

Intellectual Capital Management as a Strategy for Digital Transformation in Higher Education Institutions: The Case of King Khalid University, Saudi Arabia

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Abstract

The study aims to review the effective role of intellectual capital management as a strategy in pro-moting the digital transformation process at King Khalid University from the point of view of the faculty members and students. The study relied on the descriptive analytical approach to achieve this goal, and the survey list was used as a main tool for data collection, and it was distributed to a sample of university faculty members. The statistical analysis program (spss) was used as an integrated statistical package to enter and process data and test hypotheses. The sample size of the study amounted to (120) individuals, The study seeks to answer the main question: What is the role of intellectual capital management in promoting the digital transformation of the educational system? And to clarify the relationship between the ability of faculty members to manage intellectual capital and the success of digital transformation in the educational process, The results of the study revealed a positive relationship between intellectual capital and the promotion of the university's digital transformation in all its administrative and academic operations, And that faculty members have administrative and intellectual skills that help them to think scientifically to manage intellectual capital and guide students efficiently, This means that the university possesses academic competencies that help the success of digital transformation. The study showed that human capital enabled the university in a short period of time to succeed and to automate all its administrative and academic work, overcoming all obstacles facing the student and the teacher, The study recommended that the university should hold community partnerships to enhance intellectual and electronic capabilities and exchange knowledge and experiences.

Keywords: *Intellectual Capital Management, Digital Transformation, King Khalid University.*

1. INTRODUCTION

Universities are among the most suitable institutions to adopt the digital transformation approach (Nurluozet al., 2011). Simply because it has a huge stock of strong knowledge infrastructure. It is also the most important identity component of the education system through which the student's personality will be flourished and developed. It is the main engine for achieving social development as well as the progress in various aspects of life (Alghamdi, 2012). Accordingly, successful organizations are those who are working on developing their human resources and applying the intellectual capital to be successful and distinguished.

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The knowledge economy is a modern global trend that the developed countries and societies seek to achieve by taking advantage of the data of the times and creating a digital economy whose backbone is communication and information networks, and relying on the power of information, knowledge and human capital to increase its domestic product. Intellectual capital is the actual indicator that helps the success of any organization, and a major source of its distinction and superiority.

Academic institutions, particularly universities, with their different management, are among the best and most needed organizations for implementing digital transformation. Because it helps it improve university performance and achieve its future goals in light of the rapid changes in the external environment. Apparently, universities do not differ from each other in terms of owning material and human resources, but they differ in terms of possessing sustainable competitive advantages represented in intellectual capital (El-Hilali, 2012; Cricelli, et al., 2018). Consequently, the universities are required to make changes in the technological structure related to content, methods, and academic assessment, in order for the educational process to succeed. Such transformation led researchers to realize the importance of investing in the human element and increasing its knowledge like other intangible assets such as the organization's reputation, organizational climate, job satisfaction, customer service, innovation, and creativity (Chiavenato, 2001). Therefore, the role of intellectual capital in activating digital transformation, especially at King Khalid University (KKU) in Saudi Arabia is the main aim of the current study.

The current study concerns about the role of intellectual capital management as a strategy to promote the digital transformation process in the higher educational institutes, particularly, King Khalid University, Saudi Arabia. It is very important to know the availability of different intellectual capital dimensions and their contribution in the digital transformation process. On the other side, what will be the required proposals to enhance the effectiveness of the university's intellectual capital in the digital transformation process.

Digital Transformation:

Digital Transformation (DT) refers to the use of technology within organizations to improve the delivery of goods and services to the public and target customers (Jensen, 2019). Given the rapid changes and opportunities offered by new technology, DT can be defined as the process of transforming business, service, competency, and process activities into digital models (Kumar, 2016). Without doubt, DT helps academic institutions to obtain an advanced information infrastructure and effective information and communication technologies (ICT) to be able to conduct all its activities online (Ali, 2013). Therefore, DT would save a lot of time and effort for all elements of the educational process and enable huge volumes of content to be used (Egbert, 2009).

DT in universities aims to integrate modern technologies in education to provide students a with direct access to several external sources of knowledge and to enhance student's self-learning skills (Al-Hadi, 2005). Improving the supportive competition between all elements of the educational system (management, teachers, and students) is a continuous target for DT. Applying the concept of DT in universities provides a culture of decision-making based on data and establishes a digital mindset throughout the campus for leadership, students, faculty, and university staff (Sousa and Rocha, 2019; Mohammad, 2021). DT commits the faculty members to be very well trained on using modern technology in all teaching processes including lecturing, examination, grading and communication (Mohammad, 2022; Alfaiakawi and Alenizi, 2018).

Saudi universities have been tried to use DT in the educational processes since the mid-1990s, especially with the increase in the number of students enrolled. In 1996, the first traditional form of electronic learning (E-Learning) was demonstrated by using

computers in teaching and later after this, King Abdulaziz University Jeddah started the e-learning systems and virtual classes on 2005 (Al-Asmari and Khan, 2014).

The deanship of E-Learning at KKU developed and designed innovative tools which significantly contributed to the e-learning system and improved its outputs. As a result of these efforts, the deanship of E-learning in KKU has achieved the first place in the international competition Quality Matter (QM) about making difference for students in the higher educational levels outside the USA in the year 2021. Quality Matters is the world leader in e-course quality, with over 1,500 educational institutions from 30 countries around the world.

KKU is working to reduce the impacts of Covid-19 and preserving its constituents and students by implementing precautionary procedures. The university management is committed to distribute guidelines to ensure safety for all and to support education in the ongoing pandemic (Mohammad, 2022). Because of these actions, the study was not interrupted, and DT proceeded successfully during the pandemic although the existing challenges.

