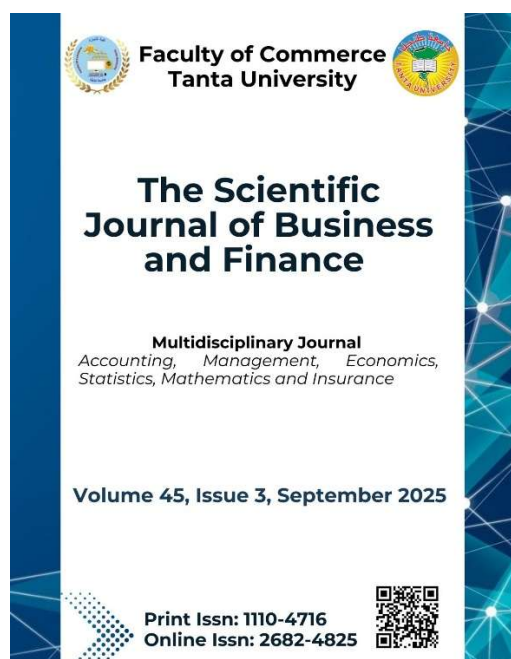




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The Impact of Digital Transformation on Performance of Higher Education Institutions – A Case Study of Deraya University

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The Impact of Digital Transformation on Performance of Higher Education Institutions – A Case Study of Deraya University

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Abstract

This study aims to investigate the impact of the various dimensions of digital transformation (DT) (strategy, culture, security and legislative requirements, technological requirements, and human requirements) on institutional performance (academic, administrative, and societal) at Deraya University in Egypt. To achieve the study's objective, the researcher used a descriptive analytical approach. A questionnaire was designed and distributed online to all Deraya University employees (approximately 357). A census method was used, and 315 valid and complete questionnaires were retrieved, with a response rate of approximately 88.8%. The data were analyzed using the Statistical Package for the Social Sciences (SPSS). The study results concluded that there is a statistically significant relationship between the combined dimensions of DT and institutional performance at Deraya University. The results showed that organizational culture, security, and legislative requirements have a significant impact on the implementation of DT and the achievement of institutional goals. The results also showed that technological, human, cultural, security, legislative, and strategic requirements, respectively, have a strong impact on administrative performance. Furthermore, the provision of human requirements, organizational culture, and security & legislative requirements, respectively, impact societal performance. The study recommended that universities have to pay greater attention to developing and formulating strategies and providing technological requirements to enhance their societal performance. Furthermore, providing security and legislative requirements plays a vital role in achieving sustainability and institutional development. The study also recommended that higher education institutions (HEIs) have to develop a comprehensive strategy for DT, promote digital culture, enhance cybersecurity, provide security and legislative requirements, develop digital transformation strategies, modernize technological infrastructure, enhance human resource capabilities, and monitor and evaluate digital transformation initiatives, all of which contribute to improving academic, administrative, and societal performance.

Keywords: Digital transformation; organizational performance; Higher education institutions; Deraya University.

1. Introduction

In rapidly evolving world, institutions face numerous challenges and transformations influenced by technological advancements, market changes, extensive competition, and customer changing needs and wants. One of the most significant shifts is the adoption of digital transformation, which has become a crucial factor in shaping modern institutions, including those in higher education sector. The forth industrial revolution and its technological tools, e.g., the artificial intelligence (AI), virtual reality, cloud computing, internet of things (IoT), big data, and other tools have a significant impact on how organizations operate and compete. Digital transformation is not just a tech upgrade it is a strategic shift that helps businesses thrive in a digital-first world. (Rogers, 2016)

Digital transformation in higher education is no longer optional; it has become a strategic necessity for institutions seeking to remain competitive and providing high-quality education. This shift is particularly important in response to global changes, digital economies, and evolving student expectations. (Schallmo *et al.*, 2020)

Regardless of organizations' readiness for such changes, digital transformation remains an inevitable effective reality. Digital transformation has changed the shape of institutional patterns, making the institution face the choice between adapting and adopting this reality and exploiting it to achieve competitive advantage, or resisting change and potentially exiting the competition and hence extinction. (Gregersen, 2019)

Higher education institutions are key players in the knowledge economy, and their performance directly influences scientific research, workforce development, and national progress. The ability to adapt to digital transformation is essential for improving educational outcomes and operational efficiency. (Avalos-Bravo *et al.*, 2022)

It is worth noting that digital transformation is not only about information technology, but also about recrafting the business strategy, whether completely or partially, and even changing the organizational culture as a whole sometimes. In order to succeed in digitization, institutions must not only view it as a means of support, but also rather consider technology as a strategic capability that enables the organization to adapt and gain a competitive edge. (Stolterman & Fors, 2004)

Given this background, this study aims to examine the impact of digital transformation on performance of higher education institutions, with a focus on Deraya University.

2. Literature Review

This section examines the conceptual framework, DT in the field of higher education services, and institutional performance. DT has become a critical driver of innovation in HEIs, influencing academic, administrative, and societal performance. DT encompasses multiple dimensions, including strategy, culture, security & legislative requirements, technological requirements, and human requirements. While existing research explores the role of digitalization

in HEIs, gaps remain in understanding how these dimensions collectively impact institutional performance.

Gurbaxani and Dunkle (2019) argue that a well-defined digital strategy is essential for aligning technological initiatives with institutional goals. Moreover, strategic planning in DT ensures that HEIs leverage digital tools to enhance learning outcomes and operational efficiency. (However, Hinings *et al.*, 2018) highlight that many institutions lack a cohesive digital strategy, leading to fragmented implementations. Digital transformation requires a cultural shift toward innovation and adaptability. (Kane *et al.*, 2016) argue that resistance to change among faculty and staff can hinder DT adoption. Conversely, Vial (2019) emphasizes that a digitally inclusive culture fosters collaboration and improves both academic and administrative performance.

With increasing cyber threats and data privacy regulations, HEIs must integrate robust security measures. (Siponen, *et al.*, 2020) note that compliance with legislative requirements enhances institutional credibility but may slow down digital initiatives due to bureaucratic constraints. The adoption of emerging technologies (e.g., AI, cloud computing, LMS) is crucial for modernizing HEIs. Selwyn (2019) highlights that technological infrastructure directly impacts academic delivery and research capabilities. (However, Bond *et al.*, 2020) identify financial constraints as a barrier to acquiring advanced technologies.

Digital literacy and continuous upskilling of faculty and students are vital. Pettersson (2021) suggests that training programs enhance digital competence, improving teaching and learning experiences. (Yet, Henderson *et al.*, 2017) find that many HEIs lack structured professional development frameworks. DT enhances personalized learning, virtual classrooms, and research collaboration (Dwivedi *et al.*, 2021). (However, Zhao, *et al.*, 2022) note disparities in digital access affecting student outcomes. Automation and data analytics streamline enrollment, finance, and HR processes (Picciano, 2021). (Yet, Williamson 2019) warns that poor integration leads to inefficiencies.

Digital platforms improve student engagement and community building (Junco, 2022).

However, Selwyn (2020) raises concerns about digital exclusion and mental health impacts.

Research Gaps

- Limited Holistic Studies: Most research examines individual DT dimensions rather than their combined effect on HEI performance (Vial, 2021).
- Regional Disparities: Few studies compare DT impacts across developed and developing nations (Alenezi, 2023).
- Longitudinal Effects: There is a lack of long-term studies on how sustained DT influences institutional resilience (Bond *et al.*, 2022).

While DT significantly enhances HEIs performance, gaps persist in understanding the interdependencies between its dimensions. Future research should adopt an integrated approach, examining how strategy, culture, security, technology, and human factors collectively shape academic, administrative, and social outcomes.

Digital Transformation (DT)

This section is concerned with the definition of DT and performance of higher education institutions. Although the term DT is relatively new, the concept of digital products, services, and media was understood in the 1990s. For example, in the field of commerce and trade, media campaigns by major media organizations were considered one of the most important digital channels for reaching customers, despite the fact that the purchasing process was primarily conducted in stores and often in cash. By the beginning of the new millennium, the rise of smart devices and social media networks has radically changed the ways customers access products they want, as well as their expectations regarding how and when to receive them. Organizations have realized that they can now reach and communicate with customers digitally and personally. (Schallmo *et al.*, 2020)

Definition of D

Many researchers have defined DT according to their own perspectives, based on their own orientations and the sector in which they operate. This has generated numerous definitions of digital transformation, demonstrating its impact on everyone. DT can be defined as the changes that affect one or more aspects of human life caused by technology (Stolterman & Fors, 2004). (Henriette *et al.*, 2016) defines it as "digitization," a social phenomenon or cultural development from a holistic perspective.

According to (Babica *et al.*, 2020) the term "DT" refers to the profound and quickening transformation of business, and society in general, to fully utilize advancements in digital technologies and the corresponding changes in how organizations, people, and objects communicate in order to enhance performance through the enhancement of current business procedures, the investigation of new revenue streams, and the guarantee of sustainable value. For organizations, it means creating or developing digital-based business models. It is a gradual process of change that begins with adopting the use of digital technologies and evolves into a comprehensive transformation of organization by adopting technological tools or by continuously striving to create value through these technological tools. (Garinger, 2016)

Based on the previous definitions, DT is a powerful and adaptable transformative instrument for a wide range of fields, including financial services, education, health, science and innovation, logistics, and transportation. DT process involves more than just automating current tasks; it also involves rethinking and innovating work procedures and practices, as well as the organizations that implement them. It also entails a sharp rise in the production and utilization of digital data for social and environmental analysis, resource monitoring, client and partner understanding, action coordination, service delivery, performance measurement, better policymaking, and nearly instantaneous citizen feedback. In conclusion the researcher defines DT as the strategic integration of digital technologies into all areas of a business or an organization, leading to fundamental changes in how it operates, delivers education, conducts research, and manages administration. It involves value to customers, and adapts to market conditions. DT involves:

- The adoption of advanced technologies such as Artificial Intelligence (AI), Cloud Computing, and Big Data.
- The digitization of academic and administrative processes to enhance efficiency.
- The development of digital strategies to improve learning experiences and institutional performance.

