# Catalyzing Change: The Interplay of Digital Transformation and Organizational Culture in a Saudi University Context

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## Abstract

Complex changes to organizational culture are resulting from digital transformation (DT) in universities in developing countries. This paper examines how DT has impacted organizational culture change at a Saudi Arabian University. This study adopts a qualitative methodology, applying an interpretive case study strategy, utilizing semi-structured interviews with a sample of 12 managers and Information Technology personnel. The study's results inform the development of a theoretical framework identifying key factors that inform DT's impact on organizational culture change. This includes reviewing the university's history to analyze its customs and traditions, so as to identify the impact of DT by comparing previous paper-based systems with automated work flow processes that establish how performance has been shaped by DT increasing employee engagement. Factors such as senior management support, DT's impact on norms and values, accountability, changes to work and behavior, and skills all play a role in determining organizational culture change. The paper concludes with an interpretation of how DT impacts organizational culture change. The findings have implications for how university managers can understand the impact of DT on organizational culture change, ensuring they play a positive role in such processes.

**Keywords:** organizational culture; universities; organizational cultural change; DT; case study.

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# تحفيز التغيير: التفاعل بين التحول الرقمي والثقافة التنظيمية في سياق جامعة سعودية

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## الملخص

إن التغييرات المعقدة في الثقافة التنظيمية، ناتجة عن التحول الرقمي في الجامعات في البلدان النامية.

ويتناول هذا البحث كيفية تأثير التحول الرقمي على تغيير الثقافة التنظيمية في إحدى الجامعات السعودية، وقد تبنت هذه الدراسة منهجية نوعية، حيث تطبق استراتيجية دراسة الحالة التفسيرية، وذلك باستخدام مقابلات شبة منظمة مع عينة مكونه من اثنا عشر مديراً وموظفاً في تقنية المعلومات. وتفيد نتائج الدراسة في تطوير إطار نظري يحدد العوامل الرئيسية التي تحدد تأثير التحول الرقمي على تغيير الثقافة التنظيمية.

ويتضمن ذلك مراجعة تاريخ الجامعة لتحليل عاداتها وتقاليدها، وذلك لتحديد تأثير التحول الرقمي من خلال مقارنة الأنظمة الورقية السابقة مع عمليات تدفق العمليات الالية التي تحدد كيفية تشكيل الأداء من خلال زيادة مشاركة الموظفين في التحول الرقمي. وتؤثر فيها عوامل مثل دعم الإدارة العليا، وتأثير التحول الرقمي على المعايير والقيم، والمسئولية، والتغييرات في العمل والسلوك، والمهارات، دورًا في تحديد تغيير الثقافة التنظيمية. وتختتم الورقة بتفسير لكيفية تأثير التحول الرقمي على تغيير الثقافة التنظيمية. وتؤثر النتائج على كيفية فهم مديري الجامعات لتأثير التحول الرقمي على تغيير الثقافة التنظيمية، مما يضمن أنهم يلعبون دورًا إيجابيًا في مثل هذه العمليات.

**الكلمات المفتاحية:** الثقافة التنظيمية؛ الجامعات؛ التغيير الثقافي التنظيمي؛ التحول الرقمي؛ دراسة حالة.

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## 1. Introduction

The existing literature agrees that for any organization, the process of cultural adaptation is fraught with complexities. This current study focuses on the issue of whether digital transformation (DT) can facilitate such a change in the context of a university in a developing country, specifically one with a long-established culture. This is pertinent, as existing research into Information Systems (IS) has thus far failed to determine how DT might be implemented to effectively drive positive change in organizational cultures in the context of developing countries. This despite the fact that DT has demonstrated considerable potential to benefit universities, including in terms of enhancing productivity, efficiency, growth and competitiveness. Furthermore, the culture of universities tends to focus on shared norms, values and customs, which dictate what is considered acceptable. Therefore, this study examines the potential for DT to modify organizational culture in developing countries by exploring the unique environment at a Saudi university (Pollock & Cornford, 2004).

