Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4, 2084-2098
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i4.6479

Digital transformation obstacles categorization in higher education institutions in the middle east and its effect on the UN sustainable development goals: A systematic literature review

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Abstract: The operations and curriculum of higher education institutions are undergoing significant changes and challenges in the ME region. These significant changes are being driven by a number of factors and are not allowing this sector to achieve sustainability goals. The Sustainable Development Goals (SDGs) have a strong link to the use of digital transformation, especially in higher education, and those goals could be achieved with the use of digital technologies (SDG 4). Therefore, students use digital tools to enhance their learning, which include a variety of tools chosen to incorporate formalized learning environments in higher education instruction. In this article, we identify those challenges based on a systematic literature review. The study identifies hurdles to digital transformation in higher education in the ME area, including internal and external issues. Furthermore, the paper demonstrates how to employ digital transformation approaches to achieve one of the 17 Sustainable Development Goals set forth by the UN and links the usage of digital transformation in ME area higher education institutions with these goals. The study provides a full understanding of impediments, allowing for effective tactics and solutions. This research article identifies the six main obstacles that face digital transformation in higher education institutions in the Middle East area, then categorizes them into five categories. Furthermore, this article identifies the role of digital transformation in achieving SDG 4, which is the quality of education in HEIs in the ME. Higher education institutions are complex, and in such an area as the Middle East, it is not easy to implement any transformation, especially digital transformation, due to numerous challenges in this area. Based on a systematic literature review, we identify such challenges in this study. The article finds both internal and external barriers to the digital transformation of higher education in the ME region. Additionally, the study ties the use of digital transformation in higher education institutions in the ME area with the 17 Sustainable Development Goals established by the UN and shows how to use digital transformation methodologies to accomplish one of these goals. Effective strategies and solutions are made possible by the study's thorough comprehension of the obstacles.

Keywords: *Categorization, Digital transformation (DT), Higher education institutions (HEIs), Middle east region (ME), Obstacles, Sustainable development goals (SDGs).*

1. Introduction

1.1. Background

1.1.1. UN Sustainable Development Goals (SDGs)

The 17 interrelated Sustainable Development Goals (SDGs) aim to improve and sustainably develop the world for everybody.5. In order to eradicate poverty, safeguard the environment, and guarantee that everyone lives in peace and prosperity by 2030, they were unanimously embraced by all UN Member

History: Received: 25 February 2025; Revised: 14 April 2025; Accepted: 18 April 2025; Published: 22 April 2025
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States in 2015. Additionally, there are 169 targets in the 17 SDGs. There are currently 5285 activities completed in relation to these 17 SDGs, 1034 events planned, and 1221 publications pertaining to these goals [1]. The UN 17 Sustainable Development Goals are shown in Figure 1 below.

Numerous works of literature addressed the relationship between digital use and the UN SDGs in various ways. For instance, discover how artificial intelligence can be utilized to address climate change (SDG 13), attain affordable and clean energy (SDG 7), and promote responsible production and consumption (SDG 12) [2]. Additionally, among other things, the agricultural sector can use geospatial technologies to improve access to clean water and sanitation facilities (SDG 6), decrease hunger in multiple areas (SDG 2), promote health and well-being (SDG 3), increase awareness of responsible consumption and production (SDG 12), and protect life on land (SDG 15) [3].

For the case of HEIs in the ME, by generating knowledge for new technologies and social innovation, HEIs also play a critical role in the advancement and execution of the United Nations (UN) 2030 Agenda for Sustainable Development and the digitalization of society [4]. To guide actions towards sustainability throughout the entire university system, including education, research, campus operations, community outreach, assessment, and reporting [5, 6]. HEIs should support sustainable development in their physical infrastructure, decision-making processes, and pedagogical issues [7].

This article will link the use of DT and the effect of DT obstacles identified and categorized in this paper on SDGs in HEIs in the ME.

