ECONSTOR Make Your Publications Visible.

A Service of

ZBW

Leibniz-Informationszentrum Wirtschaft Leibniz Information Centre for Economics

Al-Otaibi, Saad Aziz; Albaroudi, Hasna Balaj

Article

Prospects and obstacles of digital quality management in Saudi Arabia universities. A systematic literature review from the Last Decade

Cogent Business & Management

Provided in Cooperation with:

Taylor & Francis Group

Suggested Citation: Al-Otaibi, Saad Aziz; Albaroudi, Hasna Balaj (2023) : Prospects and obstacles of digital quality management in Saudi Arabia universities. A systematic literature review from the Last Decade, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 10, Iss. 3, pp. 1-15,

https://doi.org/10.1080/23311975.2023.2256940

This Version is available at: https://hdl.handle.net/10419/294624

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.



WWW.ECONSTOR.EU

https://creativecommons.org/licenses/by/4.0/

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.







Cogent Business & Management

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/oabm20

Prospects and obstacles of digital quality management in Saudi Arabia universities. A systematic literature review from the Last Decade

Saad Aziz Al-Otaibi & Hasna Balaj Albaroudi

To cite this article: Saad Aziz Al-Otaibi & Hasna Balaj Albaroudi (2023) Prospects and obstacles of digital quality management in Saudi Arabia universities. A systematic literature review from the Last Decade, Cogent Business & Management, 10:3, 2256940, DOI: <u>10.1080/23311975.2023.2256940</u>

To link to this article: https://doi.org/10.1080/23311975.2023.2256940

9

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 19 Sep 2023.

٢	
L	

Submit your article to this journal 🗹

Article views: 834

Q

View related articles 🖸



View Crossmark data 🗹



Received: 13 April 2023 Accepted: 04 September 2023

*Corresponding author: Saad Aziz Al-Otaibi, in Administration of Hajj and Umrah College of Business Administration, UMM Al-Qura University, Makkah, Saudi Arabia E-mail: saaotybi@uqu.edu.sa

Reviewing editor: Balan Sundarakani, University of Wollongong Faculty of Business, United arab emirates

Additional information is available at the end of the article

OPERATIONS MANAGEMENT | REVIEW ARTICLE

Prospects and obstacles of digital quality management in Saudi Arabia universities. A systematic literature review from the Last Decade

🔆 cogent

business & management

Saad Aziz Al-Otaibi^{1*} and Hasna Balaj Albaroudi²

Abstract: Higher education institutions throughout the world are facing difficulties from political, economic, and technical causes, demanding the adoption of innovative management techniques and organisational structures to preserve their places in the global market. In this environment, digitization has emerged as a vital instrument for boosting educational quality in institutions throughout the world. A relatively new idea, digital quality management, has gained traction in higher education institutions. The purpose of this study is to investigate the role of digital quality management in supporting exceptional development in Saudi Arabian institutions through the digital transformation process. The research technique adhered to the PRISMA 2020 statement, resulting in the selection of 36 papers on digital quality management. There were three key data classifications that developed, including education and learning, digital transformation, and quality management studies. The evaluation discovered significant weaknesses in higher education institutions' quality management systems for digital development. Existing research has mostly focused on traditional methodologies for evaluating quality management, such as lean six sigma, comprehensive quality management, and quality management systems used by Saudi institutions. Establishing and maintaining high-guality assurance and management in higher education is critical for long-term advancement since continuous quality review is critical to success. The findings of this study will help higher education institutions identify their digital quality management strengths and areas for improvement, encouraging academics to reevaluate quality objectives and digital learning management strategies in order to improve overall learning quality. Finally, via the process of digital transformation, digital quality management provides an effective outlet for Saudi Arabian institutions to build long-term competitive advantages and promote outstanding development.

Subjects: Management of IT; Business, Management and Accounting; Higher Education Management; Teaching & Learning;

Keywords: quality management; digitalization; universities; digital learning; quality management system; Saudi Arabia





© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

1. Introduction

The nature of digital technology is a critical differentiator that is generating huge changes in the competitive landscape and within organisations. We have reached a tipping point where the impact of digital technology is manifesting "in full force" and allowing "unprecedented things" (Zaki, 2019a)." Today, mobile, location-based, virtual reality, digital twins, blockchains, artificial intelligence (AI), wearable technologies, chatbots, neuroscience, business process automation, and machine-to-machine interactions via the Internet of Things (IoT) are all merging (Shahatha Al-Mashhadani et al., 2021). The discoveries are built on and magnified by combining several technologies across the physical, digital, and social domains (Zaki, 2019b). Furthermore, digital technologies have the agility and global connectivity structures that enable instant interaction and access to a vast amount of data and computing power; these features are reflected in today's learning and teaching environment and enable a more extensive reach (of people) regardless of geographic location (Bolton et al., 2018; Khan et al., 2022). The digital transformation is enhancing the abilities of institutes and organizations not only in terms of quality development but also quality management in digital mediums (Caena & Redecker, 2019). Higher education institutions are keen to deploy the digital quality management system to improve educational operations in industrialized countries. A rise in accuracy and quality is driving the adoption of digital transformation (Khan et al., 2020). A rise in accuracy and quality is driving the adoption of digital transformation. That is highlighted because virtual universities have become increasingly popular in recent years (Jurva et al., 2020). They allow students to select courses from a worldwide range, significantly different from the past. Other advantages of digital quality management at universities include improved teaching quality, high-tech learning settings, worldwide networking, and employment prospects (Jiang & O'Neill, 2017).