DT research is currently evolving rapidly, with an increasing number of research papers on the topic (e.g., Matt et al., 2015; Ebert & Duarte, 2018; Verhoef et al., 2021). A particular challenge within this dynamic sphere concerns conceptualizing how DT can catalyze a profound shift in the cultures of academic institutions. Consequently, the current study seeks to develop a theoretical foundation substantiated by empirical evidence, by focusing on a single case within a Saudi Arabian university, employing an interpretive case study methodology, as outlined by Walsham (1995 & 2006). Notably, this research offers a fresh perspective on this subject, bridging the gap that exists in current IS literature. The case study involved a diverse

cohort, including IT staff and managerial personnel facing the multifaceted technical, organizational, and managerial challenges involved in DT. By capturing firsthand experiences, this study aims to shed light on the intricate processes changing organizational culture in a Saudi university setting as a result of DT.

Furthermore, the outcomes of this investigation are expected to have significant implications beyond the confines of this single case study. The study aim is to firstly enable managers within universities in developing countries to gain sufficient insight to effectively navigate cultural transformation within their own institutions, drawing inspiration from this successful case. Secondly, it aims to enable IT specialists to obtain an understanding of the critical role played by DT in fostering positive organizational culture, which represents a pivotal element in successfully realizing overarching goals during the DT journey.

Crucially, the significance of this research lies in its contribution to both theory and practice. In undertaking a novel exploration of the nexus between DT and organizational culture, it aims to enhance existing knowledge and provide actionable insights to guide future endeavors. The research is therefore underpinned by the following objectives: firstly, to review the existing literature concerning IS, to identify the key influences and mechanisms through which DT might be expected to reshape the culture of universities; secondly, the development of a theoretical framework grounded in the work of Alvesson and Sevningsson (2015) exploring the dynamics of organizational culture change; and finally, the collection and analysis of data from the selected case study university in Saudi Arabia, culminating in a theoretical framework based on the

rich insights generated by this case study. Thus, by unravelling the intricate relationship between DT and organizational culture, this paper offers a narrative to both advance understanding and inform real-world practice.

## 2. Literature Review

### 2.1 Defining organizational culture

A review of the literature revealed that culture is a crucial element to consider when examining the diverse influences of information technologies. This is because culture operates on multiple levels, such as national, organizational, and group, and as such can impact the effective implementation and utilization of information technology. Additionally, culture plays an important role in a variety of managerial processes that can directly or indirectly influence IT (Leidner & Kayworth, 2006). Moreover, organizational culture continues to be cited as an important factor in the success or failure of IS adoption (Jackson, 2011). More specifically, organizational culture, which can be defined as the shared assumptions, values, and artifacts within an entity (Schein, 1985), profoundly affects various processes, employees, and overall performance (Shahzad et al., 2012). Certain aspects, such as organizational learning, can fully mediate the relationship between organizational culture and organizational innovation (Abdi & Senin, 2014). Indeed, the literature indicates a correlation between organizational culture and the affective, cognitive, and behavioral tendencies that inform attitudes toward organizational change (Abdul Rashid et al., 2004). Successful cultural change within an organization can be challenging, but is imperative, and necessitates a systematic approach; i.e. strategic human resources management (Molineux, 2013). Organizational research has set out guiding principles for

fostering cultural change: emphasizing firstly, the alignment of vision and action; secondly, the need for incremental changes within a comprehensive transformation strategy; thirdly, the importance of distributed leadership, staff engagement and collaborative relationships; and finally, the benefits of continuous assessment and learning as a result of change (Willis et al., 2016). A contemporary strategy for managing complex processes of change within both projects and organizations involves forging alliances, in recognition of the fact that cultural change requires trust, collaboration, and a focus on modifying behaviors and values. This suggests that alliances have the capacity to influence organizational values, norms, and regulations (Lehto & Aaltonen, 2021).