Figure 1.
UN 17 Sustainable Development Goals.
Source: United Nations.

1.1.2. Digital Transformation

The necessity for digital transformation in higher education in the ME is highlighted by rapid technological advancements and their profound impact on society. In 2019, the worldwide e-learning

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2084-2098, 2025
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market was worth over USD 200 billion. In the same year, the Learning Management System (LMS) market generated around USD 18 billion [8]. The COVID-19 epidemic has expedited the transition to digital education, forcing many institutions to adopt remote and hybrid teaching approaches. The worldwide e-learning market is projected to reach USD 848.12 billion by 2030, indicating increased adoption of online educational platforms and digital resources [9].

Scholars refer to digital transformation (DT) around the world as the use of digital technologies to create or modify business models and processes, as well as transform organizational structures, resources, or relationships with internal and external actors [10-13]. Digital technologies have a significant impact on modern firms, including production, organizational hierarchies, and relationships with partners, suppliers, and customers [14-20].

The nature and breadth of education have changed as a result of digital technology. Smart devices, the Internet of Things (IoT), artificial intelligence (AI), augmented reality (AR) and virtual reality (VR), blockchain, software applications, and other disruptive and versatile technological advancements have created new avenues for improving education [21, 22]. Accordingly, education systems around the world have prioritized their educational agendas to adjust strategies or policies around ICT integration European Commission [23] and increased their investment in ICT integration in recent years [24, 25].

Since pertinent ideas have existed in various forms for at least 50 years, digital transformation is not a wholly new phenomenon. The first wave of change, sometimes referred to as "digitization," occurred in the 1960s and 1970s and led to minor organizational changes and the automation of some process components [26]. According to the Weberian paradigm, information flows inside the organization stayed vertical. The second wave of change, commonly referred to as digitalization, took place in the 1980s and 1990s and was fueled by the discourse surrounding business process reengineering [27]. Businesses continued to create the same goods and services, but they did it in a totally novel method that had an impact on internal operations, information flows, and organizational structures [26].

1.1.3. Digital Transformation in The Higher Education in the ME

Despite the investment made in integrating technology in HIEs in ME, studies have revealed that the desired effects have not yet been attained and that the findings have not been encouraging [25, 28]. These problems were made worse by the COVID-19 pandemic, which compelled all educational levels to switch to online instruction [29]. Questions about the nature, scope, efficacy, and process of digitalization in HIEs in the ME region have been raised by the increased use of digital technology brought about by online instruction [30, 31].

According to Blaskó, et al. [32] and Di Pietro, et al. [33] a number of educational institutions specifically showed a lack of experience and insufficient digital competence, which led to growing disparities, inequities, and learning losses. In order to improve their digital capabilities European Commission [34] and raise their levels of digitalization Costa, et al. [35] these institutions must learn from and build upon the experience. Digitalization affects many facets of a school's development and presents opportunities for basic education reform [22, 36, 37]. But it's a complicated process that calls for significant, revolutionary adjustments that go beyond the technical facets of infrastructure and technology [38].

The way people live, work, and educate themselves is being impacted by the social, political, economic, and technical developments occurring in the ME region. Given the exceptional rate of technological adoption, it appears that all countries, regardless of their current level of development, will experience a digital revolution [39]. The need for digital transformation has subsided in the developed world over the past 20 years, and governments have created advanced strategies for utilizing digital technology to enhance existing goods and services and produce new ones.

Developing nations, particularly those in the ME, have been working to transition from aspiration and goal to planning, implementing, and enjoying the advantages of digital transformation during this time [40]. In order to survive and continue to perform essential duties, organizations must prioritize and address the pressing issue of digital transformation [41]. Therefore, For HEIs, coping with

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2084-2098, 2025
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digitization is consequently extremely difficult. However, given that their future will surely be digital, they must overcome this obstacle. Digitalization has uncertainty, just like any other change process. When assumptions are established that don't (or just partially) match reality, these uncertainties grow [42]. The question now is not if an organization will undergo the necessary digital transition, but rather how it will do so in such area like ME. This research paper examines the challenges that ME region countries may face when implementing digital transformation in their higher education institutions.