In recent years, universities worldwide have seen dramatic transformations fueled by technology developments and societal e-trends toward digitalization. Digital transformation, like all substantial shifts, necessitates a great degree of adjustment and re-adjustment. As a result of the global economy, significant changes in the socioeconomic-educational system have occurred, notably in higher education, including changes in educational standards, quality, decentralization, virtual and independent learning (Mohamed Hashim et al., 2021a). That strategy places a greater focus on the students than on the technology and the learning opportunities. The learning environment has also enhanced due to digital devices and transformation; the outcome of the digital environment has been promising over time (Hanelt et al., 2021). However, digital technologies and learning are in the infancy stage in countries like Saudi Arabia. Even though Saudi Arabia has made significant investments in the field of education. Despite fast development and significant capital contributions to educational buildings, the Saudi Education Ministry has not met all of its goals (Alaboudi & Alharbi, 2021a).

However, Saudi Arabia has embraced various educational forms and models, including the blended approach (Zakaria et al., 2013). According to studies, Saudi Arabian students are exposed to and have access to new technologies daily (Abdel-Salam et al., 2019). Educators' and the government's constant concern about improving learning outcomes and meeting needs and expectations led to the creation of novel learning methodologies (Alaboudi & Alharbi, 2021b). In addition to this, digital quality management is a severe concern for Saudi institutions in terms of quality education, student engagement, and instructor skills and abilities (Almuhaideb & Saeed, 2020). Higher education establishments in Saudi Arabia are anticipated to be more focused on digital transformation than in previous years, and they used digital transformation techniques to increase the quality of education, instructor skill, and student learning capacities (Abdulrahim & Mabrouk, 2020).

The current study intends to examine the relevance of digital quality management in Saudi Arabian institutions in the age of digital transformation. In addition, the study investigates how digital quality management might assist Saudi universities in establishing long-term competitive advantages by supporting outstanding sustainable development in higher education establishments. The importance of how Saudi institutions should leverage digital quality management skills to alter delivery and experience is significant. Developing a competitive advantage for universities is still inadequate; nonetheless, the article gives first-hand insight into the significant changes affecting universities and how they might adapt to their benefit. It also fosters healthy debates, particularly on topics that have received little attention in the literature.

2. Materials and methods

The current analysis combines content from Scopus, a widely utilized database among academics worldwide. We conducted a literature search using the phrases "digital," AND "quality management," AND"universities." The database initially returned a total of 9,890 entries. For record filtering, we used the PRISMA framework 2020, as detailed by Moher et al. (2009) and represented in Figure 1. The PRISMA statement 2020 is an updated version of the framework that was created in 2009 and 2015, and it provides comprehensive selection and rejection criteria. Furthermore, computer science, engineering, social science, business management, accounting, economics, econometrics, and finance were the only subjects covered at Saudi Arabian universities. As a consequence, the number of records in the database was reduced to 6,642.

Furthermore, the current study only included articles, reviews, and book chapters, reducing the total number of records to 2,334 that were suitable for inclusion. This study's specific criteria were the publication of articles in English that were important to the field of digital quality management. The study's scope was confined to the years 2012 to 2021, and it included only materials released in the previous decade. Furthermore, the records evaluated were solely from Saudi





Arabia, with publications from other nations barred from consideration, resulting in the elimination of 50 items. Subsequently, a comprehensive selection was made for each discovered categorization to evaluate related documents, and only 36 publications were chosen to be included in the assessment to synthesize it, the irrelevant records and duplication were removed during the detailed reviewing process. Figure 1 depicts the current study's complete PRISMA statement 2020 selection and rejection procedure.

Subsequently, a comprehensive selection was made for each discovered categorization to evaluate related documents, and only 36 publications were chosen to be included in the assessment to synthesize it, the irrelevant records and duplication were removed during the detailed reviewing process. Figure 1 depicts the current study's complete PRISMA statement 2020 selection and rejection procedure.

3. Results

3.1. Descriptive analysis

Figure 2 depicts the interdisciplinary character of the study issue and highlights the participation of the many fields in digital quality management in Saudi Arabian universities. With nine studies included in the analysis, business, management, and accounting is the most contributory field, accompanied by computer science with eight relevant studies, engineering with six studies. The remaining contributions come from various fields of study such as economics, econometrics, finance, and social sciences.

In addition, the records extracted from 2012 to 2021 and the Year-based publication are shown in Figure 3. That is essential for assessing the impact of digital quality management in Saudi Arabia's universities research. Figure 3 indicated the growing increase in the number of published articles each year, with the highest frequency of publication count in 2022 with 14 records. A total of six articles were recorded from 2021, three records from 2018 and 2017 consecutively chosen.

Finally, the articles included from the Saudi Arabia universities are detailed illustrated in Figure 4. The King Saud University contributes the significant records on the digital quality management with the number is 12, the other articles with more numbers are included from the King Abdulaziz University with the nine records for the current study. The Scope of the current study is related to the Saudi Arabia universities, and the records only included from Saudi Arabia. In addition to this, the College of Sciences contributed the five records in the current study. The other significant contributors were Imam Abdulrahman Bin Faisal University, Umm Al-Qura University, and King Khalid University. The details of the affiliations of records are depicted in Figure 4.



Page 4 of 15

Figure 3. Distribution of records selected from 2012–2021.





4. Literature mapping

Digital quality management is constantly growing in Saudi universities, and researchers are deeply considering this area of research. We used the keywords digital quality, quality management, and Saudi Arabia to recognize the most common keywords employed in the studies. As stated above, there were 539 studies contained in the keywords at literature review phase 1; in addition, these records were used to recognize the literature classifications from these keywords, as Table 1 shows.