Distance education

Societies that failed to employ the distance education system have become undeveloped societies and it is difficult for them to keep up with the rapidly growing information era. Accordingly, distance education become the focus of attention of global and regional academic institutions as well as governments of the developed countries that are interested in introducing the distance education system in their educational systems (Al-Bitar, 2016).

DT can only be achieved when the organization recognizes and embraces the significance of digital culture and puts it as a high priority demand. It is not just a technical problem, but a problem related to both organizational structures and individuals (Duparc, 2013). The higher education sector is one of the most common organizations that are directly affected by such changes (Mehaffy, 2012). Therefore, in Saudi Arabia, the Ministry of Education, in collaboration with the Ministry of Education have prepared the *Madrasati* platform, which is an educational platform that helps study courses, and enables students to interact with teachers, as if they are in one classroom (Al-Dahshan , 2020).

Intellectual Capital:

The Organization for Economic Cooperation and Development defines intellectual capital as the economic value of two categories of intangible assets represented in the organization's structural capital and human capital (Nahapiet and Ghoshal, 1998; Guthrie, 2001 and El-Gendy, 2005). In other words, intellectual capital is the summation of human and structural capitals (Andriessen, 2004). The competency of workers based on their education and experience is a significant component of the intellectual capital (Sveiby, 1997). Not only this, but the internal structure of the organization which includes legal form, management, systems and the organization culture is considered as one of the most important sources of intellectual capital. The relations between the organization and customers and suppliers contribute to its intellectual capital.

The intellectual capital is one of the basic requirements for determining the value of an enterprise, and it extends as a value outside the boundaries of the organization to include the value of the relations that the enterprise possesses with each link of the extended value chain, in addition to the relations which established with all other parties in the external community (El-Gendy, 2005).

Intellectual Capital Component

There are several attempts to identify the main components of intellectual capital and establishing indicators to measure these components. Among these attempts, Kurdi

(2010) divided the IC into three main parts (Human, structure, and Technology) which are integrated to measure the efficiency of IC in universities (Figure 1).

- I. Human capital is the skills, knowledge, and experience that individuals gain within an organization, and it is a source of competitive advantage for them. Additionally, it is considered as one of the most important sources of innovation within the organization if they are invested effectively (Soli, 2014).

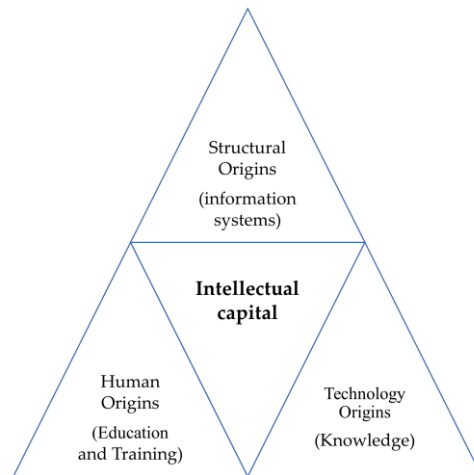


Figure 1: Intellectual capital components in the education systems.

- II. Structural capital refers to the devices, equipment, and all technical and cognitive means, as well as procedures and strategies that support and assist individuals in the productive process within the organization to carry out their work efficiently and with high quality (Soli, 2014). Structural capital deals with the mechanisms and structures of the organization that support workers in their quest for optimal performance from the intellectual aspects, it is the crucial link that allows individuals to innovate and be creative.
- III. Technology is part of the organization's culture and strategies which reflect the percentage of investment in knowledge management and information technology (El-Etreby, 2017). Technology includes innovation, and operations capital.

As mentioned by Morsi (2013), the indicators that infer the IC include:

- i- Organizational Structure: It includes the authority of the institution's control system, the clarity of the relationships between authority and responsibility.
- ii- Operations: includes the level of product quality and the efficiency of operational processes.
- iii- Information system: It includes mutual support between employees, providing data and information related to the institution's activity, and sharing knowledge.
- iv- Relationships capital: It reflects the relationships that the organization has with its customers, suppliers, competitors, or any other party that contributes to the development and transformation of ideas into valuable products and includes integration factors with government ministries, regional authorities, companies, institutions, the entire community and relations International cooperation, short-term cooperation and long-term partnership in order to produce new components in all sub-systems of the intellectual capital of the organization (Qarni and Al-Atiqi, 2012).

In its turn, the indicators which can be inferred on the capital of relations include:

- Marketing capabilities: include building and using a customer database, providing the necessary capabilities to serve customers and service beneficiaries, and the ability to identify customer needs.
- Market Density: It includes the units sold to several customers.
- Customer loyalty indicators: These include the extent of customer satisfaction with the service, customer complaints, building relationships with customers, and the level of new customers (Morsi, 2013).

In the business model, intellectual capital is divided into market, human, intellectual and infrastructure assets as per Brooking (1997) (Figure 2).

Market Assets	Human Assets	Intellectual Assets	Infrastructure Assets
<ul style="list-style-type: none"> • Brands • Customers • Distribution outlets • Accumulated orders 	<ul style="list-style-type: none"> • Experiences • Innovation capabilities • Problem solving • Performance indicators 	<ul style="list-style-type: none"> • Commercial relations • Trade secrets • Patents • Education • Knowledge rights 	<ul style="list-style-type: none"> • Organization's culture • Risk assessment methods • Sales management methods • Financial structure • Customer databases • Communication systems

Figure 2: Intellectual capital components in the business model.

The importance of developing intellectual capital in universities:

Intellectual capital contributes to achieving the results and objectives of universities. The survival and continuity of universities in the practice of their activities and work is closely related to the capabilities, skills and various roles played by the human element, which is the main component of intellectual capital (Alsaho, 2011).