Due to varying degrees of development, information and communications technology (ICT) developments in the Middle East and North Africa (MENA) region in the sector of HE are highly varied. both within and across nations. A number of factors, such as the job market, infrastructure, economic climate, and inadequate governance, can be blamed for this disparity. However, in order to advance growth, almost every nation in the region is working to implement regulations that encourage digitization [40].

Saudi Arabia and the United Arab Emirates (UAE) are two nations that are well-suited for future technological advancement [43]. But according to the National ICT Index, those nations continue to fall behind other developed economies in terms of their capacity for digital government [44].

Several governments in the MENA region have started national transformation plans that emphasize supporting ICT and Digital Transformation technologies in order to address their respective economic, social, and environmental concerns [45]. One important result of their national visions is the integration of digital technology to create better cities and smarter countries [44].

1.2. Research Gap

There is a dearth of literature on the challenges and difficulties of adopting digital transition with specific catergorization for those challenges, particularly in higher education and, more especially, in ME and developing countries [46]. The purpose of this study is to fill in those gaps. This study is important for higher education institutions and other stakeholders involved in the higher education hierarchy in the ME, such as students, educators, researchers, institutions, and government agencies, given the significance of higher education in today's information society and knowledge economy [47]. Forthurmore, there is a theoretical deficit with reference to comprehensive assessments on the subject in the context of higher education institutions (HEIs), which are important for stakeholders to achieve and support SDGs. By analyzing the general state of the art, the theoretical viewpoints in the field, and future research insights, this study investigates how digital transformation (DT) may support sustainability and SDGs in HEIs in order to meet this demand in ME region [3].

Since the study of digital transformation in higher education in ME is still in its infancy, obstacles have not yet been thoroughly and methodically recognized and examined. Numerous disruptive modifications have been implemented since the turn of the twenty-first century [47]. While there are many obstacles and challenges associated with emerging technology, they also present new opportunities [48]. Traditional methods and patterns are typically maintained in education, and changes are initiated and adopted slowly [46].

Higher education sector in ME must embrace digital transformation in order to achieve sustainability and to remain competitive and maintain essential functions. The forms of digital transformation issues in the ME region are examined in this study. The importance of the study stems from both the crucial role that digital transformation plays in today's knowledge economy, which became more apparent following the COVID-19 pandemic, and the crucial role that higher education plays in educating and training future leaders, workers, and citizens [40].

1.3. Research Questions

1) RQ 1: What are the obstacles of adopting DT in the HEIs in ME region?
2) RQ 2: How can those obstacles be categorized and grouped together?
3) RQ 3: What is the role/affect of DT in achieving SDG 4 in HEIs in ME?

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1.4. Contribution

A lot of articles discussed DT in HEIs around the World, but we identified the challenges and categorized internal and external challenges and hurdles to DT for HEIs in the ME region. And after that we discussed the affect of those obstacles on acheiving and supporting sustainable goals. Strategies for overcoming these two types of barriers can be devised in a systematic manner. Educational policies can support and accelerate digital transformation in higher education institutions. This work can help HEI professionals, including academics, administrators, and researchers, grasp the challenges of digital transformation and adapt their practices to the changing landscape and to come up with strategies to support SDGs in higher education in the Middle East area.

2. Methodology

The article was carried out using a systematic literature review (SLR) in an effort to find and examine pertinent contributions that enable answering the research questions in order to provide a thorough analysis. The primary theories and research on the subject that have been published over the last 9 years are covered in the systematic literature review that is provided here. It is based review articles from academic, peer-reviewed content databases as well as other important research and publications from international and professional organizations (like the OECD) that are relevant to the ideas under study (such digitalization and digital capacity). Based on the principles put forward by Budgen and Brereton [49] "a means to identify, evaluate, and interpret relevant research on a particular topic." The following are the phases used to conduct the study, which were modified from Budgen and Brereton [49].