Importance of DT

There is no doubt that DT has changed the shape and pattern of all sectors and fields, including economic, social, educational, and political ones. It has contributed to the development and improvement of consumers' lives, standard of living, aspirations, and expectations regarding the services and products provided by these sectors. Accordingly, the following factors highlight DT as a crucial instrument in higher education institution: (Gebayew *et al.*, 2018)

- Improving Teaching & Learning: Enhancing student engagement through e-learning, virtual classrooms, and interactive digital tools.
- Enhancing Administrative Efficiency: Automating processes such as admissions, student records, and financial management.
- Facilitating Research & Innovation: Enabling access to global research databases, AI-driven analytics, and cloud-based collaboration.
- Expanding Accessibility & Inclusion: Allowing remote access to educational resources for students in different geographical locations.
- Strengthening Institutional Competitiveness: Aligning with global trends to improve university rankings and attract international students.

DT Dimensions

DT is not a goal achieved by an organization measured by a specific time period. Rather, it is a strategic vision in which the organization is constantly striving to achieve digitalization and make it the foundation of its survival and continuity. This is achieved by meeting several requirements, such as building a business model based on digital technology, adopting a digital culture that supports digitalization, focusing on supporting teamwork, innovation, and creativity, which enables it to keep pace with, anticipate, and prepare for ongoing environmental changes, creating a competitive advantage, increasing efficiency and effectiveness, and other benefits. DT in universities includes multiple dimensions, including: (Wang *et al.*, 2015)

A. Strategy According to the Boston Consulting Group BCG (2020), only 30% of DT efforts succeed in achieving their goals. However, establishing plans and setting priorities based on a clear strategic vision can increase the likelihood of success from 30% to 80%. Based on this, BCG (2020) established a set of basic principles to establishing a clear roadmap for digital adoption:

– **Digital Vision**

- is determined based on answering a set of questions: How will digital change the organization's scope of work? What opportunities does it offer? Which new competitors pose a threat for organization?
- Competitive Advantage Assessment: is done by answering a set of questions such as: How does digitalization affect competitiveness? To what extent? What is the organization's market proposition? What are its strengths and weaknesses?
- Digitization Opportunity Assessment: Which opportunities align with the strategy based on the organization's expected value, ambitions, and capabilities? Where should they be ranked?
- Gap Analysis: This evaluates the organization's current situation and compares it with its desired outcome.
- Digitization Roadmap: What is the timeframe, objectives, and responsibilities for each action program? What is required (amount, type, and sources of liquidity) for financing?

Together, these elements create a coherent and diverse system of support options that contribute to integrating the digital strategy into the organization's overall strategy, ensuring that these elements are implemented simultaneously and in a comprehensive manner.

B. Organizational Cultural

Organizational culture is the set of shared values, beliefs, norms, behaviors, and practices within an organization. This culture influences how employees work, take decisions, and interact with each other. Organizational culture is shaped by multiple factors, including history, product type, market, technology and encouraging faculty members and students to embrace new technologies. Understanding organizational culture is essential for improving organizational performance and fostering collaboration. It serves as a behavioral guide for employees. Organizational culture is one of the most important factors influencing the success or failure of any change an organization undertakes. (Vey *et al.*, 2017) Therefore, any organization planning for digital transformation must take into account culture impact, anticipate employee reactions, and formulate a plan that leverages these behaviors to support the implementation of digital transformation. When embarking on digital transformation, it is natural to study a change in roles and responsibilities, which necessitates a change in administrative leadership and job positions. DT requires a significant change in the way organizations operate. Employees are often familiar with the working environment, so they may resist any changes and fear of learning new methods and techniques. Employees also believe that DT could limit their job security and lead to job loss. One reason for employee resistance is their inability to understand the potential benefits of DT. (Lee & Lee, 2015)

C. Security & Legal Compliance DT

requires multiple security and legislative requirements. This includes robust cybersecurity to protect data and digital infrastructure. Additionally, clear legislative frameworks must be in place to regulate the use of digital technology, including data protection and privacy laws. DT also requires a robust technological infrastructure and qualified human resources to ensure effective and secure implementation. These requirements are essential to achieving DT goals in a safe and legal environment. (Hassouna, 2024)

Information security and privacy are among the biggest issues and challenges for organizations and individuals when it comes to digital transformation. Security has been and remains a critical issue for organizations and their partners. According to (Agrawal *et al.*, 2019) approximately 95% of respondents agreed that digitization and sharing of organizational information with other parties (suppliers, customers, etc.) increases the importance of implementing information security measures. Therefore, to the extent that digitization will provide opportunities for organizations, it will also increase the level of risks related to information security.

D. Technological Infrastructure

The technological requirements for DT include several key pillars, such as a robust technology infrastructure, reliance on artificial intelligence (AI) and automation, cloud computing, user experience, AI-driven solutions, and strong security practices. (Hassouna, 2024)

E. Human Resources Development

New technologies have a significant impact on organizations at multiple levels—management, accounting, operational processes, etc.—but without human resources, these benefits cannot be fully realized. DT requires a workforce with appropriate skills and the ability to utilize digital technology. Therefore, organizations must assess the skills and competencies they currently possess and then determine whether they possess what is sufficient to achieve digital transformation. Moreover, organizations must

F. conduct training programs for staff and students on digital competencies. (Sumrit, 2021)

Manifestations of DT

In reality, the manifestations of DT are numerous and varied, given that technological advancements have a significant impact on all fields, sectors, and institutions, even individuals. However, the following most of important DT aspects:

- E-commerce: is a set of integrated processes such as purchasing, collection, production, and marketing via the Internet. (Bouars, 2021) It involves the use of electronic communications and digital information processing technology in business transactions to create, transform, and redefine value-creating relationships between organizations, and between organizations and customers form other hand (Chanana & Goele, 2012).

- Information Systems (IS): organizations need information systems to achieve their organizational objectives. These systems can be classified as data processing systems, management information systems, or decision support systems (Mills *et al.*, 1986). Information systems consist of information technology infrastructure, data, software, and users who utilize information technology to deliver information and communication services. The term IS also refers to the management of organizational functions responsible for planning, designing, developing, implementing, operating systems, and delivering services. Therefore, the concept of IS combines both technical components and human activities and describes the process of managing the lifecycle of organizational information systems. (Chen *et al.*, 2010)
- Artificial intelligence (AI) strategy success is measured based on key performance indicators (KPIs) (these vary depending on the nature of the organization; for example, a commercial organization's KPIs differ from those of an industrial nature). AI helps determine which outputs are measured, how they are measured, and on what basis they are ranked according to their importance and priority. AI is a set of activities designed to make machines intelligent. Intelligence is the feature that enables an organization to operate appropriately, taking its environment into account. Reliance on AI is increasing than ever before. (Kiron & Schrage 2019)
- The Internet of Things (ToT): is a collection of connected devices and technologies that facilitate communication between devices itself and between devices and the internet. This means that devices, such as cars, phones, refrigerators, and others, can use sensors to collect data and interact intelligently with users (AWS, 2022). ToT is considered one of the most important areas of future technology and has received significant attention from a wide range of industries. ToT has revolutionized the way businesses operate by enabling organizations to develop value-added services through a network of machines and devices, improving business models and enhancing their sustainability. (Lee, 2019)
- Big Data a term that refers to large data sets with a large, diverse, and complex structure. Big data are difficult to store and analyze. The process of searching through massive amounts of data to uncover patterns, hidden correlations, and predict changes in their environment is called big data analysis. This information extracted from the analysis process helps organizations gain clearer and deeper insights, as well as the potential for a competitive advantage. Therefore, in order to exploit and apply the outputs of big data, the mining and analysis process must be carried out with extreme precision. (Sagiroglu, & Sinanc , 2015)
- Virtual reality (VR) is a system composed of a set of hardware and software through which it is possible to create, understand, and sense presence in an environment other than the real one (Mütterlein, & Hess, 2017). It is also an advanced human-computer interface that simulates a real-world environment. Users can navigate the virtual world, view it from different angles, access it, and reshape it as they wish (Zheng,*et al.*,1998). VR can enable organizations to identify the outputs that can be achieved under certain conditions without the need to conduct a real-world experiment, thus saving time, cost, and reducing the risk margin. (Patel, & Cardinali,1994)

DT in Higher Education

Higher education sector, being considered as a pioneer and leader in society development and change. Based on this, the way it provides its educational and scientific research services has changed. Digital technology-based learning provides a flexible and personalized learning process in which student is the central and starting point upon which higher education institutions formulate their goals, plans, and even strategies. (Røe *et al.*,2022)

According to Amin (2018), DT in higher education is a change in an institution's strategy, culture, operations, and the way it delivers its services and products. This change primarily aims to survive and gain a competitive advantage in an ever-changing environment, while also improving the quality and scale of its services and products, as well as staying abreast of environmental changes. Applying this to higher education, it represents a transition from a traditional education system to one based on digital technology. This change embodied in the evolution of educational content delivery, such as e-learning, distance learning, blended learning, and others. Through this transformation, the goal is to improve the level of educational training required and prepare students to meet the demands of the contemporary labor market.