Intellectual capital represents a competitive advantage for universities, as universities compete in the current era on the basis of their knowledge and skills, which represent a fundamental source of competitive advantage (Sheikh, 2013). Contemporary, the importance of the intellectual capital available at the university is represented in its ability to form a new stock of knowledge, as a result of the interaction between the latent knowledge of its members and the explicit knowledge that is represented in its balance of experiences and transactions.

The value of knowledge available to the university is concentrated in being the basis for wealth production activities through the practical application of ideas, information, concepts and methods and their use for the purposes of continuous improvement in the performance of the university's functions, and the production and innovation of products and services that were not known before (Qarni and Al-Atiqi, 2012).

Objectives of intellectual capital development at King Khalid University:

King Khalid University was established by Royal Decree No. 7/78/AD on 3/11/1419 AH, which includes the completion of all the necessary legal procedures. Accordingly, the university's first budget was issued on 9/14/1419 AH as part of the state's general budget for King Khalid University to be involved in the pre-existing educational system of Saudi universities. The university is located in the Asir region in the southwest of the Kingdom of Saudi Arabia (kku.edu.sa). The development of intellectual capital in universities is one of the most important elements that enable the university to achieve strategic vision. In other words, achieving a return on investments, considering the social return of university education, and achieving university cost-effectiveness, i.e. achieving the

highest return on the money spent. Strengthening the university's stability as a social system, creating a frame of reference for the university's activities and work, and developing a sense of self. The mutual relationship between universities and intellectual capital can be itemized as follows:

- I. The development of intellectual capital provides the university with the capability to face external and internal competition and to improve its competitive rank (Koenig, 1996).
- II. Empowering workers with knowledge and shifting away from the patterns of central organizations and relying on flat organizational structures through which allows the communication and direct interaction between individuals to be open and more efficient (Al-Salma, 2002).
- III. The development of intellectual capital helps in integrating knowledge, increasing the university's ability to invest knowledge, the successful implementation of innovations, developing new models and methods of work, and attracting more new clients.
- IV. Contributes to the transformation towards a knowledge university, i.e. a university that has a technological infrastructure that enables it to apply knowledge management in its daily operation and spreads a culture that enables workers to exchange ideas and information.
- V. Increasing the university's ability to develop its productivity and develop its capabilities for innovation and creativity and the growing investment in people through good preparation of learning and training plans and programs, and the development of research and development plans (Al-Kathiri, 2013).

The result of intellectual capital management in promoting the digital transformation strategy

KKU has relied mainly on e-learning policy. Accordingly, the ad-hoc committee of the Ministry of Education has decided to keep up on developments during the time of DT as follows:

The supervisory offices must operate through the suspension period in order to follow up the educational process, coordinate all procedures for distance education and respond to all inquiries from parents.

To ensure that the Virtual School runs during the suspension period through e-learning tools provided by the Ministry of Education through the Virtual School platform and the use of digital video materials via the website and applications in the Apple App Store and AI & Rod as the Unified Education System.

Regarding the universities, they should work in collaboration with the national center for electronic education to prepare the students for the E-learning approach.

KKU is reacting immediately to the directions from the ministry by publishing the work guide of the e-learning approach on the main website of the university. The guide contains multiple techniques for e-learning to be conducted and deliver the service for more than 60 thousand students in 29 colleges through more than 5200 courses. On the other hand, during the first three months of distant social, the DT of education allows the university to offer more than 20 professional training courses to the faculty members. In addition, many courses were also offered to the students in the field of life and academic skills.

The procedures for quarterly and final tests were considered, in terms of problems that students might face, and for working out mechanisms to resolve them in a manner that ensures flexibility and consistency in the performance of the tests, held in the form of remote electronic tests, as well as presentations and all assignments carried out electronically.

The University has also directed a lot of attention to the disabled students during the pandemic and provide them the access to distance education. The University has created 563 literacy and visual content and developed 15 courses to facilitate their learning and the activation of e-learning.

The university's intellectual Capital role in the activation of digital transformation.

The universities are one of the most important institutions of intellectual capital due to their role in the production of knowledge through scientific research, and the transfer of knowledge via teaching, and then working on its contribution and marketing via communication with the external community and the development of the environment (Abdel Aziz, 2012). The real competition between universities starts when each university tries to develop their own intellectual capital, and to attract distinguished intellectual elements from other universities, as most universities have become aware that the real value of them is not only due to material factors, but also to human, organizational and relational factors (Galal, 2009). Going with the same context, the intellectual capital considered as the basis for creating digital technologies and the way to implement plans aimed at building the competitive capabilities of universities.

The process of developing intellectual capital in universities can be achieved through electronic training, which came in response to the requirements of the times on the one hand and using it as an entry point for developing intellectual capital, in order to reach distinct levels of performance and quality (Mohamed, 2014). Intellectual capital is what the university faculty members possess of distinct cognitive capabilities that universities work to employ through their policies and training programs to put these new knowledge and ideas into practice. However, in the pandemic times, crisis management has an effective role in the digital transformation process and the quality of the educational system at King Khalid University (Mohammad, 2022). The study (Waih, 2013) concluded that the university serves as an incubator for intellectual capital, so it must bear the responsibility for comprehensive development in society, and this can only be done through attention to intellectual capital at the university, including the knowledge and scientific capabilities possessed by its faculty members, and the climate it provides. Intellectuality supports creativity and excellence. The university professor derives the nature of his mission from the university's goals. He enriches and develops knowledge through scientific research, transfers and preserves knowledge through teaching, and transfers experience, skill and advice through community service.