2.1. Planning

Analyzing papers pertaining to digital transformation and digital literacy in higher education institutions is the first goal of the research. The review was guided by the research questions that were developed by combining components that would help identify trends in digital transformation, research techniques and tools used to evaluate such practices, and prospects for further study; these findings would be helpful to other researchers who are interested in the topic [49].

Three databases were searched: EBSCO's Business Source Complete, which focused on business and management studies; the multidisciplinary scientific platforms Scopus and Web of Science; and a database dedicated to educational sciences. The search was done in the mentioned three databases using English sources and with 9 years' time restrictions. We conducted keyword, abstract, and title searches.

2.2. Execution

The publications were chosen based on inclusion criteria such empirical research or mixed studies, studies conducted in higher education institutions, focus on students and instructors, and publication dates between 2015 and 2024. All titles and abstracts have been read after removing the dublications we used MS Excel and Mendeley Software. The selected research articles should address the challenges and impediments to implementing digital transformation in higher education institutions, particularly in the Middle East. Articles published in languages other than Spanish and English or those that were not arbitrated were not included.

2.3. Results

The metadata for the search results was automatically extracted. The results were manually retrieved after the selected papers had been read and assessed. to determine the research that higher education institutions have done in this area, the pedagogical problems they have faced in implementing DT trends, and the opportunities for advancement in digital transformation. After processing, the acquired data was categorized in an easily readable spreadsheet while taking our study question into account.

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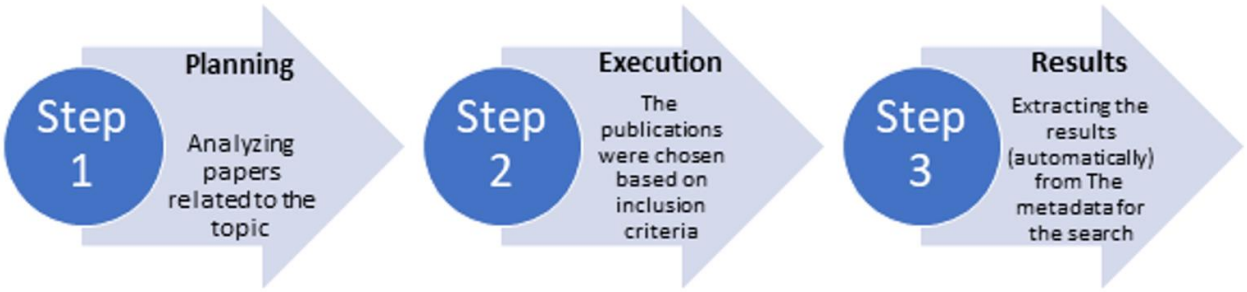

Figure 2.
The three main steps of the research methodology.

3. Results

The presentation of the results is determined by the research questions. Excel and Power BI were utilized for data analysis.

3.1. RQ 1: What are the Obstacles of Adopting DT in the HEIs in the ME Region?

3.1.1. Lack of Technological Literacy in The ME Region

The ability, know-how, and self-assurance to use digital technology are referred to as digital literacy. The success or failure of digital transformation is thought to be largely dependent on the human element [50]. The barriers mentioned in the literature include academic staff members' insufficient DT skills, academics' and staff members' lack of skills and knowledge, and the possibility that students and academic and administrative staff lack the necessary knowledge to utilize the digital services that are available [51].

The "Working Group on Education on Digital Skills and Work" UNESCO [52] the "Bologna Digital 2020" report in Europe [53]. The Chinese government's "Outline of China's National Plan for Medium and Long-term Educational Reform and Development (2010–2020)" Xiao [54] and the Digital Educational Agenda ADE.mx in Mexico SEP [55] are just a few examples of the various initiatives that education systems around the world have taken to address the impact of DT and digital technologies and to increase the awareness and the importance of DT in higher education among faculty members, students, and adminstrative staff [53].