### 2.2 Defining DT

In their research, Wischnevsky and Damanpour (2006) characterize organizational transformation as concurrent and significant alterations that affect crucial areas, such as strategy, structure, and power distribution, often occurring within a short timeframe. DT specifically involves the adoption of disruptive technologies to enhance productivity, create value, and contribute to social welfare (Ebert & Duarte, 2018). In 2019, Val constructed a framework defining DT as a process involving technologies that cause disruptions, thereby prompting strategic responses from organizations. These responses then reshape value creation paths, while negotiating organizational barriers and integrating structural changes. Typically, organizations need to implement management practices and strategies to oversee DT, devising tailored transformation strategies that offer a central framework, facilitating the comprehensive coordination, prioritization, and implementation of DT throughout the organization (Matt et al.,

2015). In the digital realm, strategizing emerges as the primary catalyst for change. Businesses that do not take risks are unlikely to flourish and may suffer from loss of talent, as employees of all age groups prefer to work for companies dedicated to advancing within the digital domain (Kane et al., 2015). However, emerging technologies, such as augmented reality, and disruptive technologies, such as machine learning, rarely contribute significantly to transformative processes (Andriole, 2017). Complexities also emerge when addressing organizational issues (i.e. transforming business models) for which there are no previously established approaches (Ziyadin et al., 2019). In addition, research has identified six dimensions at the enterprise level that are critical for positioning companies to achieve competitive advantage using DT: (1) organizational strategic vision; (2) alignment of vision and DT investments; (3) cultural readiness for innovation; (4) control of intellectual property assets and know-how; (5) strong digital capabilities; and (6) effective utilization of digital technologies (Gurbaxani & Dunkle, 2019).

## 2.3    Organizational culture, decisions and risks

Culture can significantly impede decisions concerning the implementation of IS, due to variations in interpretation and meaning across different organizations (Robey & Rodriguez-Diaz, 1989). Cultural issues can elevate the risks associated with IS implementation, potentially leading to cultural incompatibilities between the new system and the organization's prevailing culture (Romm et al., 1995). Sebastian et al. (2020) identified two digital strategies as pathways to DT (i.e. customer engagement and digitized solutions), emphasizing the requirement for organizations to anticipate disruptions to conventional business models and invest in adaptation, enhanced profitability, productivity, and

competitiveness (Llopis-Albert et al., 2021). Ultimately, DT results from the application of digital technologies and techniques to organizational and economic contexts, affecting products, services, and processes (Sebastian et al., 2020).

## 2.4    Impact of emerging technologies on DT

Prior research into the role of digital business contexts (Schwertner, 2017), has found that maturing digital businesses aim to integrate digital technologies, such as social, mobile, analytics/big data and the cloud, to transform work processes. However, the ability to digitally reimagine a business is largely determined by a clear digital strategy supported by leaders fostering a culture of innovation and change. A unique component of DT is that risk taking is becoming the cultural norm as more digitally advanced companies seek out new levels of competitive advantage.

Emerging technologies, as explained by Calp (2020), utilize artificial intelligence techniques to augment the processes of DT employed by enterprises. Calp (2020) performed a case study involving a public organization in Sweden that has incorporated automated technologies into its DT journey. The analysis revealed varying definitions of digitalization and automation among different stakeholder groups within the organization. Moreover, it indicated divergent expectations concerning the outcomes achieved when automating administrative tasks. A further study by Pflaum & Gölzer (2018) discovered that "Internet of Things" (IoT) technologies are reshaping the focus of business processes, as firms shift from physical products to data driven service-oriented approaches.

In a further evaluation of the impact of emerging technologies, Peng and Tao (2022) indicate a significant enhancement in enterprise performance can be achieved through DT, as it can be used to deliver innovation. The primary avenues for leveraging DT to drive enterprise development include cost reduction, revenue augmentation, efficiency improvement, and the promotion of innovation. A more specific study underscoring the impact of DT was undertaken by Hanelt et al. (2021), and comprehensively reviewed 279 articles. That findings clarified that DT is guiding organizations to develop adaptable structures that are conducive to continuous adaptation.