DT Requirements in Higher Education

The most important requirements for implementing DT in higher education institutions are as follows: (Bakir, 2006)

- Developing a strategy that supports digitization: The digitization strategy is based on posing three questions: Where higher education institution is headed? What is the role of the institution in that future? How can educational institution integral its capabilities and the desired direction? The strategy identifies all stages and steps necessary to implement such change, as well as identifying the individuals involved in implementation process, the necessary material/human resources required, and how to obtain them.
- A business model that supports digitization: Through a business model supported by digital technology, higher education institutions can embody digital transformation and effectively utilize it in their operations.
- Training programs: Training programs for all users (students, administrators, and academic staff) are implemented after determining their current level of knowledge and skills then designing training programs based on the output of the evaluation results. These programs are specifically designed based on individuals' qualifications and shortcomings. The evaluation process is continuous before, during, and after implementation phase. (Ibrahim *et al.*,2019).
- Providing the necessary infrastructure, including equipment, hardware, and sufficient resources to implement automation, and carrying out periodic updating and maintenance. This includes computers, databases, and servers (local or non-cloud computing), adequate internet coverage, and software such as those used in education (Moodle) or e-administration (such as accounting and finance software, customer relationship management software, etc.).
- Allocating the necessary financial resources to implement the DT initiatives. All the above requirements cannot be met without adequate financial resources. For example, an organization

cannot purchase and maintain the necessary equipment and supplies without providing user training programs.

- DT awareness program: All stakeholders must be aware of the importance of DT and the potential benefits. Through this process, organizations aim to preempt resistance to change and encourage key players to adopt, accept, and support DT.
- Formulate the necessary legislation and laws for DT, as well as cybersecurity, which is one of the most significant concerns of users (especially faculty members). Intellectual property rights must be protected. It is also important to ensure that their privacy and data are not hacked or stolen.

In addition, senior management willingness to implement DT strategy is a crucial aspect for the successful DT implementation. Senior management provide the necessary resources, oversee DT efforts, ensure its correct and complete implementation, and undertake oversight and correct deviations if found.

DT challenges in Higher Education

Despite its benefits, DT faces challenges, including: (Rodrigues, 2017).

- Unclear strategic vision: A higher education institution needs a strategic vision that ensures that all its components are aligned with DT implementation efforts. A clear vision allows institution members and stakeholders to participate in shaping the digital strategy.
- Resistance to Change: Faculty members may be reluctant to adopt new technologies.
- Financial Constraints: Digital infrastructure requires significant investment in hardware, software, and training.
- Cybersecurity Risks: Increased digitalization exposes universities to data breaches and cyber threats.
- Digital Divide: Inequalities in internet access and technological literacy among students.
- Regulatory & Ethical Concerns: Ensuring data privacy and ethical use of digital tools in education.

DT in Higher Education

Digital transformation in universities includes: (James, 2021)

1. E-learning Platforms: Universities increasingly rely on Learning Management Systems (LMS) such as Moodle, Blackboard, and Coursera.
2. Online & Hybrid Learning Models: A shift from traditional in-person teaching to virtual and blended learning.
3. Data-Driven Decision-Making: Using Big Data analytics to improve student performance and resource allocation.
4. Digital Libraries & Open Access Resources: Expanding access to electronic books, research journals, and digital archives.
5. AI-powered Student Services: Automating academic advising, grading, and administrative support.

Performance of Higher Education Institutions

In a knowledge-based economy, higher education institutions, as centers for human resource development, play a fundamental role in economic development and growth, as well as in the advancement and prosperity of societies and the achievement of technological progress. In order to survive and compete in contemporary environment, many higher education institutions have turned to adopting approaches and methods to raise their performance level (such as benchmarking, performance management, etc.). Without a general understanding of past events, there will be no lasting change or improvement. Therefore, without evaluating performance based on key fundamental factors (strategic objectives, customer and shareholder aspirations, environment factors, etc.), there will be no lasting improvement in the quality of higher education institutions. (Jalaliyoon & Taher Doost, 2012)

Accordingly, this section will address the nature of performance in general and in higher education institutions in particular, in addition to reviewing approaches and methods of measuring and evaluating performance. In addition studying indicators used for measuring performance, as well as indicating difficulties faced by higher education institutions in determining suitable indicators.

Definition of Performance

The concept of performance is considered one of the most difficult concepts to agree on a unified definition among researchers. This was confirmed by (Abu-Jarad *et al.*,2010) that the concept of performance in modern management philosophy faces problems of conceptual clarity in two areas: the first is consensus on a common definition, and the second is the agreement on factors, determinants, and methods of measuring it. Performance measurement is the process of collecting data related to previously defined indicators and standards, while performance evaluation is the process of examining and reviewing the level and extent of progress achieved and comparing it with previously defined indicators and standards. (Abu-Jarad *et al.*,2010) This process is based on the outputs of the performance measurement process. The term performance is sometimes confused with productivity. Therefore, below an attempt to list the most important definitions that address performance:

(Mahmoud *et al.*,2017) defined Performance as the overall growth of the organization (sales, market share, financial, etc...). Performance encompasses three specific areas of organizational results: first, financial performance, which includes, for example, profits, return on investment (ROI), and return on assets; second, market performance, such as sales and market share; and finally, shareholder return, which includes total shareholder return, economic value added, and so on. In other words, performance is measured and evaluated based on the three previous dimensions.

On the other hand, performance is viewed as an integrated system resulting from the organization's activities, within the framework of the interaction of its internal and external components, which encompass several dimensions, including individuals' performance, group performance, and overall organizational performance. (Mohammed, 2011)

Abdulrahman & Garba, (2020) define performance as the ability of organizations to achieve their goals through organized and proper use of resources. It determines the value and level of organizations within their environment and is measured through measurable quantitative outputs or by comparing them to outputs of other organizations under the same conditions. Performance, in other words, is the effective utilization of resources and is measured through benchmarking or quantitative indicators such as production volume, sales, etc.

According to Bartuseviciene, & Sakalyte (2013) Performance is the effort an organization exerts to achieve its goals. This is achieved through a set of activities and actions, and by effectively utilizing available resources, especially scarce ones (highly skilled human resources, time, information, etc.). It is measured through several indicators depending on the organization's perspective, direction, and sector (financial, capital, market share, social, etc.). Performance is evaluated using several methods and indicators such as benchmarking, self-evaluation, production volume, the balanced scorecard (BSC), etc.

Performance in Higher Education Institutions

Performance in higher education institutions is the outcome that stems from the transformation of knowledge into skills, through practices, processes, and practical application of this knowledge, as well as through the experiences gained and accumulated in the working field. (Amina & Ali, 2011)

According to (Kivisto *et al.*,2019), the concept of higher education institutions performance refers to all procedures, tasks, and operations (e.g., teaching, research, and activities related to mission and strategic objectives), in addition to the outputs and results resulting from these activities.

Al-Hajjar (2004) argues that higher education institutions performance is an integrated system (inputs, processes, and outputs) that connects the elements of higher education institutions and their environment (internal and external). Performance affects all of their diverse components and parts, as confirmed by researchers.

There are several factors that influence the performance of higher education institutions, namely internal factors (these are factors that arise from the interaction of the internal elements of the institution and can be controlled, such as technical factors, organizational culture, and resources, etc.). External factors, which are those changes that indirectly affect the institution's activities and decisions and cannot be controlled, include (customers, competitors, economic factors, political & governmental factors, and social and cultural factors, etc.). Other factors can also have a negative impact on performance, such as staff skill shortages, inadequate training programs, negative institutional policies, obstructed communication and interaction, weak leadership styles, anxiety and stress, weak knowledge management, and others (Khaleel & Sayah, 2020).

Therefore, the concept of performance in higher education institutions is not simply about results. Rather, it is an open and integrated system (processes, inputs, and outputs) that reflects the institution's commitment to achieving its goals and satisfying the expectations of its stakeholders. This system stems from the process of transferring, and utilizing knowledge and skills in various operations and activities (staff management, student learning and development, scientific research,

society development), and seeks to utilize organizational resources efficiently and achieve goals effectively.

Performance Management

Performance management is the execution of management functions (planning, organizing, leading, and controlling) at every organizational level. Performance management is more comprehensive than just evaluation; that it works to set appropriate work standards and avoid any potential deviations during and after performance. Therefore, performance management, as an integrated system, implicitly includes performance evaluation and assessment. This is achieved through planning and forecasting processes and the development of the best ways to perform tasks, then taking corrective actions if required. (Al-Barghouthi *et al.*, 2015)

Therefore, performance management refers to the set of activities in which an organization participates to improve individual or group performance, with the ultimate goal of improving organizational effectiveness. It also emphasizes the strategic and integrated nature of performance management, which focuses on increasing the organization's effectiveness by improving employee performance and developing the required capabilities and competences of individuals and groups. (Den Hartog *et al.*, 2004)

Thus, effective performance management ensure that everyone has a clear understanding of the common goals that must be achieved. Then, individuals are guided, supported, and developed to apply a set of methods that help achieving these shared goals. Performance management focus on achieving continuous development and it is not limited to a specific period or circumstance. It also balances the individual and group performance with the organization's strategic intent to ensure that planned outcomes are consistently achieved. (Dransfield, 2000)

Therefore, performance management is a key tool for developing the competencies and skills of individuals, motivating them, and making them a strategic competitive advantage (Aguinis, 2019). Performance management is integrated into all aspects of an organization's management and decision-making processes, transforming the organization's practices with a focus on achieving desired outcomes (Commission, 2010).