The table explains four significant classifications occurrence percentage and education and learning percentage is highest with 48, and total occurrences of the critical terms are 27, and relevance score of each term is also shown. The second primary classification percentage is financial inclusion with 28% with 18 key terms, and a relevance score is shown in Table 2. Finally, the digital transformation percentage is 24 percent with 15 key terms and relevance score during the co-occurrence analysis. The results indicate that digital quality management has a significant percentage over other digital education and learning, digital transformation, and quality management.

In addition, the papers were subjected to content analysis to identify the study's categories. The content of published literature is analyzed using VOS Viewer software, which creates data clusters on the text to group related concepts. The current study found that researchers' keywords and keywords defined more specifically in the journals' indexing technique detailed in the databases are equally accurate for bibliometric analysis to reveal the structures of the examined field. As

Figure 4. Distributions of records affiliations from the Saudi Arabian universities. a result, we used both types of terms for the co-occurrence analysis within the research area connected with digital quality management. The investigation included 36 records, with 63 keywords generated from the data. We meticulously researched and picked just the 36 most common terms that appeared in at least three entries.

The content analysis findings are depicted in Figure 5—the group is divided into four significant clusters, each represented in various colours in Figure 5. Quality assurance and management are represented by yellow in the cluster. Digital transformation, artificial networks, and quality assurance are all part of the green cluster. In the end, the purple cluster is learning, studying, Saudi Arabia, and growing.

5. Classification of literature

The literature on digital quality management research at Saudi Arabian universities during the previous decade was addressed in this part. The literature focuses mainly on the three key data themes derived from the VOS viewer, which the authors analyze in-depth using the terminology co-occurrence streams.

6. Education and learning

Saudi Arabian academic institutions have been keen to embrace digital education or online education to develop educational processes in the previous decade. The importance of digital learning stems from the increasingly global culture we now live in. Everyone can have equal access to the same resources, allowing them to participate in all aspects of life, including education, business, and health care (Syed et al., 2021). According to Ahmed et al. (2020), digital learning will aid in the efficient management of resources such as location and time. The online learning environment aids in the resolution of the issue of insufficient resources and facilities, such as books, classrooms, labs, and teaching personnel. In addition, the notion of securing online learning management systems arose because of the emergence of such threats. The growing use of digital learning methods and the integration of new technological approaches in higher education schools and institutes has resulted in many issues and risks (Mehmood et al., 2017). Digital

Table 1. Keyword occurrences, classification, occurrence percentage, and relevance score				
Classification	relevance score	Occurrences	Occurrences	Relevance score
Digital transformation	24%	adoption	7	0.8327
		artificial intelligence	3	0.6232
		artificial neural network	3	0.8318
		benefit	5	0.8105
		big data	4	0.3532
		big data analytic	3	0.7285
		blockchain	3	1.5521
		cloud	8	1.1994
		cloud service provider	4	1.7473
		communication	3	1.8907
		condition	3	0.8006
		genetic algorithm	3	1.16
		iot	7	0.6183
		reliability	4	0.3916
		term	3	0.4264
		Total	63	

(Continued)

Classification	relevance score	Occurrences	Occurrences	Relevance score
Education and learning	48%	context	3	0.4709
		contribution	4	0.7745
		covid	3	2.2643
		education	6	1.4907
		end	4	0.6761
		evaluation	4	1.0701
		factor	4	1.1554
		field	4	0.6929
		food	3	0.4402
		healthcare	3	1.2621
		implication	5	0.9658
		industry	5	0.5034
		learning	6	1.3993
		life	4	1.4382
		outcome	5	0.5171
		person	3	0.4144
		privacy	3	1.907
		processing	4	1.1633
		protocol	4	1.0031
		qos	4	1.0537
		risk	4	1.161
		self	3	0.3886
		sensor	5	1.1173
		skill	5	1.0904
		state	3	0.4961
		student	7	1.3015
		study	15	0.3666
		transparency	3	0.7847
		Total	126	
Quality assurence	28%	access	4	1.4207
		accessibility	3	0.9989
		accountability	3	1.1141
		accuracy	5	0.6626
		assessment	4	1.9623
		capability	5	0.7149
		data management	4	1.7002
		data owner	3	1.9187
		data privacy	3	1.907
		digital transformation	4	0.8103
		lack	3	0.6974
		large amount	4	1.2183
		monitoring	4	0.5235
		need	7	0.4499

(Continued)

Table 1. (Continued)				
Classification	relevance score	Occurrences	Occurrences	Relevance score
		node	4	1.2627
		number	4	0.6562
		quality assurance	3	1.0731
		saudi arabia	4	1.356
		smart city	3	1.3804
		Total	74	

learning is far better and distinct as compared to traditional learning. When compared to traditional learning, digital learning is different because it enhances student learning outcomes, faculty members' technical system implementation skills, and staff productivity (Abdulrahim & Mabrouk, 2020).

Furthermore, while online learning or digital education is not a new tool or topic of debate for academics and educators, the present pandemic has drawn all of them together to discuss future education and learning while also looking at the digital quality management of online learning (Qureshi et al., 2020). Finally, the education and learning processes in the current time are more significant and efficient due to the technological involvement in higher education institutes. The following section discusses the digital transformation tools and mediums that effectively contribute to the digital quality management process. Finally, thanks to technology engagement in higher education facilities, education and learning processes are more significant and efficient in the current period. The next part discusses the digital transformation tools and channels that successfully contribute to the digital quality management process.