### 2.5    Success and failure of DT

When seeking to determine what factors inform the success or failure of certain DT initiatives, Tabrizi et al. (2019) explained that many digital technologies offer opportunities for improving efficiency and fostering customer intimacy. However, when individuals lack the necessary mindset to adopt change, and the existing organizational practices are flawed, DT serves only to amplify a firms' shortcomings. In Kotter's (1995) classic study on why transformation fails, two main reasons are identified: (1) that change goes through a series of phases and times, and (2) any mistakes in any of these phases can have extreme negative consequences.

### 2.6    Impact of DT on organizational culture change

A survey of the impact of DT on organizational change revealed that companies commonly exhibit digital affinity and experiment with digital technology, undertaking strategically planned transformations and integrating advanced data analytics

into business processes (Berghaus & Back, 2016). Digital technologies are understood to have wider ramifications for both value creation and value capture (Nambisan et al., 2019). A study by Henriette et al. (2015) explained that such technologies have the capacity to alter business models, operational processes, and inform the end-user experience. DT initiatives are widespread across multiple industries, but frequently encounter setbacks, because organizational cultures resist change. In 2017, Hartl and Hees conducted a Delphi study, and found that orgaizations typically promote values that encourage innovation and concern for employees. In the context of the banking sector, Al-Faihani and Al-Alawi (2020) examined the literature concerning organizational cultural influences impacting DT, integrating research from both DT and organizational culture domains. Their results underscored the significance of considering organizational culture when implementing DT initiatives. Effectively overseeing cultural change is imperative to the success of DT. However, although prior research has recognized the significance of organizational culture in DT, a substantial portion of this research lacks detailed insights into the specifics of culture change within the context of DT and its management. Digital culture change is identified by a disrupted, ever-evolving environment, heightened importance, and intensified application of digital technologies (Hartl, 2019). For example, in the context of public organizations, DT is currently reshaping bureaucratic structures, cultures, and the relationships between stakeholders (Mergel et al. , 2019)

## 2.7　Gaps in the literature

In terms of prior research in this area, a recent study by Lindgren et al. (2021) conducted within a Swedish public

organization centered on defining DT and understanding its meaning among stakeholders. However, it did not encompass relevant parties such as employees, managers, and IT personnel, who could offer additional insights into the practicalities of DT and its automation. By considering the perspectives of various stakeholders involved in the process of DT utilization and implementation, especially regarding the impact of DT on organizational aspects like cultural change, we can expand our understanding of the effects of DT upon organizations. The literature concerning DT not only elucidates the nuances of DT across various contexts but also partially enhances comprehension of DT. However, provision of specific examples of enhanced performance resulting from DT is lacking in the literature, and so addressed as a significant gap in this research.

Furthermore, the review of the literature revealed a dearth of studies investigating the impact of DT on organizational culture change in developing countries, particularly within the education sector. None of the studies reviewed focused specifically on the impact of DT on organizational culture in universities within developing countries. Some of the studies (e.g., Calp, 2020) did demonstrate the potential contribution of artificial intelligence to organizational DT journeys in education. Certainly, the emergence of new technologies, including AI, prompts an inquiry into the extent of their adoption in universities. The central gap addressed in this study concerns whether the adoption of DT by higher education institutions plays a role in, or impacts on organizational culture change.

A study by Schwertner (2017) emphasized the significance of cultural change in the context of DT, underscoring the pivotal role of leadership in facilitating such changes. Our research thus provides a comprehensive examination of how organizational

culture change is influenced by DT and top management. The literature lacks studies of new DT projects within organizations to elucidate, extend, and provide fresh insights into the reasons why transformations might fail and how the DT journey impacts organizational culture change resulting in failed DTs. Therefore, we consider here what extent organizational culture change influences the success or failure of emerging technologies and DT.