Literature Review

Abdul Razek (2020) aims to clarify the role of intellectual capital in achieving technical innovation by testing the relationship and impact models between them. The problem of the study was embodied in several questions, including: Does intellectual capital contribute to achieving technical innovation? What is the reality of the relationship between them in the company in question? The sample of the study consisted of (30) employees, including all managers and their assistants at the upper, middle and lower management levels in the Asia Cell Mobile Communications Company. The questionnaire was relied on as a main measurement tool for the study, and then relied on personal interviews to collect data. The study also relied on the descriptive and analytical approach to display and analyze the data. Several statistical methods were employed to analyze this data, most notably (Pearson correlation coefficient), Simple regression analysis method, F and t test). The study concluded that the shares of the intellectual capital of the company in question have an impact on the achievement of technical creativity, and the study recommended the need for the company to pay attention to the relations between superiors and subordinates and its relations with customers to understand their needs in a big way.

AL-Jinini (2019) aimed to identify the impact of intellectual capital (IC) on technical innovation (IT) and entrepreneurship (EO) in small and medium-sized companies. To 63

employees working in small and medium companies in Jordan, the study found that all dimensions of intellectual capital positively affect technical innovation and leadership, and that human capital and relationship capital have a strong impact on technical creativity.

Zouaoui and Benkhedidja (2017) aim to understand the role of digital learning in the development of intellectual capital in some companies in Setif Governorate, and to know this role in the development of intellectual capital in its three dimensions represented in (human capital, Structural capital, relational capital, and data collection from the thirty surveyed companies, and the SPSS program was used to analyze the questionnaire data. The study reached a number of results, the most important of which was that there is a positive role for digital learning in the development of intellectual capital.

Yaseen (2016) aimed to determine the extent of the impact of the components of intellectual capital on the competitive advantage in Jordanian telecom companies, The results concluded that both relationship capital and structural capital have a positive impact on competitive advantage, and that relationship capital and structural capital affect competitive advantage by 38,25%.

Jodaki and Abdeyazdan (2015) presented a structural pattern of e-learning and intellectual capital in the special economic zone of the port of Abadan, Iran. It is relied on the list of the questionnaire, which included all employees, managers, assistants, and experts in the port of Abadan. The study sample consisted of 40 port managers and 180 employees. The results of the study demonstrated a positive relationship between e-learning and the three dimensions of intellectual capital (human capital, organizational capital, and customer capital).

Hussinki et al. (2017) developed and proved both the theoretical framework and models of the relationship between intellectual capital and intellectual capital practices and their components that affect organizational performance. The study concluded that building organizational value depends on intellectual capital with all its components represented in (human capital - structural capital - relationship capital). The dimensions of knowledge management are represented in (generation and acquisition, storage and retrieval, dissemination and distribution, application of knowledge).

Kamukama et al. (2011) determined the role of the mediating variable, competitive advantage, in the relationship between intellectual capital and improving financial performance in microfinance institutions in Uganda. The study was conducted on a sample of 57 microfinance institutions in Uganda. It relied on the MedGraph program, Sobel's test, and the method (Baron & Kenny, 1986) to test the effects of mediation. The study concluded that competitive advantage is an important mediator in the relationship between intellectual capital and financial performance, and the enhancement of the competitive advantage between them by up to 22.4%.

2. MATERIALS and METHODS

The current study relies mainly on the descriptive analytical approach which include describing and analyzing the phenomenon in order to understand and determine the contribution of intellectual capital to the digital transformation of the education process in KKU. The research is limited to the KKU community and covers the time period between July to October 2022

2.1. Sampling and Populations

A survey questionnaire has been designed and distributed by the author among the faculty members and students in Al-Mahala college, Campus of KKU, via online access to measure their perceptions about the research topic. The survey sample consists of 62 faculty members who are totally involved in the education processes, and they are all

practiced the DT based on the instructions of CM at KKU. The students participated in the survey were 74 from different academic levels. The study samples have been carefully selected to represent one of the main campuses of KKU. The details, characteristics, and distribution of the questionnaired samples are shown in the following tables and figures (Tables 1-3, Figures 3-5).

2.1.1. Category

Table (1) and Figure (3) show the frequency distribution of the study samples.

Table 1: Frequent distribution of study sample.

Category	Number	Percentage
Faculty Member	46	38%
Students	74	62%
Total	120	100%

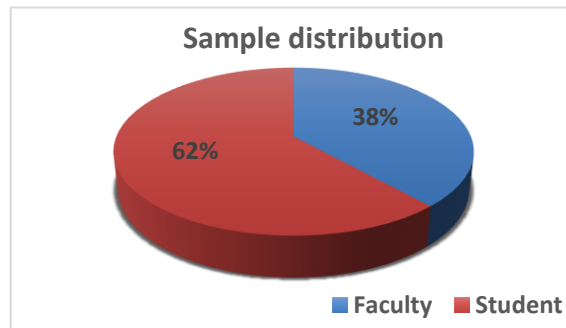


Figure 3: Bi-chart shows the distribution of study samples.

2.1.2. Career Level

Table 2: Frequent distribution of Faculty members based on their rank.