3.1.2. The ME Region Conservative Culture

Cultural barriers are regarded difficult to overcome [56]. Culture is identified as a major barrier to DT all around the world, for instance, in Latin America and and Europe [57, 58].

Only when the entire company acknowledges and embraces the significance of digital culture can true DT be accomplished [59]. Digital transformation is not so much a technological endeavour as it is a people and structure initiative, according to [57]. The International Association of Universities claims that because organizational culture changes affect human behaviour and technological advancements lag behind, cultural change is a major barrier to digital transformation. Technology is developing faster than organizational culture [56].

3.1.3. Fear and Resistance to Change

Barriers to digital transformation include resistance to change, anxiety, uncertainty, and worries that things cannot change, as well as the disinterest of more traditional academics [60]. The widespread opposition to the adoption and deployment of modern information systems is another barrier [56]. Organizational structure changes are another consequence of digital revolution. These modifications have the potential to strengthen some people while weakening others [58].

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In order to overcome HEIs' fear of change, concepts that meet both individual needs and obstacles are required. In order to face this issue, university administrators must first acknowledge that the digital transformation processes represent a tremendous societal upheaval that impacts everyone [51].

It is difficult and slow to change academic culture in universities because people tend to do things in a certain and defined way and are reluctant to leave their comfort zone [56]. There are several reasons why people resist change as per the study of Alzahrani, et al. [61]: firstly, habit, which refers to people's habitual reactions to their environment. Secondly, security, which refers to the fact that people resist any change that poses a threat to their security. Thirdly, economic factors, which relate to the potential risk that may arise from the implementation of the change. Lastly, the fear of the unknown, which is characterized by the substitution of uncertainty and ambiguity for known practices [61].

3.1.4. Lack of Finacial Resources

In actuality, digitization is not inexpensive, particularly when discussing the Middle East and North Africa (ME) region, where several nations, including Lebanon, Iraq, Yemen, Syria, Sudan, and many more, are already experiencing economic hardship. In terms of the DT budgeting, for instance, the European Commission intends to allocate a total of € 9.2 billion to help shape and support the digital transformation of Europe's economies and societies between 2021 and 2027. This will be done by ensuring that digital technologies are widely used throughout the economy and society and by concentrating on advanced digital skills, cybersecurity, artificial intelligence, and supercomputing [62].

The scale of HEIs' digital transformation is obviously smaller. Nevertheless, digitization comes with accompanying expenses. The technology required for digitization, staff training and support, and digital data maintenance are examples of common expenses. Additionally, as digitization necessitates change, all typical expenses associated with altering working methods are applicable [63]. However, many of these expenses are already incurred. For HEIs, for instance, maintaining and growing their technology infrastructure has long been a fixed budget item. Training for teachers and staff is also continuously funded [64].

3.1.5. Lack of IT Infrastructure and Competinces

According to a number of studies, the ME's inadequate infrastructure has hindered the actual usage of digital technologies, including Wi-Fi, which has slow connection speeds and poor internet access [58]. The IT infrastructure's complete preparedness for the UAE's digital transformation implementation as example of ME country, has drawn criticism [41]. Inadequate equipment, outdated equipment, and a lack of national and international bandwidth are only a few of the major infrastructural issues in Cuba as example of non-ME country [65].

Unsuitable IT infrastructure means unstable high-speed internet access, unsuitable IT design, and inappropriate IT infrastructure [66]. The digital transformation process in HEIs requires the three mentioned components [39].

3.1.6. Poor Strategic Planning

Many HEIs in the ME are currently developing a corresponding digitization strategy as a result of the public focus on digitalization. However, these tactics are typically still in their infancy [41]. This is because digitization is a complicated topic that is hard for any one firm to fully understand. Additionally, people view digitalization as a (partially disruptive) process of change that elicits both excitement and mistrust. Furthermore, the hierarchical structures of HEIs vary, which adds to the complexity of putting a digitalization strategy into practice [39].