To conclude, performance management is an integrated management system that encompasses all levels and components of an organization, used to achieve growth, improve performance, and avoid and correct performance deviations as soon as they occur, i.e., simultaneous evaluation and assessment of performance. (Armstrong, 2009). Therefore, an organization can continuously improve and develop its performance. This means that it does not stop at achieving a specific goal or being restricted to a specific timeframe or circumstance. Performance management takes all internal and external components of an organization into consideration, especially human resources, as they are considered the core of the organization's performance and the strategic tool for achieving its goals and complete advantage.

Performance Improvement approaches

There are many approaches organizations can use to improve their performance. Some require radical changes, while others require partial changes. The following are some of the most common and widely used approaches: (Khan *et al.*,2019)

- Benchmarking: is the process by which an organization looks to the "best in class" and attempts to emulate their methods and processes. Benchmarking helps organizations determine what they can do better. The decision to adopt benchmarking is valuable to organizations by opening the door to many different ideas, methods, and approaches. Benchmarking is more than just a means of collecting data about how well an organization performs against others. It is also a method to identify new ideas and new ways to improve processes, achieve continuous learning, support productivity, creativity, and innovation, thus better meeting customer expectations. The ultimate goal of benchmarking is to improve processes that meet customer expectations, as well as to identify the best standards of excellence for products, services, or processes, and then make the necessary changes to achieve those standards, which are commonly called best practices. (Elmuti & Kathawala,1997).
Benchmarking is classified into six types: internal benchmarking (Comparing processes within different departments or units of the same organization), external benchmarking (Comparing to competitors or industry leaders), competitive benchmarking (comparing to direct competitors), Functional (Generic) Benchmarking (Comparing processes or functions with those of non-competing organizations in different industries), Performance benchmarking (Comparing to metrics or set of performance standards), Process Benchmarking (Comparing specific processes to identify best practices, regardless of industry), and strategic benchmarking (Examines long-term strategies and business models of top-performing companies. Before an organization decides to conduct benchmarking, it needs to define exactly, what it wants to do. (Jalali, 2016)
- Total Quality Management (TQM) is an integrated management approach that focuses on customer requirements. TQM is achieved through a clear strategy that focuses on deploying a culture of quality, which emphasizes leadership and excellence in all activities (production, marketing, finance, administration, etc.). (Nassar, 2017). TQM is a comprehensive philosophy that includes a set of integrated approaches, tools, and administrative processes used to achieve customer satisfaction. TQM main pillars include identifying customers' needs and wants, setting Key performance indicators (KPIs) aligned with customer expectations, monitoring operations and progress, comparing actual performance against target, providing motivation to individuals from senior managers, delegating authority, and decentralizing decisions, supporting creativity and innovation, adhering to the principle of continuous improvement, adopting a zero-defects approach, supporting effective communication, and removing barriers between departments (Al-Ghalbi, 2020).
- Reengineering: is the analysis and redesign of workflows and processes. It is essential to adopt a radical redesign approach to processes, work methods, management systems, external relations, supporting information systems, and organizational structure to achieve

improvements in performance measures such as cost, quality, delivery speed, and others, through which value is created for customers (O'Neill & Sohal, 1999). Through reengineering, an organization can integrate specialized functions into a single function, which saves time, saves efforts, reduces costs, and streamlines and organizes work. It also changes the current organizational culture, where achieving good performance and focusing on satisfying customer, rather than focusing on financial indicators alone. Moreover, learning is encouraged, along with training, to develop skills and capabilities of employees. (Khalil *et al.*, 2015)

- Kaizen (Continuous improvement): is the ongoing effort made by an organization to improve all its elements and components, such as processes, tools, products, services, etc., and is implemented repeatedly. These continuous improvements may affect the entire organization or parts of it. Organizations that excel in continuous improvement start from the belief that success comes from innovating new methods and means of performing tasks and achieving goals at both the micro and macro levels. Involving all employees in sharing knowledge and generating creative ideas, exploring better ways to provide customer services, and responding to changes in the external environment (Dewareral, 2019). This method is used to avoid wasting resources, especially scarce ones (such as time), as well as avoiding the accumulation of burdens or increasing pressures, avoiding any defect or deviation in performance between what is planned and what is implemented, and correcting it in real time. Continuous improvement focuses on both processes and results. It is a shared responsibility among all components and parts of the organization, and it affects all areas: human, marketing, production, and finance. (Al-Salmi, 1998)

To enhance performance, universities must (Anand *et al.*, 2009)

- Invest in faculty development: Providing training and research support.
- Enhance student learning experiences Adopting innovative teaching methods.
- Strengthen partnerships Collaborating with industries and international institutions.
- Implement digital solutions Using AI, cloud computing, and data analytics to streamline operations.

Measuring Performance in Higher Education Institutions

Wang (2010) argues that higher education institutions have two basic functions: academic and administrative. Academic performance is considered the core of higher education institutions' performance, while administrative performance supports and serves academic performance. Together, they form a complete picture of performance across the various functional roles in higher education institutions. To evaluate the performance of any institution, its functions must be used to determine indicators. Accordingly, higher education institutions' indicators are divided into two types: academic performance indicators, which in turn are divided into sub-indicators related to research and educational performance, and administrative performance indicators, which are further divided into two sub-indicators related to financial performance and human performance. Wang adds that both indicators contribute to serving society through their outputs (scientific research outputs, training competent students, preparing graduates for the labor market, providing consulting to institutions, patents, etc.). The following table shows the indicators used to measure both academic and administrative performance.

Table 1. Indicators used to measure academic and administrative performance

Academic Performance		Administrative Performance		
Scientific Research	Education	Financial	Human	
Level of researcher involvement in research activities.	Number of students enrolled at the bachelor's and master's degrees	Revenues from scientific research.	Employment Success Rate	
Number of research projects funded by external grants.	Number of educational programs available at each educational level	Amount of government funding.	Employee Skills and Diversity (Proportion of English Speakers, Number of PhD Students, Number of Higher Education Professors, Lecturers, etc.)	
Budget allocated for research grants.	Ratio of students per degree (bachelor's/master's)	Amount of third party funding.	Age Ratio of Employees, e.g., the percentage of young employees between 30 and 40 years.	
Number of strategic research partnerships or projects.	Ratio of students to staff members	Revenues from tuition and other services.	Amount of Spending on Training and Development	
Number of research publications.	Student retention rate	Revenues from operating costs.	Employee Motivation and Satisfaction	
Number of doctoral positions awarded.	Student withdrawal rate	Surplus/deficit ratio of income.		
Extent of exploitation and commercialization of intellectual property (e.g., patents).	Student satisfaction rate (based on an internal survey)	Liquidity ratio.		
Number of successful entrepreneurs (startups).	Average time required for bachelor's and master's degree graduation (educational effectiveness)	Debt ratio.		
Citation rate (H-index).	Graduation rate (number of degrees issued)	Daily spending volume/available liquidity.		
Number of board members of the Research Council and editors of journals.	Employment rate of graduating students	Annual spending volume on infrastructure.		
Number of awards.		Employee satisfaction with spending strategies.		
Position in global research rankings (Leiden ranking or peer-review).		Ratio of spending (utilities, maintenance, and repairs) per student.		

Source: Xiaocheng Wang, *Performance Measurement in Universities: Managerial Perspective*, Doctoral Thesis Faculty of Management and Governance, University of Twente, The Netherlands, January 2010, p. 30-62. The Quality Assurance and Accreditation Council of the Association of

Arab Universities has identified 11 factors for measuring the performance of higher education institutions. These include quantitative and qualitative performance indicators, which can be summarized in three axes: academic performance (faculty members, student affairs, student services, teaching methods, and scientific research); administrative performance (vision, mission, goals, and plans; leadership and administration; financial, technical, human resources; and performance evaluation); and Social performance (Social service; university ethics). (Association of Arab Universities, 2019)

Regarding Social performance indicators: the Arab Council identified several indicators including approved plan for Social service and development (the existence of a scientific unit to manage and strengthen relationships with local Social institutions, the availability of specialized centers for Social service, the availability of an approved plan for Social service and environmental development, and others). Social indicators must focus on the existence of a clear plan for Social service, the keenness of higher education institutions to establish and maintain relationships with local, Arab, and international institutions, and the sustain endeavor to contribute Social development, and solving Social problems by organizing forums, scientific seminars, publishing scientific magazines, and literacy programs. Moreover, contributing to fight against disease and poverty, providing consultations, training programs, and consultation. In addition, organizing health campaigns and other activities. Searching for ways to reconcile educational programs with labor market requirements, measuring and evaluating the level of satisfaction of Social stakeholders and the labor market with the institution's performance and that of graduates. (Association of Arab Universities, 2019)