7. Digital transformation

Due to the enormous need for individuals' online and digital learning requirements, digital technologies adaption in higher education establishments has been considerably adopted in recent years (Mustapha et al., 2021). According to Bhatti et al. (2021), from producing to delivering value to clients, digital transformation integrates digital technology into all aspects of business, education, health, and manufacturing. That notion is critical for a company's and the economy's longterm success. Digital transformation integrates the various industries and sectors for the growth of economies significantly; Industries have gotten even brighter as computing, networking, sensor, and cloud computing technologies have proliferated (Hossain et al., 2018). Furthermore, the application of IoT and AI technologies has the potential to positively modify conventional educational processes in universities, including (a) enhanced use of data obtained from intelligent sensors; and (b) regulating and supervising internal activities inside the online class environment (Alreshidi, 2019). The use of technologies is on peek due to the COVID-19 pandemic, and researchers emphasize the latest technologies to utilize educational effectiveness.

However, the digital transformation using recent technologies like artificial intelligence and blockchain is still infancy stage in the education institutes in Saudi Arabia. According to Mohammed et al. (2021), artificial intelligence is essential to digital transformation because of its educational advantages (Mühleisen, 2018). It allows for academic conversation with the learner, tends to make teaching and learning more pleasurable, and aids in the presentation of scientific material in an interactive, tangible manner, as well as continuous evaluation processes, all of which are features that have drawn attention to him in the development of educational programs, particularly in higher education (Zaki, 2019b). At the same time, the use of blockchain in the academic area is still in its beginning phases (Abad Segura et al., 2020). A small number of

Table 2. Results of records, authors, year, setting, and classification				
Authors	Year	Cited by	Settings	Segment
Alshammari S.T., Alsubhi K., Aljahdali H.M.A., Alghamdi A.M.	2021		cloud data	cloud computing environment
Zulfa M.I., Hartanto R., Permanasari A. E., Ali W.	2021		5 G technology, edge computing, and the Internet of Things (IoT)	Artificial Intelligence
Alkhowaiter W.A.	2020	41	digital payments and baking	digital banking
Altaf S., Ahmad S., Zaindin M., Soomro M.W.	2020	6	Wireless Sensor Networks (WSNs)	Artificial Neural Network (ANN)
Ren Y., Qi J., Cheng Y., Wang J., Alfarraj O.	2020	15	digital continuity	electronic record
Alaya B., Khan R.	2020	2	online video content	load management and replication algorithms
Shahid A., Almogren A., Javaid N., Al-Zahrani F.A., Zubair M., Alam M.	2020	47	Supply chains	complex networks
Ghaffar Z., Ahmed S., Mahmood K., Islam S.H., Hassan M.M., Fortino G.	2020	15	Cyber-physical- social systems	Cloud storage
Shorfuzzaman M., Masud M.	2019	3	data cloud	quality of service
Rani S., Chauhdary S.H.	2018	7	Internet of things (IoT)	Smart City
Sahi M.A., Abbas H., Saleem K., Yang X., Derhab A., Orgun M. A., Iqbal W., Rashid I., Yaseen A.	2017	61	e-Healthcare	privacy requirements
Hassan M.M., Albakr H., Al-Dossari H., Mohamed A.	2017	8	cloud-assisted body	healthcare applications
Malik S.U.R., Khan S. U., Ewen S.J., Tziritas N., Kolodziej J., Zomaya A.Y., Madani S.A., Min- Allah N., Wang L., Xu CZ., Malluhi Q. M., Pecero J.E., Balaji P., Vishnu A., Ranjan R., Zeadally S., Li H.	2016	37	ʻDigital Age	cloud computing

educational institutions use blockchain technology, and the bulk of these organizations use it to assess and communicate academic credentials and learning objectives. According to industry experts, blockchain technology, on the other hand, has a lot more to offer and can potentially revolutionize the profession (Rahman et al., 2018).

Higher education institutions can use digital transformation to incorporate new technology. Digital learning is regarded as one of the educational system's fundamental foundations, and



Figure 5. The classification of literature using the VOS viewer.

the performance of educational systems is linked to the quality of his preparation (Lodhi et al., 2021). To stay up with the changes of the digital era and keep up with contemporary educational trends in light of future responsibilities, it has become vital to focus on creating preparatory programs. Monitoring the performance of professors, students, and other aspects of the digital educational process at Saudi Arabian institutions is also critical. The following section examines the quality assurance context literature of digital quality management at Saudi institutions.

8. Quality management

In recent years, universities worldwide have seen rapid transitions, spurred by technological advancements and social e-trends toward digitalization. Like all other significant changes, digital transformation involves a significant deal of adjustment and re-adjustment (Zulfa et al., 2021).

The higher education institutes are improving the changes in educational standards, quality, decentralization, virtual learning, and autonomous learning through implementing digital technologies (Khan et al., 2020). According to Ghaffar et al. (2020), educational quality has become a long-term aim for many universities worldwide; although it is an intrinsic but contextual metric, it necessitates a lot of emphasis and empirical discussion. In addition, scholars, researchers, institutions, regulators, and governments are becoming more aware of the strategic relevance of education quality. Managing educational quality is a difficult task since it is a multifaceted topic. Universities prioritize quality as one of their most essential characteristics, as seen by their actions (Shahid et al., 2020).

According to Papanthymou & Darra (2017) the integration of quality management system in HEIs boosts the institutional as well as the performance of individual students. Van Schalkwyk & Steenkamp (2019) said that quality management, with a special focus on leadership commitment, enables Higher education institutions to achieve excellence in their operations. Quality focus Higher education institutions focus on the development of their students through excellent faculty, research and development facilities and training on different techniques (Qasrawi et al., 2017). Psomas & Antony (2017) studied TQM practices adopted by Higher education institutions in Greek and said that it has significantly improved quality in Higher education institutions performance,

enhanced faculty members and staff satisfaction and has had a positive impact on society. Top management commitment, stakeholder involvement, and continuous improvement of culture and processes are all essential components of quality management system in universities. The key attributes that comprise quality management system frameworks in higher education institutes/ universities are customer and process focus, effective decision-making, continuous improvement, and leadership commitment (Abbas et al., 2021).