Thus, digitization is a component of digital transformation, but it is not the exclusive one. Other elements are derived from elements required for any change process to be successful. For instance, this entails proper strategic planning, building trust, integrating all parties involved, thinking through procedures, and promoting learning on an individual, team, and organizational level [67]. In the ME region, the teaching and learning process linked to the digital transformation pathway is not supported

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by HEIs' overall strategy and governance, inconsistent strategies, and a lack of strategy to support it [68, 69]. Lastly, a lack of analytical skills and inability to handle fragmented data are major obstacles for many HEIs when it comes to making strategic decisions [67].

3.2. RQ 2: How can those Obstacles be Categorized and Grouped Together?

First and foremost, we must remember that DT is really about change, encompassing competition dynamics, people, processes, strategies, and structures [70]. There are several models and mechanisims to group and categorize the obstacles and challenges of DT in ME. People, processes, and technology (PPT), for example, are widely recognized as the three elements that are essential to an organization's change [71]. Furthermore, in Cooper, et al. [71] this model was originally presented. Technology, procedure, faculty, environment, and administration are the categories that another system for classifying the hurdles suggests [72]. Four major categories were used by the authors of Pirkkalainen and Pawlowski [43] to classify their framework of hurdles for Global Social Knowledge Management (GSKM). These categories include social, technical, cultural, organizational, and contextual.

In this article, we listed and categorized the impediments and challenges identified in the literature as given in Table 1.

Table 1.
Obstacles categorization list.

Category	Obstacles	References
Strategic Obstacles	Poor Strategic Planning	Kaminskyi, et al. [73]; Khan, et al. [74]; Muasher, et al. [75] and Kerroum, et al. [47]
Technological Obstacles	Lack of IT Infrastructure and Competinces	Muasher, et al. [75]; Mohamed Hashim, et al. [76]; Khan, et al. [74]; Marks and Al-Ali [40]; Melanyina, et al. [77] and Zawacki-Richter and Qayyum [78]
People Obstacles	Lack of Technological Literacy in The ME Region	Mohamed Hashim, et al. [76]; Melanyina, et al. [77]; Marks and Al-Ali [40] and Zawacki-Richter and Qayyum [78] Mohamed
Organisational Obstacles	Lack of Finacial Resources	Mohamed Hashim, et al. [76]; Jonathan and Magd [79] and Kamel [80]
Cultural Obstacles	The ME Region Conservative Culture Fear and Resistance to Change	Mohamed Hashim, et al. [76]; Jonathan and Magd [79]; Kamel [80];Bozkurt and Kondakçı [9] and Khan, et al. [74]

3.3. RQ 3: What is the role of DT in Achieving SDG 4 in HEIs in ME?

In the context of higher education in the ME to achieve sustainable development (SDG 4), technologies like virtual reality, gamification, augmented reality, robotics, and digital approaches like virtual exchange and blended learning, among others, have been used by the studies previously analyzed to enhance teaching and learning activities because of their capacity to foster pro-environmental consciousness and behavior like in-person approaches [48]. Additionally, engaging pedagogies that involve high levels of thinking and collaboration between students seem to have a positive impact on this process. An in-depth content analysis of the aforementioned publications revealed that digital transformation for sustainable development at HEIs is an emerging topic in the literature and has contributed to various activities to ensure sustainability in higher education in ME [2].

4. Discussion

4.1. Strategic Obstacles

This goup of obstacles linked to the poor strategic planning. According to a study by Kaminskyi, et al. [73] a new approach is unquestionably required for the adoption of digital transformation in higher education. Regretfully, the majority of higher education institutions still lack a strategy for the digital

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 4: 2084-2098, 2025
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transformation process, ranging from organizational strategy to technology strategy to support teaching and learning [74]. According to a study by Kaminskyi, et al. [73] higher education is constrained in its planning regarding how to begin the digital transformation, either because it pertains to the plan of the transformation process of the current business or the plan of education service transformation and teaching itself.