Regarding academic performance indicators: the Arab Council identified several factors for measuring academic performance including scientific research plan (the extent to which the institution's plan is consistent with the state's strategy, the institution's plan alignment with its resources, etc.). Scientific research (the availability of a scientific research database, encouraging students and faculty members to conduct scientific research, the availability of the necessary resources and facilities, etc.). Budget allocation (the extent to which the financial budget is allocated to support and publish scientific research, measuring and evaluating the financial allocations spent on research). In addition, Student and faculty participation in scientific research (the availability of opportunities for the faculty members to participate in scientific seminars, student and faculty members exchange with foreign and international universities, etc.). Educational programs (programs compatibility with the state's general philosophy, as well as with the labor market and society needs, the institution's adoption of several types of education such as distance learning, their compatibility with international teaching programs, etc.). (Association of Arab Universities, 2019)

As for the administrative performance indicators revolve around the following points: the institution's policies, rules and regulations. The quality of its plan, vision, mission and objectives (the institution has a clear, comprehensive vision and mission that expresses its aspiration and wishes, the ability to achieve its objectives, measure and continuously monitor performance,

clarify the vision, mission, and objectives to all key stockholders, etc.). Effective leadership (the institution's leadership's interest in providing the appropriate scientific environment, optimal use of human and material resources, the extent to which the opinions and suggestions of society representatives taken into consideration account...etc.). In addition, the organizational structure (the flexibility of the organizational structure, the delegation of authority, the existence of quality assurance unit, defining the responsibilities and powers of dean, vice dean, and heads of scientific departments, accurate job descriptions, incentive and reward system, etc.). (Association of Arab Universities, 2019)

3. Study Problem

The performance of private HEIs can be significantly influenced by their adoption (or lack thereof) of DT. The study of Smith & Johnson (2021) found that HEIs without AI-driven student recruitment tools had a 10-15% decrease in enrollment compared to digitally advanced competitors. Institutions lacking robust online admission systems or digital marketing strategies may suffer a drop in enrollment. Moreover, Institutions with outdated Learning Management Systems (LMS) reported 20-25% higher dropout rates in online programs (OECD, 2022). Poor e-learning infrastructure can increase attrition. Universities with automated degree-tracking systems achieved 12% higher graduation rates (McKinsey & Co., 2023). Thus, inefficient digital academic advising systems correlate with delays in degree completion. Students from DT-adopting institutions had 30% higher job placement rates due to digital skill integration (World Bank, 2021). Institutions using cloud-based ERP systems reduced administrative costs by 18-22% (Deloitte, 2022). Therefore, manual processes (e.g., paper-based exams, in-person registration) inflate expenses. Professors in non-digital HEIs spent 40% more time on administrative tasks than those in digitalized ones (EDUCAUSE, 2023).

Gartner (2021) highlighted that HEIs without AI chatbots took 48-72 hours to respond to student queries vs. <1 hour for digitalized institutions. Gallup (2022) found that institutions with poor digital infrastructure scored 15-20% lower in student satisfaction surveys.

Therefore, the imperative necessity of adopting DT and the advantages it provides to improve the organizational performance in all its aspects, in addition to the special nature of higher education institutions that distinguish them from other institutions formed the basis on which this study is designed. The study will investigate the impact of DT on the performance of higher education institutions. Accordingly, the study problem is formulated as follows:

"Is the increase/decrease of the institutional performance is due to the adoption or lack thereof of digital transformation? Consequently, what is the impact of digital transformation on institutional performance?"

To answer this question, the following sub-questions are formulated:

- Is there a significant relationship between DT and university performance?
- Is there is a significant relationship between DT dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, and human requirements) and academic Performance at Deraya University.

- Is there is a significant relationship between DT dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, and human requirements) and administrative Performance at Deraya University.
- Is there is a significant relationship between DT dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, and human requirements) and societal Performance at Deraya University.

4. Study Objectives

The primary objective of this study is to analyze impact of DT on the organizational performance of higher education institutions. To achieve this, the study aims to:

1. Understand the theoretical background of both DT and performance.
2. Understand the extent of interest in both DT and performance in higher education institutions in Egypt.
3. Identify the most important challenges preventing performance improvement in higher education institutions in Egypt.
4. Provide recommendations for higher education officials to leverage DT to improve performance.

5. Study importance

This study holds practical and theoretical significance, particularly in the following regard:

- For Universities: The study highlights the importance of DT in improving academic performance, operational efficiency, and competitiveness.
- For Policymakers: The findings can assist educational authorities in designing effective policies to support DT efforts in universities.
- For University Members: Understanding DT role in improving teaching methods and study opportunities.
- For Future Researchers: Providing a foundation for further studies on the impact of digitalization in education.

6. Study Methodology

Higher education institutions are undergoing fundamental transformations due to advancements in technology and digitalization. DT has become an essential strategic priority for universities seeking to enhance their performance, efficiency, and global competitiveness. This study explores the theoretical foundations of DT, focusing on its concept, importance, dimensions, and challenges within higher education institutions.

In order to answer the study questions, problems, and test its hypotheses, the descriptive analytical approach was used, through collecting and analyzing empirical data.

This was done with the aim of comprehending the theoretical framework of the topic, understanding its elements, and analyzing its dimensions, by reviewing Arabic and foreign studies, including books, dissertations, articles, and academic websites that addressed the phenomenon of digital transformation and the performance of higher education institutions. Moreover, a case study method was also adopted to apply what was addressed in the theoretical framework to Deraya University, and analyzing the results obtained in a way that helps

understand the relationship between study variables, and ultimately reaching conclusions that contribute to developing the institution under study.

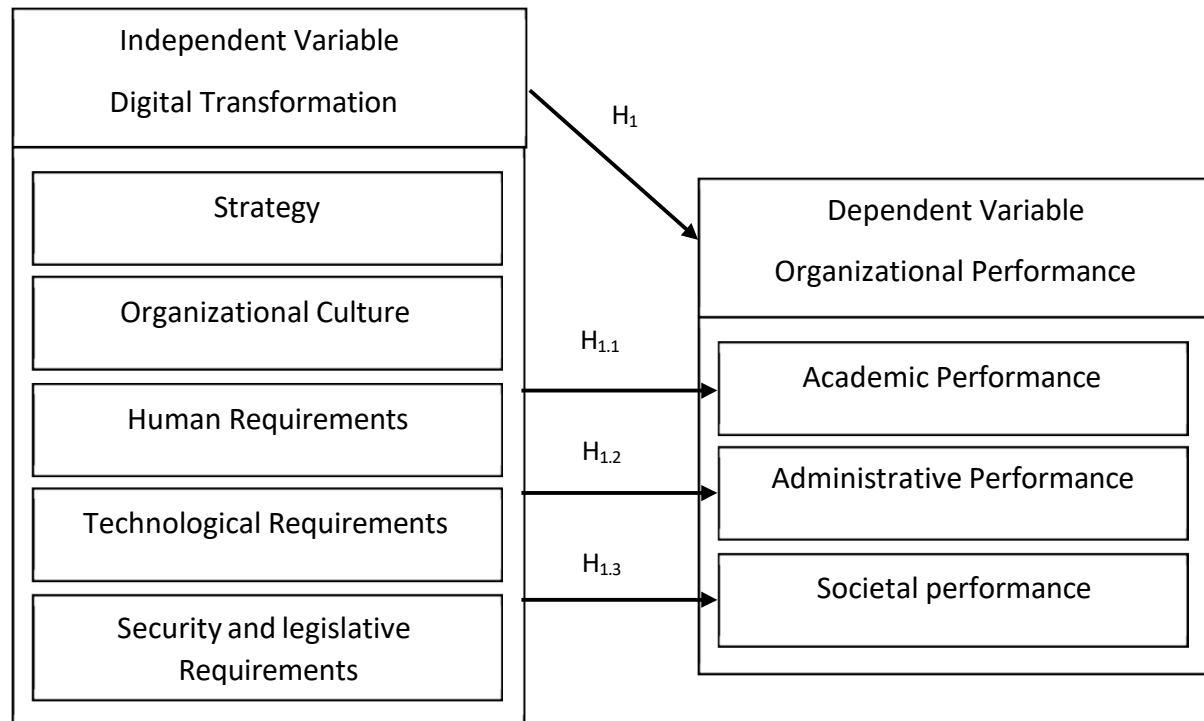


Figure 1. Study Model

Source: the researcher based on previous studies

A questionnaire was designed of three sections; the first is the demographic one (gender, age, qualifications, and working experiences). The second section measure the dimensions of the independent variable Digital Transformation (Strategy, Organizational Culture, Security & Legislative Requirements, Technological Requirements, and Human requirements). The third section was designed to measure the dimensions of the dependent variable Institutional Performance (Academic, Administrative, and Societal) Performance. Data was collect through an online form from a sample of employees (academic and administrative) working at university to test the study's hypotheses and analyze the collected data using the Statistical Package for Social Sciences (SPSS). In addition to the primary data, the study uses the following secondary data:

- Journal articles, consulting reports
- Academic publications,
- Presentations, books,
- Statistics from central bank and research organization

7. Study Hypotheses

Based on the problem statement, the study proposes the following main Hypothesis:

- H_1 : There is a significant relationship between Digital Transformation dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Institutional Performance.

The following sub Hypotheses are derived from the main Hypothesis as follows:

- $H_{1.1}$: There is a significant relationship between Digital Transformation dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Academic Performance.
- $H_{1.2}$: There is a significant relationship between Digital Transformation dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Administrative Performance.
- $H_{1.3}$: There is a significant relationship between Digital Transformation dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Societal Performance.

8. Study Limitation

This study limited to:

- Conceptual limitation: Examining digital transformation with its sub dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and organizational performance with its sub dimensions (academic performance, administrative performance, societal performance) as key variables.
- Spatial limitation: this study is limited to study Deraya University in Upper Egypt.
- Time limitation: Data collection and analysis took place in 2025.