The extent to which DT enhances and alters our comprehension of organizational transformation is also a notable gap in the literature, and one that could elucidate our understanding of its adoption. There is also limited examination of how various organizations plan their DT and achieve organizational change, thus it is anticipated that this survey study will pave the way for further qualitative research in this field (Berghaus & Back, 2016).

A study by Pflaum and Gölzer (2018) addressed organizational changes associated with DT technologies, such as IoT, identifying a shift towards data-driven approaches. Thus, this exploration of the influence of data-driven approaches in DT, specifically their role and impact on organizational culture change should offer a useful contribution to knowledge.

DT has the potential to reshape our comprehension of IS. Additionally, considering how digital innovations influence organizations, particularly in terms of culture, may contribute to an enriched perspective on how new paradigms and principles are established in the realm of DT. The review of the literature undertaken here examined current understanding of the impact of organizational culture in traditional contexts, in contrast with when it is exposed to DT, and gaps in this area noted by other researchers. For example, the potential impact of DT on

organizational culture change is not clearly elucidated by Nambisan et al. (2019) who indicates a need for additional studies in the area. Notably, Ziyadin et al. (2019) aimed to delineate DT in the business context, and highlighted a need to conduct studies on the impact of DT to deliver changes in organizational culture. A systematic review by Henriette et al. (2015) showed that no previous studies in the literature have addressed organizational culture change in contexts such as higher education in developing countries. Meanwhile, Hartl and Hees (2017) advocate for further investigations into the relationship between DT and organizational culture. Elsewhere, Hartl (2019) offered a theoretical framework to explain cultural change in DT, but based on evidence collected from a specific region. Exploring similar topics in different regions using diverse theoretical frameworks would be expected to enhance and yield valuable findings. This study also seeks to extend the work of Leidner and Kayworth (2006), which explored how emerging technologies impact organizational culture change in developing countries.

A clear strategy is necessary for organizational culture change in response to DT to minimize project failures. Developing a component based overall organizational strategy for cultural change in response to DT would prove beneficial in terms of talent retention.

## 3 Theoretical Framework

### 3.1 Theoretical impact of DT on organizational culture change

There are a number of theoretical approaches to cultural change in organizations. Therefore, the current study first established a clear theoretical framework to identify the components determining cultural change within the case study university.

This section therefore focuses on the methods employed, including Alvesson and Sevningsson (2015) view of organizational cultural change, which was adopted to guide the data collection and analysis.

Organizational culture theory (see Figure 1) states that culture can be changed with the support of top management, but that this can be a complex undertaking, in particular when it involves value creation, structural values and norms, as well as promoting understanding among organizational members. It is also challenging to gauge exact reactions to innovation, particularly as cultural change demands the transformation of individuals' ideas, values, and interpretation of meaning (Alvesson and Sevningsson, 2015).

DT can be beneficial in achieving cultural change by influencing the norms, values and meanings held by employees, including relative to working habits and routines (Almatrodi et al., 2023a). One example is that of a human resources employee, accustomed to collecting physical papers and memos for the monthly payment of bonuses for additional hours worked, requiring approval from managers based on a description of the achievements gained by the employee working overtime. However, with DT (and in particular automation) it is possible to collect all the required information and automate approval of the request from the salaries department digitally. Thus, how such employees perform their work has changed, as have how requests are managed by the Human Resources department. This demonstrates how a focus on work processes taking place both before, and following, the implementation of DT can transform previous norms.

Values can be positively impacted by DT, as the volume of information that can be generated digitally generally increases employee accountability. This is particularly true in the case of managers being able to see the amount of work undertaken by their subordinates more clearly; i.e., where the work is taking place, by whom, and how long it takes to complete, as well as the final outcome. DT can therefore enhance the meaning of the work conducted in an organization by offering accurate information regarding multiple functionalities, enhancing managers' understanding.