However, according to Khan, et al. [74] and Muasher, et al. [75] in the ME region, the most important steps in achieving a vision and new goal are converting the strategy into a clear and specific action plan; in this case, the planning process should be simple but not overly so, have a manageable volume, and guarantee the time and effort needed [47].

4.2. Technological Obstacles

This goup of obstacles linked to the lack of IT infrastructure and competinces. If higher education cannot offer sufficient technical assistance in putting the digital transition into practice, it will not be effective enough. Although the study by Muasher, et al. [75] found that the IT architecture of the higher education institution in the ME specifically in Jordan where they conducted their study, is the foundation of the digital transformation of the entire system digitalization process, numerous research types have documented that the use of digital technology has been hampered by the lack of infrastructure development in many higher education institutions, including Wi-Fi, poor internet access, and slow connection speed [76].

One of the prerequisites for incorporating ICT into the teaching-learning process is a fast internet connection. Similarly, Mohamed Hashim, et al. [59] stated that the internet in the ME and the whole world plays a crucial role in allowing instructors and students to access education from any location at any time. For instance, they use it for live presentation tools, online learning, video conferences, and video courses. Furthermore, the findings of studies conducted by Khan, et al. [74] and Marks and Al-Ali [40] revealed that many higher education institutions in the ME lack the necessary equipment, including a computer, laptop, printer, multimedia projector, scanner, and tablet.

According to a recent study by Melanyina, et al. [77] many faculty members in the ME are reluctant to embrace digital technology in their teaching-learning process because they lack technical support. The analysis supports the findings of Zawacki-Richter and Qayyum [78] which also demonstrate that in the ME region and Africa, when higher education institutions attempt a digital initiation, they hardly ever invest in the service design.

4.3. People Obstacles

This goup of obstacles linked to the lack of technological literacy in the ME region. New abilities, information, and even attitudes regarding digital technology in education are required for its integration into the educational system [76]. Still, the biggest challenge in many higher education institutions in the ME is a lack of digital competency, which includes the ability, competitiveness, and knowledge to create and choose the right technology for the teaching-learning activity [77]. According to research by Marks and Al-Ali [40] despite the success of the security innovation in some of the ME countries like UAE, which is frequently linked to comfort, academic staff members who are not accustomed to and do not understand digital technology were unable to implement ICT integration into their program and learning environment. Additionally, from the standpoint of the students, technical support should facilitate quick access to resources like literature and other applications, support the organizational study problem, and allow them to concentrate on their study material [78].

4.4. Organisational Obstacles

This goup of obstacles linked to the lack of finacial resources. A significant amount of funding and financial recources are required for the digital transformation's implementation [59]. Nevertheless, the internal financial resource continues to present challenges during the digital transformation process. According to a recent study by Jonathan and Magd [79] a number of universities in the ME and Africa

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noted that a lack of funding frequently hinders the willingness and ability of the teaching staff to implement new technology in the classroom.

Additionally, a study conducted by Kamel [80] revealed that there is a limited amount of internal financing available for innovation and the development process.