Career	Number	Percentage
Full Professor	3	7%
Associate Professor	9	20%
Assistant Professor	18	39%
Lecturer	12	26%
Teaching assistant	4	8%
Total	46	100. %

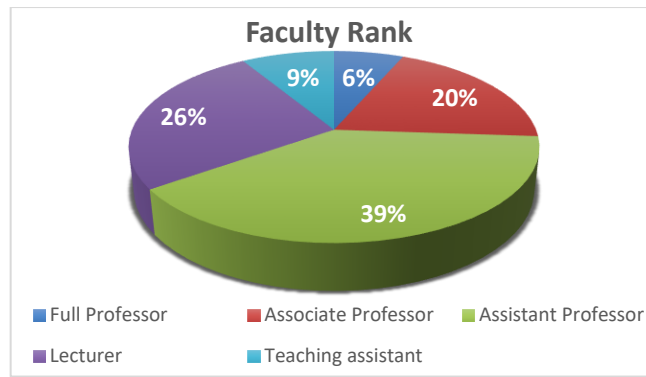


Figure 4: Bi-chart shows the distribution of faculty rank.

2.1.3. Experience Level

Table (3) and figure (5) show the frequent distribution of the study sample according to their experience variable.

Table 3: Experience factor of faculty members participating in the survey.

Years of Experience	Number	Percentage
5 years or less	20	43%
6 to 10 years old	23	50%
From 11 to 15 years old	3	7%
More than 15 years	-	-
Total	46	100. %

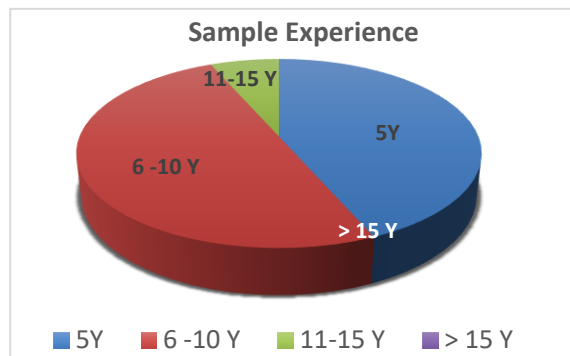


Figure 5: Bi-chart shows the distribution of experience of faculty members.

All participants in the survey have been given information about the purpose of the research and their data and information will be anonymously processed. The faculty participation in the survey was voluntary.

2.2. Data Collection

The questioner which is used to collect the information from the surveyed sample is made up of two parts; the first part consists of the personal data and the second part contains the questions of study hypotheses. The researcher used closed questions to identify the answers because of the subject significance and also used the five-scale measure to select the appropriate answers.

3. RESULTS

The results of the study reflected a significant success at King Khalid University in completing all the requirements of the educational process for digital transformation efficiently, by relying on human resources.

3.1. *The Validity and Reliability of the Survey*

The apparent and content validity of the survey have been evaluated by three reviewers who confirmed the validity of the questionnaire to test the hypothesis of the study. Using the Statistical Package for the Social Sciences (SPSS), the reliability and stability of the survey have been measured.

The validity expressed by the degree of honesty coefficient for each set is higher than (0.60) while the average of the validity coefficient in the whole questionnaire reaches 0.886. The reliability coefficient for each set of questions in the survey is higher than (0.60) while the reliability coefficient of the whole questionnaire is about 0.785 which indicates the high stability degree of the questionnaire (Table 4). Accordingly, the questionnaire list is characterized by a high degree of honesty, and this means that the list of the questionnaire is true to what it was developed for.

Table 4: The reliability and validity of the questionnaire sets.

Dimensions	Surveyed Factor	Validity	Reliability	number of statements
1st Set	role of intellectual capital management in promoting the DT.	0.645	0.803	10
2nd Set	The availability of capital management requirements at King Khalid University	0.675	0.822	12
3rd Set	The importance of DT.	0.749	0.865	15
	Average	0.886	0.785	37

3.2. *Survey Statistics and hypothesis tests*

The statements in the distributed questioner explore the impressions of faculty members and students toward the acting of intellectual capital management in DT. To describe the data property, the statistical analyses identified three significant measures include the mean (M), standard deviation (SD), and relative importance index (RII) for each statement in the three sets of questioners.

3.2.1. Role of intellectual capital management in promoting the DT.

The results presented in Table (5) reveal that the total answers on the statements related to the intellectual capital management in promoting the DT in the educational system is high with M (4.26), SD (0.492) and RII (85.26 %). The highest response was specifically to the statement " Capital management was able to overcome the obstacles of change from the traditional form to the digital form in quick ways.

The least answers of the sample members came to the paragraph that states: The university pursues an explicit policy for managing intellectual capital.” Enhancing the digital transformation of the educational system at the university under study, due to the

fact that the university has taken a distinguished approach to education and successfully reached the transformation process.

Table 5: Arithmetic mean, standard deviation, and the relative importance of the paragraphs of the role of intellectual capital management in promoting the digital transformation.

No.	Statement Text	Mean (M)	Standard deviation (SD)	Relative importance Index (RII)	Arrangement
1	The university provides a specialized team to develop the knowledge assets existing in universities	4.39	0.76	87.75%	4
2	The university is committed to holding periodic meetings for open discussion on the subject of digital transformation.	4.26	0.86	85.27%	6
3	Intellectual capital management helped achieve a competitive advantage for the university	3.89	0.95	77.83%	8
4	The university provides faculty members with courses to develop intellectual capital	4.43	0.73	88.68%	3
5	The university has provided all the requirements for managing intellectual capital for change for digital transformation	4.27	0.77	85.43%	5
6	The university uses specialists from outside the university to carry out all the work that will analyze the relationship between human resource and digital transformation	3.89	0.89	77.83%	8
7	The university has the ability to manage intellectual capital in a way that helps the success of the digital transformation process	4.54	0.64	90.85%	2
8	Intellectual Capital Management has been able to overcome the obstacles of change from the traditional form to the digital form in quick ways	4.86	0.37	97.21%	1
9	Follow-up and evaluation of the methods that are relied upon in the management of intellectual capital.	4.24	0.89	84.81%	7
10	The university pursues an explicit policy for managing intellectual capital, which is declared to all	3.84	1.03	76.90%	10

average dimension 4.26 0.492 85.26%

3.2.2. Analysis of the paragraphs of the availability of the dimensions of intellectual capital at King Khalid University and the success of digital transformation in the educational process

The total degree of the respondents' answers to the items related to the dimension of human capital at King Khalid University and the success of digital transformation in the educational process was high, with an arithmetic mean of (4.31) and a standard deviation of (0.380) (Table 6).