9. The Field Study

This section presents the methodology used to collect and analyze data, describes the study population and sample, and discusses the results obtained through statistical analysis. The study focuses on faculty members at Deraya University to assess their perspectives on digital transformation and university performance.

Introduction to Deraya University

This study is conducted at Deraya University, which was established in New Minya City by Presidential Decree No. 91 of 2010. Deraya University was the second private university in Upper Egypt. Deraya University is under the supervision of the Ministry of Higher Education and Scientific Research. It currently has four faculties (Pharmacy, Physiotherapy, Dentistry, and Business Administration). The total number of employees is approximately 357 (academics and administrators). Deraya University is considered one of the leading Egyptian universities in the field of scientific research, with researchers ranked among the top 2% of influential

scientists worldwide according to the Stanford University Innovation List. (Deraya University, 2025) The university also focuses on digital transformation, in line with the strategic direction pursued by the university and the higher education sector in general. It is worth noting that, based on the 2024 Webometrics results; Deraya University ranked 5009/32,000 globally. This ranking, in addition to its rank of 1138/1476 in the UI Green Metric World University Rankings, demonstrates Deraya University's prominent position in global rankings, highlighting its efforts in various fields. This is the result of the university's ongoing efforts to improve the quality of its education and develop its digital infrastructure.

DT efforts at Deraya University

Based on what was discussed in the theoretical part of the study regarding DT and its manifestations in higher education institutions, the study will attempt to determine whether and to what extent Deraya university possesses these features.

Deraya University provides numerous online services through its official website, including the use of the MS Teams e-learning website, which allows students to access various lectures, sections, books, and academic materials in all disciplines. This also enables the university to conduct tests and exams electronically, as well as upload assignments or upload answers in the form of files.

Students can also access these services through their university email account, which the university assigns to each student and all university staff, enabling secure and effective electronic communication. In addition, students are provided with the ability to view various announcements sent by the college or university administration, as well as to monitor academic progress, track results and grades, and register for courses electronically according to the timetable.

Moreover, the university participates in the Egyptian Knowledge Bank (EKB), which provides access through the university account to various national and international publications, magazines, theses, and academic papers. Additionally, there is an electronic library that makes its contents available to all university members, allowing them to search for references and books and obtain their identification numbers with ease. Furthermore, an electronic and interactive electronic book service for some courses, allowing students to easily access lectures and the test bank.

Important seminars, conferences, and events are also broadcast through the university's website, which provides information about the various services provided to new comers and the society in general, and answers their questions and inquiries instantaneously.

Deraya University is among the Egyptian universities that adopt a smart university (zero-paper policy), based on what we have observed, it implements this policy well as it has an ERP system to manage accounting, human resources, procurements, and other administrative issues. Moreover, it publishes announcements, exam schedules, test results, and other information entirely digitally. The university offers numerous digital services to its users, such as professional email, scholarship offers, consultations, and more, all through its website and the social media pages of its faculties and departments. The university, along with all its faculties, departments, and administrations, also have social media pages that publish news related to the university, its faculty, and its students.

Study Population

The study population includes all Deraya university members, totaling 357. The researcher use a census approach which aims to gather information from every single member of a population as the population is relatively small. Consequently, 315 valid and complete responses were received with a response rate of 88.8%. The collected data was analyzed using the Statistical Package for Social Sciences (SPSS).

Statistical Methods

Statistical analysis methods are the means to reach the results of the study, and statistical methods differ depending on the purpose of conducting them. In order to achieve the objectives of the current study and verify its hypotheses; The Statistical Packages for the Social Sciences (SPSS) used to analyze the questionnaire data obtained from the study's sample members. The methods used varied to vary the questions in the study and were as follows: Cronbach's alpha coefficient, and Pearson correlation, linear regression analysis test, and effect level.

Test of Validity and Reliability

The validity of the questionnaire means the assurance that the tool will measure what it was designed to measure. It also guarantees the validity of the survey's inclusion of all the elements that must be included in the analysis, on the one hand, and the clarity of its paragraphs and vocabulary on the other hand, so that they are understandable to everyone who uses them. The researcher codified the questionnaire items in order to ensure the validity of the study tool. Validity characterizes as the degree to which any measuring tool intended to determine what it is planned to measure (Bashta & Bouamouta, 2020). The questionnaire validity estimated and evaluated through various methods including external validity, internal validity and structure validity.

- External (Content) Validity: Content validity identified as the degree to which the study questions can be covered adequately by the study questionnaire (Saunders,*etal.*,2019). Academic professors at Deraya a University reviewed the content of the questionnaire to carry out the external content validity to confirm the consistency of the questionnaire content with the study objectives, and estimate whether the items reflect the study problem or not. The comments were discussed, and the necessary modifications, deletions, and additions were made. Thus, the external validity was confirmed by reviewing the opinions of the experts.
- Internal Validity: Correlation coefficients between each item in one field and the whole field was used to measure the internal validity of the questionnaire. Internal Validity for DT and Institutional Performance clarified in the next table which determines the correlation coefficient of each item and the total of this field.

Table 2. Person Correlation coefficients of DT

		DT	Strategy	Culture	Legal	Technology	HR
DT	Pearson Correlation	1	.430**	.931**	.871**	.850**	.897**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	312	312	312	312	312	312
Strategy	Pearson Correlation	.430**	1	.359**	.353**	.089	.107
	Sig. (2-tailed)	.000		.000	.000	.115	.058
	N	312	315	312	315	315	315
Culture	Pearson Correlation	.931**	.359**	1	.715**	.749**	.854**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	312	312	312	312	312	312
Legal	Pearson Correlation	.871**	.353**	.715**	1	.718**	.718**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	312	315	312	315	315	315
Technology	Pearson Correlation	.850**	.089	.749**	.718**	1	.801**
	Sig. (2-tailed)	.000	.115	.000	.000		.000
	N	312	315	312	315	315	315
HR	Pearson Correlation	.897**	.107	.854**	.718**	.801**	1
	Sig. (2-tailed)	.000	.058	.000	.000	.000	
	N	312	315	312	315	315	315
**. Correlation is significant at the 0.01 level (2-tailed).							

Source: the researcher (output of the SPSS program)

The validity of the internal consistency was estimated by calculating the Pearson correlation coefficient between the scores of each statement and the total score of the dimension to which the statement belongs among the dimensions of the questionnaire, as it ranged between (0.430** and 0.931**) for the DT variable, and between (0.927** and 0.938**) for the Institutional Performance variable. Thus, the questionnaire validity was statistically confirmed.

Table 3. Person Correlation coefficients of Institutional Performance

		Institutional Performance	Academic Performance	Administrative Performance	Societal Performance
Institutional Performance	Pearson Correlation	1	.927**	.936**	.938**
	Sig. (2-tailed)		.000	.000	.000
	N	315	315	315	315
Academic Performance	Pearson Correlation	.927**	1	.808**	.805**
	Sig. (2-tailed)	.000		.000	.000
	N	315	315	315	315

Administrative Performance	Pearson Correlation	.936**	.808**	1	.810**
	Sig. (2-tailed)	.000	.000		.000
	N	315	315	315	315
Societal Performance	Pearson Correlation	.938**	.805**	.810**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	315	315	315	315
**. Correlation is significant at the 0.01 level (2-tailed).					

Source: the researcher (output of the SPSS program)

Test of Reliability

Cronbach's alpha reliability coefficients were calculated for sub-variable and the total variable, and it was found that the values of the Cronbach's alpha coefficients for the alpha coefficient for the first independent variable (Digital Transformation) is 0.915, and the sub-indexes of this independent variable range from 0.869 to 0.914 which is very high and indicates high reliability. The alpha coefficient for the second dependent variable (Institutional Performance) is 0.911, and the sub-indexes of this independent variable range from 0.831 to 0.910, which is very high also. Therefore, the results confirm the reliability and consistency of each variable.

Table 4 .Cronbach's Alpha coefficients each field of the questionnaire

Main index	Sub index	Cronbach's Alpha
Digital Transformation	Strategy	0.914
	Organizational Culture	0.898
	Security & Legislative Requirements	0.922
	Technological Requirements	0.897
	Human Requirements	0.869
	Digital Transformation	0.915
Institutional Performance	Academic Performance	0.831
	Administrative Performance	0.872
	Social Performance	0.910
	Institutional Performance	0.911

Source: the researcher (output of the SPSS program)

Data Collection Method

The questionnaire was distributed electronically by creating an electronic form using Google form. The questionnaires were retrieved, imported, and entered into the statistical package program SPSS, and the statistical analysis was performed.

Hypotheses Testing

The study hypotheses are based on the problem of the current study and as an attempt to answer the current questions of the study and explain the variables of the study model. Therefore, a main hypothesis was formulated which is: "There is a statistically significant effect between Digital Transformation and Intuitional Performance at Deraya University at the significance level of (0.05). Testing this hypothesis. It was divided into sub-hypotheses, and a simple linear regression test was used to test each sub-hypothesis separately, as follows

Hypothesis testing

The study has one main hypothesis and sub hypotheses as follows

The main hypothesis test

H_1 : There is a significant relationship between Digital Transformation dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Institutional Performance.

Analysis with simple linear regression model which attempts to explain the relationship between two variables using a straight line; one of them is independent variable (DT dimensions) and the other is a dependent variable (Institutional Performance).