However, in Saudi Arabian universities, digital quality management is likely to be a novel concept. Higher education institutions' adoption of procedures and processes is fraught with difficulties (Nadeau, 2017). The past research focuses on the lean six sigma and total quality management methodologies in the previous literature, and digital quality assurance is still a massive gap for the control of digital learning methods in universities. According to Alshammari et al. (2021) in earlier studies, the focus has been on lean six sigma and total quality management procedures, and digital quality assurance remains a significant gap in the regulation of digital learning methods in universities.

The digital transformation also introduces a slew of new technologies that will revolutionize remote learning and dramatically increase the use of digital media during the present pandemic. After the virus spread, universities worldwide continued to provide online education (Sharifi et al., 2021). In Saudi Arabian universities, the digital style of education has also been used. However, there is a massive gap in the skills and competencies necessary to use digital devices and resources. The introduction of digital technology at the university level came as a shock, and students and professors lacked the necessary abilities (Hoq, 2020). Furthermore, digital quality management is a novel idea in the Saudi university, and academics must concentrate their efforts in this area to advance their study.

9. Discussion

In light of the highly debated idea of quality education, the issue of improving the quality of higher education within the framework of modern transformational processes is a challenge. The term "Quality in higher education" has a huge impact on the development of the country and elevates the institute. For the institute to generate high-quality work and avoid errors, it needs highly skilled faculty, an excellent infrastructure, a market-oriented curriculum, among other factors (Allam, 2020). The future of higher education is being significantly shaped by technological advancements. It includes altering the classroom, the growing significance of online learning, workforce diversity, corporate-university collaboration, and acknowledging the difficulties associated with reshaping education for digital learning. For example Budarina & Polupan (2019), analyse the idea of digital quality management in higher education to highlight the theoretical basis and practical application of digital quality management in higher education. According to the findings, digital management allows for the familiarisation, research, and consideration of all participants in the educational process's thoughts, arguments, and reflections.

The digital revolution is a topic of great interest and profound benefit to the education systems of Saudi Arabia. We believe that by better addressing digital transformation in educational policies and adapting them in the education institutions can be beneficial for higher education institutes. Previously, only lecturers were responsible for the quality of education, but now quality is on the agenda of various external parties such as governmental authorities, higher education institutions, and the corporate sector. As part of organisational responsibility, quality has become a critical issue of institutional quality management. The university administration has recognised the increasing significance of effective quality management in providing quality education and competitive graduates to potential stakeholders. Because the output of higher education is the backbone of the entire country and society, the need to use digital technologies to reconsider the current quality management system has evolved.

10. Conclusion

This research investigated the methodology and trends surrounding digital guality management in Saudi higher education institutions from 2012 to 2021. The primary objective of this article was to explore how Saudi Arabian universities can leverage digital quality management to gain a competitive advantage amidst the ongoing digital revolution of the past decade. The findings underscored that digital transformation is a potent and dynamic strategy that necessitates various changes in learning, development, technology, processes, and cultural aspects within universities. It emphasizes the importance of embracina diaital auglity management as a catalyst for institutional growth and success in the rapidly evolving digital landscape (Mohamed Hashim et al., 2021b; Vaicondam et al., 2022). Universities in Saudi Arabia adopted the digital learning process early on, and research suggests that universities are eager to upgrade lecturers' and students' digital abilities. Furthermore, according to the research, universities prioritize the development of learning processes and online learning mechanisms for the expansion of digital education. According to (Omar & Almaghthawi, 2020a), Saudi Arabia is a developed country with many public and private universities founded in the past decade. In line with the national goal of Saudi Vision 2030, the implementation of the National Transformation Program (NTP) in Saudi Arabia has taken place. One of the key objectives of the NTP is to establish and expedite the execution of "digital infrastructure projects." In pursuit of this goal, Saudi universities have been actively collaborating to develop and implement digital education programs and strategies. Recognizing the significance of effective quality management, university administrations in Saudi Arabia have acknowledged the need to ensure quality education and produce competitive graduates who can contribute to the nation's progress. Given that the output of higher education plays a vital role in the development of the entire country and society, the demand for a digital quality management system has become increasingly evident.

11. Practical implication and future agenda

The current study reveals significant deficiencies in the quality management system for digital quality management in higher education institutions despite their efforts and modifications to the country's existing educational system. Many scholars researched lean six sigma, integrated quality management, and quality management systems, but there was little study on online learning and education performance evaluation. These are classic quality management assessment approaches employed by Saudi institutions. However, continuous quality management is so important to higher education success that building and maintaining high-quality assurance and management in higher education has become crucial to their long-term growth (Omar & Almaghthawi, 2020b). In addition, the appealing and demanding trend toward using digital quality management resources in education and learning is both intriguing and challenging. One strategy to enhance and build quality management in universities is to provide a technology environment that encourages students to use online learning to promote successful teaching and learning processes. A requirement for the successful integration of digital technologies in active learning environments is staff professional development (Børte et al., 2020).

