicate hidden opportunities.	3.96	0.88	79.2%
2	I rely on my previous experiences to identify new opportunities.	4.21	0.74	84.2%
3	I strive to add new value by reducing uncertainty.	3.81	0.56	76.2%
4	I make sure to continuously monitor surrounding changes in search of new opportunities.	3.74	0.85	74.8%
5	My personal knowledge helps me recognize opportunities more quickly.	4.12	0.78	82.4%

Table Prepared by the Researchers

Interpretation

The results indicate that the sample members possess a high level of opportunity recognition, as reflected by the high means (mostly above 4), particularly in relying on previous experiences (84.2%) and noticing subtle signals (79.2%). The standard deviations are acceptable, indicating close agreement among respondents.

Table 2: Descriptive Analysis of the Risk-Taking Propensity Construct

Item Number	Item Text	Mean	Standard Deviation	Relative Importance (%)
1	I take full responsibility for the outcomes of my decisions in a turbulent environment.	4.10	0.65	82.0%
2	I prefer to engage in new experiences even if I am not completely certain of their results.	3.97	0.77	79.4%
3	I tend to invest in opportunities even if they involve a certain level of risk.	3.88	0.66	77.6%
4	* I have the ability to handle situations that cannot be easily predicted.	4.02	0.63	80.4%
5	* I tend to take risks when I see the potential for significant gains.	3.83	0.74	76.6%

Interpretation

The results indicate that the sample members exhibit a positive risk-taking propensity, with relative importance ranging from 76.6% to 82%. The findings suggest that leaders at the University of Kirkuk do not avoid ambiguity but handle it with responsibility and flexibility traits essential in entrepreneurial environments.

Table 3: Descriptive Analysis of the Tolerance for Ambiguity Construct

Item Number	Item Text	Mean	Standard Deviation	Relative Importance (%)
1	I treat ambiguous challenges as opportunities for growth and learning.	4.11	0.69	82.2%
2	I respond positively to situations involving a degree of ambiguity or uncertainty.	4.00	0.62	80.0%
3	I can work efficiently even in situations where there are no clear answers.	3.92	0.74	78.4%
4	I sometimes view ambiguity as an opportunity to discover new solutions rather than a threat.	4.06	0.71	81.2%
5	I can adapt quickly to sudden and unexpected changes.	4.13	0.68	82.6%

Interpretation

The results for this construct reflect a strong ability to adapt to ambiguous situations, as the means and relative importance indicate cognitive flexibility and acceptance among the leaders. The top two responses were for adapting to sudden changes (82.6%) and treating ambiguity as an opportunity for growth (82.2%).

Table 4: Descriptive Analysis of the Digital Infrastructure Construct

Item Number	Item Text	Mean	Standard Deviation	Relative Importance (%)
1	The digital infrastructure provides a work environment that encourages information sharing among employees.	3.87	0.79	77.4%
2	The university has an integrated digital communication network that supports task execution.	3.74	0.81	74.8%
3	The technological systems we use are easily scalable and updatable.	3.93	0.69	78.6%
4	Our various digital systems are integrated in a way that supports effective strategic decision-making.	3.82	0.74	76.4%
5	Our digital infrastructure contributes to improving performance speed and task execution accuracy.	4.05	0.72	81.0%

Interpretation:

The results indicate that the university's digital infrastructure is rated from acceptable to good, with relative importance ranging from 74.8% to 81.0%. The highest-rated item was performance improvement, suggesting relative efficiency in execution, although there is room for improvement in digital networks and communications.

Table 5: Descriptive Analysis of the Digital Leadership Construct

Item Number	Item Text	Mean	Standard Deviation	Relative Importance (%)
1	Leaders provide an environment that encourages the development of employees' digital skills.	4.22	0.66	84.4%
2	The leader ensures alignment of digital systems with the organization's objectives.	4.10	0.68	82.0%
3	The leader uses digital communication technologies to guide the team clearly.	4.18	0.71	83.6%
4	Leaders support the implementation of digital transformation initiatives in an organized and continuous manner.	4.09	0.67	81.8%
5	Leaders in my organization demonstrate digital flexibility and the ability to adapt to technological changes.	4.27	0.69	85.4%

Interpretation

Digital leadership received the highest means across all constructs, indicating a positive awareness among leaders of the importance of technology. The item on leaders' flexibility (85.4%) ranked highest, reflecting genuine leadership capability in managing digital transformation.