Table 5 . Regression analysis between DT dimensions and Institutional Performance

Model	R	R ²	Adjusted R ²	Std. Error The estimate	F	Sig.
DT dimensions and Institutional Performance	0.908	0.825	0.824	0.330653	1459.828	0.000*

Dependent variable: Institutional Performance

Independent variable: DT dimensions

Table 6. Regression equation coefficient

Model	Beta coefficient	T-Statistic	Sig.
Constant	0.121	1.241	0.215
DT dimensions	0.978	38.208	0.000*

Dependent variable: Institutional Performance

Independent variable: DT dimensions

The previous table shows that F-Statistics = 1459.828 and it is statistically significant (P-Value = 0.00) which is lower than 0.05; therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted which say "There is a significant relationship between DT dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Institutional Performance".

The Beta coefficient of the constant = 0.121, the coefficient of the model = 0.978, the value of $R = 0.908$, $R^2 = 0.825$ which shows how well terms (data points) fit a curve or line. Adjusted $R^2 = 0.824$ also indicates how well terms fit a curve or line but adjusts for the number of terms in a model.

This means that 82.4% of the change in the dependent variable is explained by the independent variables, the remaining percentage is due to other variables. The regression equation can be written as follows:

$$\text{Institutional Performance} = 0.121 + 0.978 \times (\text{DT dimensions})$$

This first hypothesis finding reveals that Digital transformation significantly enhances university performance it explains 82.4% of the change in the Institutional Performance, but requires structured implementation. Security & legal requirements are the most critical factors for success, followed by Human Requirements, then Technological Requirements, then Organizational Culture, and finally Strategy.

The first Sub-hypothesis test

H_{1.1}: There is a significant relationship between Digital Transformation dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Academic Performance.

Analysis with multiple linear regression model which attempts to explain the relationship between two or more variables using a straight line; one of them is independent variables (DT dimensions) and the other is a dependent variable (Academic Performance).

Table 7 Regression analysis between DT dimensions and Academic Performance

Model	R	R ²	Adjusted R ²	Std. Error The estimate	F	Sig.
DT dimensions and Institutional Performance	0.821	0.675	0.670	0.44445	127.019	0.000*

Dependent variable: Academic Performance

Independent variable: DT dimensions

Table. 8 egression equation coefficient

Model	Beta coefficient	T-Statistic	Sig.
Constant	0.854	4.731	0.000*
Strategy	0.063	1.498	0.135
Organizational Culture	0.225	3.638	0.000*
Security & Legislative Requirements	0.398	7.904	0.000*
Technological Requirements	0.070	1.289	0.198
Human Requirements	0.062	1.139	0.255

Dependent variable: Academic Performance

Independent variable: DT dimensions

The previous table shows that F-Statistics = 127.019 and it is statistically significant (P-Value = 0.00) which is lower than 0.05; therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis ($H_{1.1}$) is accepted which say "There is a significant relationship between DT dimensions and Academic Performance".

The Beta coefficient of the constant = 0.854 and is statistically significant, the coefficient of the strategy variable = 0.063 and isn't statistically significant, the coefficient of the Organizational Culture variable = 0.225 and is statistically significant, the coefficient of the Security & Legislative Requirements variable = 0.398 and is statistically significant, the coefficient of the Technological Requirements variable = 0.198 and isn't statistically significant, finally the coefficient of the Human Requirements variable = 0.062 and isn't statistically significant, the value of $R = 0.821$, R Square = 0.675 which shows how well terms (data points) fit a curve or line. Adjusted R Square = 0.670 also indicates how well terms fit a curve or line but adjusts for the number of terms in a model.

This means that 67.0% of the change in the dependent variable is explained by the independent variables, the remaining percentage is due to other variables. The regression equation can be written as follows:

Academic Performance = $0.854 + 0.063 \times (\text{Strategy}) + 0.225 \times (\text{Organizational Culture}) + 0.398 \times (\text{Security \& Legislative Requirements}) + 0.07 \times (\text{Technological Requirements}) + 0.062 \times (\text{Human Requirements})$

The finding of the second hypothesis reveals that Security & Legislative Requirements have the greatest impact Academic Performance, followed by Organizational Culture. University does not update its strategy appropriately to keep pace with environmental changes and has to be reviewed to be aligned with the university digital plan and institutional goals. Moreover, Technological Requirements for DT has to be updated to match the university DT plan. In addition, the Human Resources Management practices (recruitment, selection, training, performance appraisal, talent acquisition, and compensations) have to be reviewed to support the implementation of the DT initiatives.

The second Sub-hypothesis test

$H_{1.2}$: There is a significant relationship between Digital Transformation dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Administrative Performance.

Analysis with simple linear regression model which attempts to explain the relationship between two variables using a straight line; one of them is independent variable (Organizational Culture) and the other is a dependent variable (Institutional Performance).

Table 9. Regression analysis between DT dimensions and Administrative Performance

Model	R	R ²	Adjusted R ²	Std. Error The estimate	F	Sig.
DT dimensions and Institutional Performance	0.900	0.811	0.808	0.3773	262.418	0.000*

Dependent variable: Administrative Performance

Independent variable: DT dimensions

Table 10 .Regression equation coefficient

Model	Beta coefficient	T-Statistic	Sig.
Constant	-0.049	-0.321	0.748
Strategy	0.112	3.114	0.002*
Organizational Culture	0.195	3.718	0.000*
Security & Legislative Requirements	0.162	3.776	0.000*
Technological Requirements	0.297	6.438	0.000*
Human Requirements	0.226	4.890	0.000*

Dependent variable: Administrative Performance

Independent variable: DT dimensions

The previous table shows that F-Statistics = 262.418 and it is statistically significant (P-Value = 0.00) which is lower than 0.05; therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis ($H_{1.2}$) is accepted which say "There is a significant relationship between DT dimensions and Administrative Performance".

The Beta coefficient of the constant = -0.049 and isn't statistically significant, the coefficient of the strategy variable = 0.112 and is statistically significant, the coefficient of the Organizational Culture variable = 0.195 and is statistically significant, the coefficient of the Security & Legislative Requirements variable = 0.162 and is statistically significant, the coefficient of the Technological Requirements variable = 0.296 and is statistically significant, the coefficient of the Human Requirements variable = 0.226 and is statistically significant, the value of $R = 0.900$, $R\text{ Square} = 0.811$ which shows how well terms (data points) fit a curve or line. Adjusted $R\text{ Square} = 0.808$ also indicates how well terms fit a curve or line but adjusts for the number of terms in a model.

This means that 80.8% of the change in the dependent variable is explained by the independent variable, the remaining percentage is due to other variables. The regression equation can be written as follows:

Administrative Performance = $-0.049 + 0.112 \times (\text{Strategy}) + 0.195 \times (\text{Organizational Culture}) + 0.162 \times (\text{Security \& Legislative Requirements}) + 0.297 \times (\text{Technological Requirements}) + 0.226 \times (\text{Human Requirements})$

This finding of the third hypothesis reveals all DT dimensions have significant impact on administrative performance. Technological Requirements have the greatest influence, followed by Human Requirements, Organizational Culture, Security & Legislative Requirements, and Strategy respectively.

The third Sub-hypothesis test

H_{1.3}: There is a significant relationship between Digital Transformation dimensions (strategy, organizational culture, security & legislative requirements, technological requirements, human requirements) and Societal Performance.

Table 11 .Regression analysis between DT dimensions and Societal Performance

Model	R	R ²	Adjusted R ²	Std. Error The estimate		F	Sig.
DT dimensions and Institutional Performance	0.887	0.786	0.783	0.4196		225.246	0.000*

Dependent variable: Societal Performance

Independent variable: DT dimensions

Table 12. Regression equation coefficient

Model	Beta coefficient	T-Statistic	Sig.
Constant	1.028	6.030	0.000*
Strategy	-0.048	-1.202	0.230
Organizational Culture	0.188	3.225	0.001*
Security & Legislative Requirements	0.165	3.478	0.001*
Technological Requirements	0.034	0.657	0.511
Human Requirements	0.466	9.045	0.000*

Dependent variable: Societal Performance

Independent variable: DT dimensions

The previous table shows that F-Statistics = 225.246 and it is statistically significant (P-Value = 0.00) which is lower than 0.05; therefore, the null hypothesis (H₀) is rejected and the alternative hypothesis (H_{1.3}) is accepted which say "There is a significant relationship between DT dimensions and Societal Performance".

The Beta coefficient of the constant = 1.028 and is statistically significant, the coefficient of the strategy variable = -0.048 and isn't statistically significant, the coefficient of the Organizational Culture variable = 0.118 and is statistically significant, the coefficient of the Security & Legislative Requirements variable = 0.165 and is statistically significant, the coefficient of the Technological Requirements variable = 0.034 and isn't statistically significant, the coefficient of the Human Requirements variable = 0.466 and is statistically significant, the value of $R = 0.887$, $R^2 = 0.786$ which shows how well terms (data points) fit a curve or line. Adjusted $R^2 = 0.783$ also indicates how well terms fit a curve or line but adjusts for the number of terms in a model.