Finally, the current study's practical implications will help researchers and higher education institutions identify strengths and areas for improvement in digital quality management, as well as encourage academicians to reconsider quality objectives and techniques for digital learning management in order to improve overall learning quality. The ICT cluster methods have opened new doors and presented new challenges to both students and teachers (Akhmedov, 2021). As a result, the responsibility for learning tasks has shifted to the learners, substantially altering the roles of teachers. So, the implementation of ICT is important for digital transformation of the universities of the Kingdom of Saudi Arabia. The management of a university's system has a significant impact on the quality of education. It depends on the administration of the educational programme creating the specific conditions required for obtaining the desired outcomes, developing readiness for continuous improvement and correction in line with the established strategy, and taking into account current technological developments (Abdulrahim & Mabrouk, 2020; Alenezi, 2021; Jung et al., 2021; Petrovskiy & Agapova, 2016). As a result, the findings of this

study might be used to help other academics design programmes to help Saudi Arabia's digital quality management system grow. Given the current situation of the so-called "new normal" caused by the COVID-19 pandemic.

12. Theoretical implications

The curriculum emphasises digital technology's revolutionary impact and the need of digital quality management in higher education, particularly in Saudi Arabia. The report emphasises the potential for digital transformation to give institutions with a competitive advantage, improve educational results, and improve the learning environment. It also emphasises the importance of continual quality assurance and management in the context of digital learning. The material recognises the shortcomings and problems of the present quality management system and urges for more study and development in this area. Finally, the findings have practical significance for academics and higher education institutions that want to improve digital quality management practises and overall learning quality in the digital age.

Author details

Saad Aziz Al-Otaibi¹ E-mail: saaotybi@uqu.edu.sa ORCID ID: http://orcid.org/0000-0003-2313-4047 Hasna Balaj Albaroudi²

- ¹ Administration of Hajj and Umrah College of Business Administration, UMM Al-Qura University, Makkah, Saudi Arabia.
- ² Educational Administration, College of Education Prince Sattam University, Saudi Arabia.

Acknowledgment

Thanks for Deanship of Scientific Research at Prince Sattam bin Abdulaziz University.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Correction

This article has been corrected with minor changes. These changes do not impact the academic content of the article.

Citation information

Cite this article as: Prospects and obstacles of digital quality management in Saudi Arabia universities. A systematic literature review from the Last Decade, Saad Aziz Al-Otaibi & Hasna Balaj Albaroudi, *Cogent Business & Management* (2023), 10: 2256940.

References

- Abad Segura, E., González-Zamar, M. D., Infante-Moro, J. C., & García, G. R. (2020). Sustainable management of digital transformation in higher education: Global research trends. Sustainability (Switzerland), 12(5), 2107. https://doi.org/10.3390/ su12052107
- Abbas, J., Kumari, K., & Al-Rahmi, W. M. (2021). Quality management system in higher education institutions and its impact on students' employability with the mediating effect of industry-academia collaboration. Journal of Economic and Administrative Sciences. https://doi.org/10.1108/ jeas-07-2021-0135
- Abdel-Salam, D. M., Alrowaili, H. I., Albedaiwi, H. K., Alessa, A. I., & Alfayyadh, H. A. (2019). Prevalence of internet addiction and its associated factors among female students at Jouf University, Saudi Arabia. Journal of the Egyptian Public Health Association, 94(1), 1–8. https://doi.org/10.1186/ s42506-019-0009-6

- Abdulrahim, H., & Mabrouk, F. (2020). COVID-19 and the digital transformation of Saudi higher education.: Discovery service para universidad de Monterrey. Asian Journal of Distance Education, 15(1), 291–306. http://www.asianjde.com/ojs/index.php/AsianJDE/arti cle/view/468
- Ahmed, S., Rajput, A. E., Sarirete, A., Bahwireth, R., Alkhimi, W., & Almehmadi, A. (2020). Characterizing female workplace bullying via social media. https:// doi.org/10.20944/PREPRINTS202008.0536.V1
- Akhmedov, A., Sawamura, T., Chen, C.-H., Kraler, S., Vdovenko, D., & Lüscher, T. F. (2021). Lectin-like oxidized low-density lipoprotein receptor-1 (LOX-1): A crucial driver of atherosclerotic cardiovascular disease. European Heart Journal, 42(18), 1797–1807. https://doi.org/10.1093/eurheartj/ehaa770
- Alaboudi, A., & Alharbi, A. S. (2021a). Impact of digital technology on Saudi students. International Journal of Information Technology (Singapore), 13(3), 943–950. https://doi.org/10.1007/s41870-020-00451-7
- Alaboudi, A., & Alharbi, A. S. (2021b). Impact of digital technology on Saudi students. International Journal of Information Technology (Singapore), 13(3), 943–950. https://doi.org/10.1007/s41870-020-00451-7
- Alenezi, M. (2021). Deep dive into digital transformation in higher education institutions. *Education Sciences*, 11(12), 770. https://doi.org/10.3390/ educsci11120770
- Allam, Z. (2020). Demystifying the aspect of quality in higher education: Insights from Saudi Arabia. SAGE Open, 10(1), 215824401989905. https://doi.org/10. 1177/2158244019899057
- Almuhaideb, A. M., & Saeed, S. (2020). Fostering sustainable quality assurance practices in outcome-based education: Lessons learned from abet accreditation process of computing programs. *Sustainability* (*Switzerland*), 12(20), 1–21. https://doi.org/10.3390/ su12208380
- Alreshidi, E. (2019). Smart sustainable agriculture (SSA) solution underpinned by Internet of things (IoT) and artificial intelligence (AI). International Journal of Advanced Computer Science & Applications, 10(5), 93–102. https://doi.org/10.14569/ijacsa.2019. 0100513
- Alshammari, S. T., Alsubhi, K., Aljahdali, H. M. A., & Alghamdi, A. M. (2021). Trust management systems in cloud services environment: Taxonomy of reputation attacks and defense mechanisms. *Institute of Electrical and Electronics Engineers Access*, 9, 161488–161506. https://doi.org/10.1109/ACCESS. 2021.3132580