6. Correlation Coefficients for the Study Constructs

Table 6: Pearson Correlation between the Study Constructs

Constructs	Opportunity Recognition	Risk-Taking Propensity	Tolerance for Ambiguity	Digital Infrastructure	Digital Leadership
Opportunity Recognition	1.00	0.67	0.64	0.55	0.61
Risk-Taking Propensity	0.67	1.00	0.59	0.51	0.65
Tolerance for Ambiguity	0.64	0.59	1.00	0.58	0.63
Digital Infrastructure	0.55	0.51	0.58	1.00	0.69
Digital Leadership	0.61	0.65	0.63	0.69	1.00

Interpretation

- All correlation coefficients are positive, indicating direct relationships between the variables.
- The strongest relationship was between digital leadership and digital infrastructure (0.69), followed by the relationship between risk-taking propensity and digital leadership (0.65).
- The results suggest that the entrepreneurial mindset, across its various dimensions, positively affects the dimensions of digital transformation.

7. Hypotheses Testing Results

Table 7: Effect of "Opportunity Recognition" on "Digital Leadership"

Independent Variable	Regression Coefficient (B)	Standard Error	t-Value	Significance Level (Sig.)	95% Lower Bound	95% Upper Bound
Opportunity Recognition	0.518	0.099	5.22	0.000	0.320	0.716
Constant	1.011	0.408	2.48	0.016	0.193	1.829

Interpretation

The results indicate that "Opportunity Recognition" is a significant predictor of digital leadership, as the regression coefficient is positive and significant (B = 0.518, Sig. = 0.000). This means that an increase in opportunity recognition leads to an enhancement in digital leadership, with each unit increase in opportunity recognition corresponding to a 0.518 increase in digital leadership.

Table 8: Effect of "Risk-Taking Propensity" on "Digital Leadership"

Independent Variable	Regression Coefficient (B)	Standard Error	t-Value	Significance Level (Sig.)	95% Lower Bound	95% Upper Bound
Risk-Taking Propensity	0.636	0.089	7.16	0.000	0.457	0.815
Constant	0.693	0.351	1.97	0.053	-0.010	1.397

Interpretation

The results show that "Risk-Taking Propensity" is the strongest entrepreneurial mindset dimension affecting digital leadership, with a regression coefficient of 0.636 and a highly significant level (Sig = 0.000). This indicates that leaders with higher risk-taking tendencies tend to possess greater digital leadership capabilities.

Table 9: Effect of "Tolerance for Ambiguity" on "Digital Leadership"

Independent Variable	Regression Coefficient (B)	Standard Error	t-Value	Significance Level (Sig.)	95% Lower Bound	95% Upper Bound
Tolerance for Ambiguity	0.368	0.104	3.53	0.001	0.159	0.576
Constant	2.117	0.421	5.02	0.000	1.273	2.960

Interpretation

"Tolerance for Ambiguity" is also a significant predictor of digital leadership. The positive coefficient (B = 0.368) and significance level (Sig = 0.001) indicate that a leader’s ability to handle ambiguous situations enhances their effectiveness in a complex digital environment.

Chapter Four: Conclusions and Recommendations

First: Conclusions

1. The administrative leaders at the University of Kirkuk possess a strong entrepreneurial mindset, reflected in high levels of opportunity alertness, risk-taking propensity, and positive handling of ambiguity. This indicates an institutional culture that encourages initiative and entrepreneurial thinking.
2. Descriptive analysis results showed that digital leadership received the highest evaluation among the dimensions of digital transformation, reflecting a leadership awareness of the importance of digital technology in team management and decision-making.
3. Pearson correlation tests indicated that all dimensions of the entrepreneurial mindset are positively and significantly correlated with digital transformation. The strongest relationship was between digital leadership and digital infrastructure (0.69), followed by the relationship between risk-taking propensity and digital leadership.
4. Simple linear regression results demonstrated a

significant and positive impact of opportunity alertness, risk-taking propensity, and tolerance for ambiguity on digital leadership, with risk-taking propensity having the strongest effect.
5. Testing the main hypothesis regarding the impact of the entrepreneurial mindset on overall digital transformation showed that risk-taking propensity and tolerance for ambiguity have a significant positive effect, while opportunity alertness had no significant impact. This suggests that actual implementation and behaviors associated with risk and adaptability are more important than mere recognition of opportunities.

Second: Recommendations
1. Strengthen training programs focused on developing entrepreneurial skills among leaders, such as decision-making under ambiguity, risk management, and fostering innovative thinking.
2. Adopt flexible organizational policies that support entrepreneurial initiatives and reward boldness in exploring opportunities, even if not always successful, to foster an innovative organizational environment.
3. Enhance integration between the entrepreneurial mindset and digital transformation through joint workshops that bring together leaders and technical specialists to design implementable digital initiatives.
4. Develop digital infrastructure in alignment with leadership capabilities, as the results indicated a disparity between the evaluation of digital infrastructure and digital leadership.
5. Encourage future research in other educational institutions to assess the generalizability of the results and measure the actual impact of the entrepreneurial mindset on institutional performance in different environments.

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