The total degree of the answers of the sample members to the related items was high, with an arithmetic mean of (4.26) and a standard deviation of (0.492),. It is noted that there is a difference in the response of the study sample members to the rest of the items listed under this dimension.

Table 6: Arithmetic mean, standard deviation, and the relative importance of the paragraphs of the availability of the dimensions of intellectual capital at King Khalid University and the success of digital transformation.

No.	Statement Text	Mean (M)	Standard deviation (SD)	Relative importance Index (RII)	Arrangement
structural capital	The university supports faculty members and trains them on how to create digital content for activities and assessments in a way that suits students' understanding.	4.86	0.35	97.21%	1
	The university seeks to provide services to its students of value.	4.61	0.52	92.25%	3
	There is a clear and announced strategic plan for developing the intellectual capital of university employees.	4.58	0.60	91.63%	5
	Faculty members have the managerial and intellectual skills that help them to think scientifically to manage intellectual capital and guide students.	4.86	0.35	97.21%	1
Human capital	There is a sufficient technological infrastructure to manage the digital transformation process in all faculties of the university.	4.86	0.35	97.21%	1

	The university uses its employees to make strategic decisions regarding digital transformation.	4.13	0.91	82.64%	10
	The university was able to increase its advanced networks and modern technologies to accommodate the huge increase in data traffic.	4.64	0.51	92.71%	2
	Material support is available for the digital transformation program and to increase the provision of electronic services.	4.49	0.81	89.77%	8
capital relations	The university has strategies to maintain the survival of its employees.	2.62	1.08	52.40%	12
	The university is working to introduce new strategies in digital transformation and distance education.	4.60	0.54	91.94%	4
	The university administration is interested in studying the variables of the competitive environment in order to keep pace with developments.	4.19	0.94	83.72%	9
	The university administration is concerned with achieving job satisfaction for its members and establishing good relations with them.	4.55	0.66	91.01%	7
Average Dimension		4.31	0.380	86.24%	

3.2.3. The importance of DT in university

The highest answers of the sample members came to the paragraph that states: “The faculty members have the administrative and intellectual skills that help them in scientific thinking to manage intellectual capital and guide students.” The researcher believes that this is due to the role of the university in developing the skill of its members, meeting the vision of the Kingdom 2030, and achieving goals. The strategy to improve the academic environment, followed immediately by the fact that the university was able to increase its

advanced networks and modern technologies to accommodate the huge increase in data traffic.

The least answer of the sample members came to the paragraph that states, "The university uses its employees to make strategic decisions regarding digital transformation." This means that it does not trust its affiliates.

The total degree of respondents' answers to the items related to the dimension of structural capital at King Khalid University and the success of digital transformation in the educational process was high.

The least answers of the sample members came to the paragraph that states: "There is a clear and declared strategic plan for developing the intellectual capital of university employees." The mean was 4.13, the standard deviation was 0.91 and the relative importance was 82.64%. and digital transformation.

The total degree of the answers of the sample members to the paragraphs related to the dimension of capital, relations at King Khalid University and the success of digital transformation in the educational process was high as follows:

The highest answers of the sample members came to the paragraph that states: "The university is working to present new strategies in digital transformation and distance education."

The least answers of the sample members came to the paragraph that states: "The university has strategies to maintain the survival of its employees", where the arithmetic mean was 2.62, the standard deviation was 1.08 and the relative importance was 52.40%, and the researcher believes that the university should find the best strategies that will preserve human cadres Distinguished so that there is no job leakage from them.

3.2.4. The importance of digital transformation

Table 7: Arithmetic mean, standard deviation, and the relative importance of the paragraphs of the availability of dimensions of intellectual capital at King Khalid University and the success of digital transformation in the educational process

No.	Statement Text	Mean (M)	Standard deviation (SD)	Relative importance Index (RII)	Arrangement
1	Digital transformation has helped improve quality, productivity and academic performance	4.63	0.56	92.56%	5
2	Digital transformation helped complete the educational process successfully	4.55	0.72	91.01%	7
3	The results of the final exams for the students resulted in the success of the digital transformation experience	4.53	0.65	90.54%	9
4	The digital transformation has helped the faculty member to build integrated electronic courses, display a course	4.67	0.54	93.33%	3

	outline, and publish announcements, assessments, and quarterly and final exams with ease.				
5	Digital transformation provides an opportunity for students to communicate with the course outside the lecture hall in different places and times and through various electronic means	4.54	0.57	90.85%	8
6	Digital transformation about education from the method of indoctrination to the interactive method	4.51	0.56	90.23%	10
7	Digital transformation helps to improve and improve education.	4.63	0.66	92.56%	5
8	The digital transformation enabled the student and the member of the Tetris body to build dynamic and interactive courses in a flexible manner	4.73	0.48	94.57%	2
9	Digital transformation helped develop learner's motivation to learn	4.36	0.81	87.13%	13
10	Contributed to reducing the attendance density, and reducing the spread of infection among students and members	4.49	0.59	89.77%	11
11	Digital transformation helped develop self-learning skills	4.86	0.37	97.21%	1
12	We would like to adopt e-learning alongside attendance	4.64	0.61	92.87%	4
13	The university establishes community partnerships to enhance electronic capabilities	4.06	0.84	81.24%	15
14	Distance learning helped me take precautionary measures	4.46	0.63	89.15%	12
15	The university has a culture that seeks to promote digital	4.24	0.89	84.81%	14

transformation			
Average dimension	4.53	0.385	90.52%

3.3. Analysis of Research Hypotheses:

The current research based on three main hypotheses;