- Bhatti, A., Malik, H., Kamal, A. Z., Aamir, A., Alaali, L. A., & Ullah, Z. (2021). Much- needed business digital transformation through big data, internet of things and blockchain capabilities: Implications for strategic performance in telecommunication sector. Business Process Management Journal, 27(6), 1854–1873. https://doi.org/10.1108/BPMJ-12-2020-0553
- Bolton, R. N., McColl-Kennedy, J. R., Cheung, L., Gallan, A., Orsingher, C., Witell, L., & Zaki, M. (2018). Customer experience challenges: Bringing together digital, physical and social realms. *Journal of Service Management*, 29(5), 776–808. https://doi.org/10. 1108/JOSM-04-2018-0113
- Børte, K., Nesje, K., & Lillejord, S. (2020). Barriers to student active learning in higher education. *Teaching in Higher Education*, 28(3), 597–615. https://doi.org/10. 1080/13562517.2020.1839746
- Budarina, A. O., & Polupan, K. L. (2019). Digital quality management in higher education. Vysshee Obrazovanie V Rossii = Higher Education in Russia, 28 (4), 93–97. https://doi.org/10.31992/0869-3617-2019-28-4-93-97
- Caena, F., & Redecker, C. (2019). Aligning teacher competence frameworks to 21st century challenges: The case for the European digital competence framework for educators (digcompedu). *European Journal of Education*, 54(3), 356–369. https://doi.org/10.1111/ejed.12345
- Ghaffar, Z., Ahmed, S., Mahmood, K., Islam, S. H., Hassan, M. M., & Fortino, G. (2020). An improved authentication scheme for remote data access and sharing over cloud storage in cyber-physical-socialsystems. Institute of Electrical and Electronics Engineers Access, 8, 47144–47160. https://doi.org/10. 1109/ACCESS.2020.2977264
- Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. *Journal of Management Studies*, 58(5), 1159–1197. https://doi. org/10.1111/joms.12639
- Hoq, M. Z. (2020). E-Learning during the period of pandemic (COVID-19) in the Kingdom of Saudi Arabia: An empirical study. American Journal of Educational Research, 8(7), 457–464. https://doi.org/10.12691/ education-8-7-2
- Hossain, M. S., Muhammad, G., Abdul, W., Song, B., & Gupta, B. B. (2018). Cloud-assisted secure video transmission and sharing framework for smart cities. *Future Generation Computer Systems*, 83, 596–606. https://doi.org/10.1016/j.future.2017.03.029
- Jiang, L., & O'Neill, B. C. (2017). Global urbanization projections for the shared socioeconomic pathways. Global Environmental Change, 42, 193–199. https:// doi.org/10.1016/j.gloenvcha.2015.03.008
- Jung, J., Horta, H., & Postiglione, G. A. (2021). Living in uncertainty: The COVID-19 pandemic and higher education in Hong Kong. Studies in Higher Education, 46(1), 107–120. https://doi.org/10.1080/03075079. 2020.1859685
- Jurva, R., Matinmikko-Blue, M., Niemelä, V., & Nenonen, S. (2020). Architecture and operational model for Smart campus digital infrastructure. *Wireless Personal Communications*, 113(3), 1437–1454. https://doi.org/ 10.1007/s11277-020-07221-5
- Khan, N., Qureshi, M. I., Ahmad, H., & Al-Kumaim, N. H. (2020). A systematic review on emergence of digital Marketing in ASEAN region. *Journal of Computational* and Theoretical Nanoscience, 17(2), 570–582. https:// doi.org/10.1166/jctn.2020.8727
- Khan, N., Qureshi, M. I., Mustapha, I., Harasis, A. A., & Ashfaq, M. (2020). The digital Marketing past,

present, and future in Malaysia. Journal of Computational and Theoretical Nanoscience, 17(2), 583–595. https://doi.org/10.1166/jctn.2020.8732

- Khan, M. M., Siddique, M., Yasir, M., Qureshi, M. I., Khan, N., & Safdar, M. Z. (2022). The significance of digital Marketing in shaping ecotourism behaviour through destination image. Sustainability, 14(12), 7395. https://doi.org/10.3390/su14127395
- Lodhi, S., Ali Harasis, A., Shafiq, M., Khan, N., & Qureshi, M. I. (2021). Tourism research is an academic field or a multidisciplinary subject, a systematic literature review on Theoretical development in tourism research. Studies of Applied Economics, 39(10). Studies of Applied Economics, 39 (10. https://doi.org/10.25115/eea.v39i10.6198
- Mehmood, Y., Ahmad, F., Yaqoob, I., Adnane, A., Imran, M., & Guizani, S. (2017). Internet-of-thingsbased Smart cities: Recent advances and challenges. *IEEE Communications Magazine*, 55(9), 16–24. https:// doi.org/10.1109/MCOM.2017.1600514
- Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. (2021a). Higher education strategy in digital transformation. *Education and Information Technologies*, 1–25. https://doi.org/10.1007/s10639-021-10739-1
- Mohamed Hashim, M. A., Tlemsani, I., & Matthews, R. (2021b). Higher education strategy in digital transformation. *Education and Information Technologies*, 1–25. https://doi.org/10.1007/s10639-021-10739-1
- Mohammed, A., Ali, R., & Abdullah, A. (2021). The reality of using artificial intelligence techniques in Teacher preparation programs in light of the opinions of faculty members: A case study in Saudi Qassim University. *Multicultural Education*, 7(1), 5–16. https:// doi.org/10.5281/zenodo.4410582
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. Annals of Internal Medicine, 151(4), 264–269.
- Mühleisen, M. (2018). The long and short of the digital revolution. Finance & Development, 55(2), 4–8. International Monetary Fund. https://doi.org/10. 5089/9781484357415.022.A002
- Mustapha, I., Khan, N., Qureshi, M. I., Harasis, A. A., & Van, N. T. (2021). Impact of industry 4.0 on healthcare: A systematic literature review (SLR) from the Last Decade. International Journal of Interactive Mobile Technologies (iJim), 15(18), 116–128. https:// doi.org/10.3991/IJIM.V15118.25531
- Nadeau, S. (2017). Lean, six sigma and lean six sigma in higher education: A review of experiences around the world. American Journal of Industrial and Business Management, 07(5), 591–603. https://doi.org/10. 4236/ajibm.2017.75044
- Omar, A., & Almaghthawi, A. (2020a). Towards an integrated model of data governance and integration for the implementation of digital transformation processes in the Saudi universities. *International Journal* of Advanced Computer Science & Applications, 11(8), 588–593. https://doi.org/10.14569/IJACSA.2020. 0110873
- Omar, A., & Almaghthawi, A. (2020b). Towards an integrated model of data governance and integration for the implementation of digital transformation processes in the Saudi universities. International Journal of Advanced Computer Science & Applications, 11(8), 588–593. https://doi.org/10.14569/IJACSA.2020. 0110873
- Papanthymou, A., & Darra, M. (2017). Quality management in higher education: Review and perspectives.