This means that 78.3% of the change in the dependent variable is explained by the independent variable, the remaining percentage is due to other variables. The regression equation can be written as follows:

$$\text{Societal Performance} = 1.028 - 0.048 \times (\text{Strategy}) + 0.188 \times (\text{Organizational Culture}) + 0.165 \times (\text{Security \& Legislative Requirements}) + 0.034 \times (\text{Technological Requirements}) + 0.466 \times (\text{Human Requirements})$$

This finding reveals that Organizational Culture, Security & Legislative Requirements, and Human Requirements have a significant impact on Societal Performance, while results show that Strategy and Technological Requirements have no significant influence on Societal Performance. Human Requirements have the greatest influence followed by Organizational Culture and finally Security & Legislative Requirements. The university have to pay great attention to Strategy and Technological Requirements to enhance its Societal Performance.

10.Results

1. The study demonstrates that DT is a transformative force for Deraya University, with security, human resources, and culture being pivotal. Addressing strategic and technological gaps through integrated policies will enhance performance across academic, administrative, and societal domains, positioning the university competitively in the digital era.
2. The results of both theoretical and practical framework indicate that DT is no longer an option, but rather an imperative that all educational institutions must embrace. DT has significantly reshaped higher education institutions, influencing teaching, learning, research, administration, and student engagement. The integration of digital technologies—such as artificial intelligence (AI), learning management systems (LMS), big data analytics, and cloud computing—has enhanced efficiency, accessibility, and innovation while also presenting challenges.
3. Digital transformation is not just a technological shift but a cultural and operational revolution. Resistance to change and lack of digital skills and competence are key challenges. Deraya University must embrace innovation to remain competitive in the evolving global education landscape.
4. The study affirms that DT significantly enhances institutional performance in HEIs. However, it highlights the need for integrated approaches that consider interdependencies among strategy, culture, legal compliance, technology, and human capital. Future research should

focus on long-term effects and comparative studies across different regions to better understand DT's global impact.

5. The study confirmed a statistically significant relationship between DT dimensions (strategy, culture, security/legislative requirements, technology, and human resources) and institutional performance at Deraya University. The regression analysis revealed that DT dimensions collectively explain 82.4% of the variance in overall institutional performance, indicating a strong positive impact.
6. Academic Performance: Security/legislative requirements ($\beta = 0.398$) and organizational culture ($\beta = 0.225$) were the most influential DT dimensions. Strategy and technological requirements showed no significant impact, suggesting gaps in alignment with academic goals.
7. Administrative Performance: Technological requirements ($\beta = 0.297$) and human resources ($\beta = 0.226$) had the strongest effects, highlighting the role of infrastructure and staff competency in streamlining operations.
8. Societal Performance: Human resources ($\beta = 0.466$) and organizational culture ($\beta = 0.188$) were critical, while strategy and technology lacked significance, indicating underutilization in community engagement.
9. DT Dimensions Ranking: Security/legislative compliance emerged as the most critical factor (ensuring trust and sustainability), followed by human resources, technology, culture, and strategy. This underscores the need for robust cybersecurity and staff training.
10. Challenges Identified: Resistance to change among faculty/staff, inadequate financial resources for infrastructure, and weak strategic alignment and outdated technological tools.
11. Holistic Approach: The study supports the necessity of integrating all DT dimensions for optimal performance, aligning with literature (e.g., Vial, 2019; Gurbaxani & Dunkle, 2019).
12. Cultural Shift: Organizational culture's significant role echoes Kane et al. (2016), emphasizing that DT success requires behavioral adaptation alongside technological adoption.
13. Security as a Priority: The prominence of security/legislative requirements reflects global trends (Siponen et al., 2020), where data protection and compliance are pivotal for institutional credibility.
14. Gaps in Strategy: The minimal impact of strategy suggests Deraya University's digital plans may lack clarity or fail to align with operational needs.

11.Recommendations

Based on the results of the theoretical and applied study, we can propose the following recommendations for the university under study, which we believe could be adopted by other universities across the country

Table. 13 Executive Plan for Recommendations

Recommendation	Strategy	Implementation	Responsible Entity
1. Develop a comprehensive Digital Transformation Strategy	- Conduct a thorough needs assessment to identify gaps in current digital infrastructure and processes. - Align the DT strategy with the university's mission, vision, and long-term goals. - Establish clear KPIs (e.g., improved student enrollment, reduced administrative costs, enhanced research output).	- Form a dedicated DT task force comprising IT experts, faculty, administrators, and student representatives. - Use benchmarking to adopt best practices from leading universities	-Senior management (e.g., university president, deans). -Strategic planning office.
2. Foster a Digital Culture	-Promote awareness campaigns to highlight the benefits of DT (e.g., workshops, seminars). -Encourage innovation through incentives (e.g., awards for digital teaching initiatives).	-Integrate digital literacy into professional development programs for staff and faculty. -Create a platform for sharing success stories and challenges.	-Human Resources (HR) department. -Faculty development center.
3.Strengthen Cybersecurity and Legislative Compliance Implementation Strategy	- Adopt robust cybersecurity frameworks (e.g., ISO 27001) and ensure compliance with data protection laws (e.g., GDPR). - Regularly audit digital systems for vulnerabilities.	-Partner with cybersecurity firms for training and infrastructure upgrades. -Establish a university-wide data privacy policy.	- IT department. - Legal and compliance office.
4.Upgrade Technological Infrastructure	- Invest in cloud computing, AI-driven tools (e.g., chatbots for student services), and LMS upgrades (e.g., Moodle, Blackboard). - Ensure high-speed internet and modern hardware (e.g., smart classrooms).	- Pilot new technologies in select departments before full-scale rollout. -Allocate annual budgets for technology upgrades.	-IT department. -Finance and procurement office.
5.Enhance Human Resource Capabilities	- Offer mandatory DT training for staff and faculty (e.g., workshops on AI, data analytics). -Recruit IT-savvy talent and provide continuous upskilling opportunities.	-Collaborate with industry partners for certification programs (e.g., Google, Microsoft). -Integrate digital competencies into performance evaluations.	-HR department. -Academic departments
6.Improve Societal and Academic Performance	-Expand e-learning platforms and hybrid learning models to increase accessibility.	-Develop partnerships with local industries for internships and job placements.	-Academic affairs office. -Student services and community outreach teams.

Recommendation	Strategy	Implementation	Responsible Entity
	-Use data analytics to track student performance and reduce dropout rates.	-Launch community engagement programs (e.g., digital literacy initiatives for underserved populations).	
7. Monitor and Evaluate DT Initiatives	-Conduct bi-annual reviews of -DT progress using KPIs (e.g., user satisfaction, cost savings). Solicit feedback from stakeholders (students, faculty, and staff) via surveys.	-Use dashboards to visualize DT metrics (e.g., enrollment rates, research output). -Adjust strategies based on evaluation results.	-Quality Assurance Office. -DT task force.

By prioritizing DT in strategic plans and allocate sufficient budgets, fostering collaborations with tech companies and other universities, and implementing these recommendations, HEIs like Deraya University can achieve holistic digital transformation, enhancing academic, administrative, and societal performance while maintaining competitiveness in the global education landscape.

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المستخلص

تهدف هذه الدراسة في بحث تأثير الأبعاد المختلفة للتحويل الرقمي (الاستراتيجية، والثقافة، والمتطلبات الأمنية والتشريعية، والمتطلبات التكنولوجية، والمتطلبات البشرية) على الأداء المؤسسي (الأكاديمي والإداري والمجتمعي) بالتطبيق على جامعة دراية بمصر. ولتحقيق هدف الدراسة، استخدم الباحث المنهج الوصفي التحليلي؛ حيث تم تصميم استبيان وتم مشاركته عبر الإنترنت لجميع العاملين بجامعة دراية (حوالي 357). باستخدام أسلوب الحصر الشامل وتم استرداد 315 مفرد صحيحة وكاملة بمعدل استجابة 88.8%. وتم تحليل البيانات التي باستخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS). وقد خلصت نتائج الدراسة إلى وجود علاقة ذات دلالة إحصائية بين أبعاد التحويل الرقمي مجتمعة والأداء المؤسسي بجامعة دراية. وأظهرت النتائج أن الثقافة التنظيمية والمتطلبات الأمنية والتشريعية لها تأثير كبير علة تطبيق التحويل الرقمي وتحقيق الأهداف المؤسسية. كما أظهرت النتائج أيضا أن المتطلبات التكنولوجية والبشرية والثقافية والأمنية والتشريعية والاستراتيجية على الترتيب لها تأثير قوي على الأداء الإداري. كما يؤثر توفير المتطلبات البشرية، والثقافة التنظيمية، والمتطلبات الأمنية والتشريعية، على الترتيب على الأداء المجتمعي. وأوصت الدراسة بأن تولي الجامعة اهتماما كبيرا بتطوير وصياغة الاستراتيجية وتوفير المتطلبات التكنولوجية لتعزيز أدائها المجتمعي. كما أن توفير المتطلبات الأمنية والتشريعية لها دور حيوي في تحقيق الاستدامة والتطوير المؤسسي. كما أوصت الدراسة مؤسسات التعليم العالي بأهمية وضع استراتيجية شاملة للتحويل الرقمي، وتعزيز الثقافة الرقمية، وتعزيز الأمن السيبراني وتوفير المتطلبات الأمنية والتشريعية، وتطوير استراتيجيات التحويل الرقمي، وتحديث البنية التحتية التكنولوجية، وتعزيز قدرات الموارد البشرية، ومراقبة مبادرات التحويل الرقمي وتقييمها مما يساهم في تحسين الأداء والأكاديمي والإداري والمجتمعي.

الكلمات المفتاحية: التحويل الرقمي ؛ الأداء التنظيمي ؛ مؤسسات التعليم العالي ؛ جامعة دراية.