- I. The total degree of responses of the sample members to the paragraphs related to the dimension of the importance of digital transformation, with an arithmetic mean of (4.53) and a standard deviation of (0.385) in light of the benefit of activating the management of intellectual capital.
- II. The highest answers of the sample members came to the paragraph that states: The digital transformation helped develop self-learning skills and this is due to the success of the digital transformation, overcoming all difficulties and self-reliance, and that there is a response to the transformation process. The second arrangement for the paragraph "Digital transformation enabled the student and the member of the Alters to build dynamic and interactive courses in a flexible manner," which indicates the effective role of intellectual capital in the success of the transformation process.
- III. The least answers of the sample members came to the paragraph that states: "The university establishes community partnerships to enhance electronic capabilities." This is because the university still needs a cooperative relationship to exchange knowledge and experiences, which contributes to improving and developing capabilities and the quality of education.

3.3.1. The first hypothesis:

There are no statistically significant differences at the level of significance ($\alpha \geq 0.05$) among the sample of faculty members regarding the role of intellectual capital management in promoting the digital transformation of the educational system at King Khalid University (Table 8).

To test this hypothesis, the following tests were conducted:

Table 8: Contrast test results of the first hypothesis.

Statement	Averages		Test value	Morale
	Students	Faculty Members		
The university provides a working team specialized in the management of intellectual capital.	4.46	4.31	1.352	0.247
The university is committed to relying on modern approaches that increase its ability to use scientific methods that support the development of intellectual capital within it.	4.37	4.15	2.276	0.134
Academic competencies are being attracted, which have advantages that make them an added value to the university.	4.64	4.44	3.437	0.066
The university takes steps that will overcome obstacles to digital transformation, and benefit from and develop intellectual capital.	4.31	4.16	0.939	0.334
The university has the ability to manage intellectual capital in a way that helps the	3.91	3.77	0.557	0.457

success of the digital transformation process.				
The university uses specialists from inside and outside the university to carry out all the work related to the management of intellectual capital in its various dimensions.	3.87	3.92	0.117	0.732
The university monitors and evaluates the methods that are relied upon in the management of intellectual capital.	4.49	4.37	0.899	0.345
University leaders who work on preparing various ways to develop intellectual capital in universities are selected	4.85	4.87	0.096	0.758
The university has a conscious and supportive culture that is propagated in the faculties.	4.31	4.22	3.199	0.062
There is a formulation and dissemination of a clear vision and message for the digital transformation of the university.	3.99	3.79	1.37	0.244

The results show a consistent answer from faculty members and students regarding this hypothesis as indicated from the Mean (M) values. The probability value of the variance test is greater than the significance level (0.05), which shows that there are no statistically significant differences between the responses of the respondents' categories to the role axes Intellectual capital management in promoting the digital transformation of the educational system, which indicates that there are no significant differences between study groups (faculty members, students) towards those dimensions.

3.3.2. The second Hypothesis:

There is a direct, statistically significant relationship between the availability of the dimensions of intellectual capital management at King Khalid University and the success of digital transformation in the educational process. To test this hypothesis, a number of tests were carried out (Tables 9-11).

- correlation coefficient:

It is clear from the previous table that there is a statistically significant correlation of 54.4% at a significance level of 0.05 between the dimensions of intellectual capital management and digital transformation (Table 9).

Table 9: Correlation coefficient for the second hypothesis

Variable	the test	digital transformation
	correlation coefficient	0.544
Dimensions of intellectual capital management	Morale	0.000

- The coefficient of determination:

Table (10) shows that the coefficient of determination $R^2 = 0.296$, which means that the dimensions of intellectual capital management explain the change in digital transformation by 29.6%, and the remaining percentage is explained by other variables that were not included in the regression relationship, in addition to the random errors resulting from the sampling method and the accuracy of the measurement and others.

Table 10: coefficient of determination for the second hypothesis

Independent variable	The coefficient of determination	Modified determination factor	standard error
Dimensions of intellectual capital management	0.296	0.291	0.3245

- ANOVA Test:

It is clear from table (11) that there is a direct significant correlation between the dimensions of intellectual capital management and digital transformation, and this is shown through the value of “P”, which is a statistical function at a significant level of 0.05 and indicates the validity and essentiality of the relationship between the two variables, the quality of the framework and the validity of relying on its results without errors.

Table 11: analysis of variance for the second hypothesis

Declaration	sum of squares	degrees of freedom	mean squares	F	Morale
Regression	5.612	1	5.612	53.28	.0000
the rest	13.377	127	0.105		
Total	18.989	128			

- Regression analysis:

Table No. (12): analysis of regression results for the second hypothesis

Sample	non-standard transactions		Standard coefficients	Tests	morale
	standard error	Beta	Beta		
Constant	0.25	2.714	0.544	10.856	0.000
Dimensions of intellectual capital management	0.058	0.425		7.299	.0000

It appears from the previous table that the values of the t-test for the variable of digital transformation and intellectual capital management have significant significance at the level of significance of 0.05. This shows the strength of the regressive relationship between the components of intellectual capital management and digital transformation.

It is clear from the above mentioned analysis that the hypothesis is correct where there is a direct, statistically significant relationship between the availability of dimensions of intellectual capital management at King Khalid University and the success of digital transformation in the educational process at King Khalid University.