4.5. Cultural Obstacles

This goup of obstacles linked to the ME region conservative culture and the fear and resistance to Change. People are hesitant to step outside of their comfort zone and have a tendency to do things a certain way [80]. According to Mohamed Hashim, et al. [59] developing an academic culture in the ME is a challenging and time-consuming process. Identity changes will occur not just at the academic level but at all levels as a result of higher education's changing teaching technique to include technology into instruction and the adoption of a new institution corporation style Jonathan and Magd [79]. Mohamed Hashim, et al. [59] have noted that the variable and adaptable nature of academic identity can both impede and accelerate cultural transformation. According to Bozkurt and Kondakçı [9] in Turkey, many teaching staff members in were still not progressive toward the changes that were taking place and also tended to be unwilling to alter their current circumstances. They would rather read paper materials than digital ones, and some instructional staff members still struggle to digitize all of their notes and compositions. With their own technological expertise, a number of lecturers continue to firmly believe in the best practices that have been shown to accomplish their objectives. Furthermore, Khan and Qudrat-Ullah [81] found that some instructors are hesitant to adopt new digital technologies and may even avoid using them. Avoidances stem from inexperience and lack of confidence.

4.6. The Role of DT in Achieving UN SDG 4 in The HEIs in The ME

The influence of digital transformation in HEIs on the accomplishment of a single SDG cannot be isolated from the others because everyone has equal access to education, the proliferation and use of digital technology in HEIs also helps to ensure gender equality in society and increase the number of skilled workers on the labor market [17]. However, the role of DT in achieving SDG 4 is very crucial. Expanding the population's access to educational services, raising literacy levels, enhancing the educational process and the caliber of educational services, and fostering inclusive education are all examples of how digitalization has a positive impact on education and helps advance SDG 4 "Quality education" more quickly [82].

According to Strilchuk, et al. [83], in 2020, the COVID-19 epidemic caused temporary school closures for over 90% of pupils worldwide, demonstrating the impact of DT in HEIs on reaching SDG 4. By April 2020, over 1.6 billion children and young people were out of school [84]. DT enabled remote learning, ensuring educational continuity in several nations.

Targets for SDG 4 include making sure that all men and women have equitable access to high-quality higher education and expanding the pool of individuals with the technical and vocational skills necessary for employment and self-employment. In order to accomplish these goals, digital transformation is crucial. It will increase access to information and educational services on a worldwide scale. UNESCO [85] recommends prioritizing inclusive education for all countries to improve learning outcomes for students and teachers across all subjects. In ME countries, children with disabilities had a 19% lower likelihood of reaching the minimum reading level [84]. In ME countries, this issue is addressed through the use of technology and remote learning programs for students with disabilities. Special platforms are also developed to post training courses tailored to students' specific needs, allowing for home study [85].

Significant progress was made in expanding educational opportunities and school attendance in the ME during the last decade of the 2000s, particularly for girls. Prior to the coronavirus crisis, the percentage of students who did not attend higher education (after the high school) fell from 26% in 2000 to 17% in 2018 [86].

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Vol. 9, No. 4: 2084-2098, 2025
DOI: 10.55214/25768484.v9i4.6479

According to the study of Onopriienko, et al. [82] ME countries must develop educational projects, programs, and schools on digital literacy to help elderly people acquire the necessary knowledge and skills. The benefits of such training include the creation of an inclusive atmosphere in which the elderly can independently pay bills, make transfers, arrange deliveries of items, and receive necessary services remotely. All of this will help to develop the concept of lifelong learning and accelerate the accomplishment of SDG 4. Furthermore, the older population's digital proficiency will enable financial and social involvement when forced [82].

5. Conclusion

In higher education in the ME region, digital transformation (DT) has become crucial for enhancing operational effectiveness and pedagogical delivery. It is a step that transcends the realm of systems and new technology and symbolizes the modernization of an organization's competitiveness, philosophy, and patterns that adapt to new audiences. Employees, students, and the business environment are all changing at a rate that is frequently faster than an organization can adjust. Critical business operations and procedures are unavoidably made public both inside and outside the company as a result of this disruption, necessitating the restoration of new technological investments, business models, and procedures in order to better compete in the ongoing move to the digital economy. Our research article benefits higher education institutions, policymakers, and stakeholders participating in digital transformation programs. Given that digitization has spread throughout the world at varying rates and intensities, it is critical to comprehend and organize how this process has changed in diverse locales.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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DOI: 10.55214/25768484.v9i4.6479