Higher Education Studies. https://doi.org/10.5539/ hes.v7n3p132

- Petrovskiy, I. V., & Agapova, E. N. (2016). Strategies of raising the quality of higher education and attaining equality of educational opportunities. *International Journal of Environmental & Science Education*. https:// doi.org/10.12973/ijese.2016.704a
- Psomas, E., & Antony, J. (2017). Total quality management elements and results in higher education institutions: The Greek case. Quality Assurance in Education, 25(2), 206–223. https://doi.org/10.1108/ QAE-08-2015-0033
- Qasrawi, B. T., Almahamid, S. M., & Qasrawi, S. T. (2017). The impact of TQM practices and KM processes on organisational performance: An empirical investigation. International Journal of Quality and Reliability Management, 34(7), 1034–1055. https:// doi.org/10.1108/IJQRM-11-2015-0160
- Qureshi, M. I., Khan, N., Ahmad Hassan Gillani, S. M., & Raza, H. (2020). A systematic review of past decade of mobile learning: What we learned and where to go. International Journal of Interactive Mobile Technologies (iJim), 14(6), 67–81. https://doi.org/10. 3991/IJIM.V14I06.13479
- Rahman, M. A., Hassanain, E., Rashid, M. M., Barnes, S. J., & Shamim Hossain, M. (2018). Spatial blockchain-based Secure Mass Screening framework for children with dyslexia. *Institute of Electrical and Electronics Engineers Access*, 6, 61876–61885. https://doi.org/10.1109/ACCESS.2018.2875242
- Shahatha Al-Mashhadani, A. F., Qureshi, M. I., Hishan, S. S., Md Saad, M. S., Vaicondam, Y., & Khan, N. (2021). Towards the development of digital manufacturing ecosystems for sustainable performance: Learning from the past two decades of research. *Energies*, 14 (10), 2945. Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/en14102945
- Shahid, A., Almogren, A., Javaid, N., Al-Zahrani, F. A., Zuair, M., & Alam, M. (2020). Blockchain-based Agri-Food Supply Chain: A complete solution. Institute of Electrical and Electronics Engineers Access, 8, 69230–69243. https://doi.org/10.1109/ ACCESS.2020.2986257

- Sharifi, A., Ahmadi, M., & Ala, A. (2021). The impact of artificial intelligence and digital style on industry and energy post-COVID-19 pandemic. *Environmental Science and Pollution Research*, 28 (34), 46964–46984. Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/ s11356-021-15292-5
- Syed, A. M., Ahmad, S., Alaraifi, A., & Rafi, W. (2021). Identification of operational risks impeding the implementation of eLearning in higher education system. Education and Information Technologies, 26 (1), 655–671. https://doi.org/10.1007/s10639-020-10281-6
- Vaicondam, Y., Sikandar, H., Irum, S., Khan, N., & Qureshi, M. I. (2022). Research landscape of digital learning over the past 20 years: A bibliometric and visualisation analysis. International Journal of Online and Biomedical Engineering (IJOE), 18(8), 4–22. https://doi.org/10.3991/IJOE.V18I08.31963
- Van Schalkwyk, R. D., & Steenkamp, R. J. (2019). The exploration of service quality and its measurement for private higher education institutions. Southern African Business Review, 18(2), 83–107. https://doi. org/10.25159/1998-8125/5679
- Zakaria, N., Jamal, A., Bisht, S., & Koppel, C. (2013). Embedding a learning management system into an undergraduate medical informatics course in Saudi Arabia: Lessons learned. *Medicine*, 2(0, 2(2), e13. https://doi.org/10.2196/med20.2735
- Zaki, M. (2019a). Digital transformation: Harnessing digital technologies for the next generation of services. *The Journal of Services Marketing*, 33(4), 429–435. https://doi.org/10.1108/JSM-01-2019-0034
- Zaki, M. (2019b). Digital transformation: Harnessing digital technologies for the next generation of services. *The Journal of Services Marketing*, 33(4), 429–435. https://doi.org/10.1108/JSM-01-2019-0034
- Zulfa, M. I., Hartanto, R., Permanasari, A. E., & Ali, W. (2021). GenACO a multi-objective cached data offloading optimization based on genetic algorithm and ant colony optimization. *Peer Journal Computer Science*, 7, 1–25. https://doi.org/10.7717/ peerj-cs.729