3.3.3. The third Hypothesis

There is a correlation between the importance of intellectual capital management in the success of digital transformation.

To test this hypothesis, a few tests were carried out, as follows:

- Correlation coefficient:

The following table shows the correlation coefficient between intellectual capital management as an independent variable and digital transformation as a dependent variable.

Table No. (13): Correlation coefficient for the third hypothesis

Variable	the test	Activate the digital transformation process
digital transformation	correlation coefficient	0.669
	Morale	0.000

It is clear from the previous table that there is a statistically significant correlation of 66.9% at the level of significance of 0.05 between the management of intellectual capital and the activation of digital transformation.

- B. Coefficient of determination:

Table No.(14): coefficient of determination for the third sub-hypothesis

standard error	Modified determination factor	The coefficient of determination	independent variable
0.2876	0.443	0.447	digital transformation

The previous table shows that the coefficient of determination $R^2 = 0.447$, which means that the intellectual capital explains the success of the transformation by 44.7%, while the remaining percentage is explained by other variables that were not included in the regression relationship, in addition to the random errors resulting from the sampling method, measurement accuracy and others.

- C. ANOVA Test:

Table No.(15): analysis of variance for the third hypothesis

Declaration	sum of squares	degrees of freedom	mean squares	F	Morale
Regression	8.488	1	8.488	102.65	.0000
the rest	10.501	127	0.083		
Total	18.989	128			

It is clear from the previous table that there is a direct significant correlation between the management of intellectual capital and the activation of digital transformation.

D. regression analysis:

Table No.(16): analysis of regression results for the third hypothesis

Sample	non-standard transactions	Standard coefficients		Tests	Morale
	standard error	Beta	Beta		
Constant	0.29	1.601	0.669	5.526	0.000
digital transformation	0.067	0.678		10.132	.0000

It appears from the previous table that the values of the t-test for the variable of digital transformation are significant at the level of significance of 0.05, and this shows the

strength of the regressive relationship between intellectual capital and digital transformation.

The above-mentioned analysis confirmed the presence of a correlation between intellectual capital and the success of the digital transformation process in higher education institutions, therefore the proposed is correct.

4. DISCUSSION

Intellectual capital is considered as one of the most crucial factors in the daily routine of universities, because it plays an essential role in achieving excellence and maintain the required flow of information and knowledge (Sayed, 2016).The development of intellectual capital benefits in obtaining the latent information in the minds of all university employees, where the strategic success lies in how to obtain and keep this information within the universities and not rely on its presence inside the human minds (Abdulaziz, 2012). The importance of intellectual capital stems from being the most asset in the current century, as it represents the scientific intellectual forces capable of making basic adjustments and adaptations. Development and sustainable development, pursuing technological developments and benefiting from the data of the information environment through the optimal investment of intellectual resources in universities (Abdel Aziz , 2012).

The indicators of the current study confirmed the KKKU's success in achieving all the requirements of the educational process for digital transformation by using the intellectual capital resources efficiently. The faculty members of KKKU have administrative and intellectual skills that help them to think scientifically to manage intellectual capital and to guide students efficiently. The university supports them through the establishment of training programs for digital transformation, with the aim of improving the information skills necessary for self-learning for all its employees. Accordingly, KKKU possesses the academic competency and capability to perform the digital transformation successfully.

The up-to-date technologies and advanced networks at KKKU have been harnessed to accommodate the massive increase in data traffic, and developed solutions that keep the continuity of the educational processes smoothly until the situation stabilizes.

The university succeeded in providing the appropriate technological infrastructure to manage the digital transformation process, particularly, the distance learning in association with the efforts and contributions made by the administration and faculty members of KKKU.

Digital transformation has helped to improve education for both the student and the faculty member. It is significantly contributed to and probably initiate the student's self-learning skills as indicated by the assimilation of the new technology and its use in achieving the goals of the educational process.

Usually, the student productivity curve rises as his experiences and skills rise and developed (Paoloni, 2020). Such skills are reflected in the knowledge that students possess during their involvement in university. Consequently, the mission of the universities, in particular the faculty members is How to take advantage of those knowledge assets in serving the cumulative legacy of their intellectual capital?.

Distributing knowledge of various disciplines in the university along with directing other university's activities and directing the production process associated with continuous innovation of knowledge leads to achieving the competitiveness of university students. From the forgoing, it is clear that human capital is a mixture of components that express the value of human resources and its importance in achieving the goals of organizations and it is one of the influencing factors that achieve innovation and creativity.

The digital transformation as discussed in the current study, is a process of technical change for the university and the results assured that it is an important factor in the success of the educational system, as it helps to improve the quality of both education and educational services. The integration between intellectual capital and digital transformation could be the main pillars to achieve the Kingdom's Vision 2030, which is no longer an option or a luxury as it was previously, but has become a necessity necessitated by emergency circumstances.

at a time of crises that society is experiencing now, and, and to keep pace with the latest developments in technology, which is now affecting all vital and productive sectors, The DT in education system is based on the learner who will be self-reliant in a very large part of it.

The study confirmed that intellectual capital is one of the most important assets in the university, and it is the main key to the excellence, success, and development of the university in the light of the information age, and it must be invested well in order to play its role in improving productivity and transforming knowledge into value and thus enhancing the competitive advantage of the university.

5. CONCLUSIONS

The necessity of the university's interest in its employees and their use in making strategic decisions regarding digital transformation. Qualifying university employees on how to invest intellectual capital, providing them with educational evidence, and employing the necessary technology for that. The university held community partnerships to enhance intellectual and electronic capabilities and exchange knowledge and experiences.

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