Organizational culture can be a powerful force ensuring the success of strategies that necessitate change (Alvesson and Sevningsson, 2015). DT can prove beneficial due to its role in enabling change in diverse areas, including in relation to culture. However, it is important to highlight that evaluating the course of organizational culture requires understanding of what comprises that culture, as well as a degree of imagination and creativity (Alvesson and Sevningsson, 2015). In their research Hofstede et al. (1990) and Alvesson and Sevningsson (2015) have identified a number of characteristics of culture, and this paper examines how these might be impacted by changes arising from DT in the study context, as follows:

- Culture is holistic. Therefore, in order to study the impact of DT on organizational cultural change it is vital to examine its effect on all employees, in order to generate a collective interpretation of how DT impacts cultural change.

- Culture is historic in nature and expressed through traditions and customs. These therefore need to be studied to establish the role played by DT in terms of the

historical development and changes experienced by the university itself.

- An established culture is difficult to transform. This highlights the significance of assessing DT's influence on facilitating organizational cultural change. This is frequently due to human beings preferring to maintain their existing ideas, values and traditions, even when they support such change theoretically.

- Fourthly, culture is socially constructed, being both created and shared by a variety of human beings. DT thus impacts organizational culture through the social construction of values, norms and rituals.

- Fifthly, DT influences organizational culture change, and as such can be problematic to measure and classify. This indicates that adopting a case study approach can reveal how a culture may develop and change due to DT.

- Sixthly, this case study focused on how DT influences cultural change within the university, including ways of thinking, values and ideas.

The above factors demonstrate how DT can influence changes in behavior within a target organization (i.e. the university), and that it is therefore vital to understand the shared systems of meaning (Smircich, 1985; Alvesson and Sevningsson, 2015) when analyzing cultural change.

However, there are a number of important governing assumptions (Alvesson and Sevningsson, 2015) that comprise the main components of organizational culture, and play a role in analysis of DT. These are beliefs (norms and values) that are vital to the functioning of an organization, and can be expressed through both thought and action, and can also guide behavior. Analysis of how DT impacts organizational culture requires

understanding of hidden assumptions, as well as their influence on values and norms, as conveyed through organizational rituals, structures, and leadership.

It is significant that cultural change undertaken via DT can be analyzed as understanding behavior through the actions, events and beliefs performed by organizational actors in the university setting. Moreover, to better understand the impact of DT, it is important to understand the language used in the organization itself, as well as organizational actors' stories, myths and rituals (Alvesson and Sevningsson, 2015). It is also vital to recognize that organizational cultures typically diverge, and therefore DT can have varying degrees of impact on a variety of beliefs and values and rituals (Alvesson and Sevningsson, 2015).

This study further attempts to identify whether organizational culture be altered through DT. The existing literature agrees that top management can influence the values, beliefs and ideas shared by employees, and therefore is implicated in the successful integration of cultural change. However, the extent to which DT can assist top management effectively remains unclear. Change can be achieved if its members possess the necessary skills and resources, but to some extent cultural change is a fluid process that cannot be controlled, and so DT may only play a limited role in realizing it (Alvesson and Sevningsson, 2015). Thus, any analysis of cultural change requires effective interpretation of organizational culture, including new mechanisms for enforcing and monitoring behavior, alongside changes to what personnel are required. This indicates that, rather than signifying any alteration in values and meaning, behavioral change may reflect processes of surveillance and instrumental compliance (Ogbonna & Wilkinson 2003; Alvesson & Sevningsson, 2015).

As previously discussed, there is currently a dearth of studies outlining the role of DT with regard to changes in organizational culture. The existing literature tends to focus on the central role played by top management, while overlooking that of digital systems and the importance of employees' reactions to DT, which also determine the progression of cultural change.

Impact of digital transformation on organizational culture change at the university

A. The university
1. The history
2. The traditions and customs in processes and work, and how work is conducted before and after digital transformation

B. How organizatinal culture change impacted by digital transformation?

Top management and leadership influence

Norms and values

Accoutablity

Changes in work

Changes in bahvior

Skills
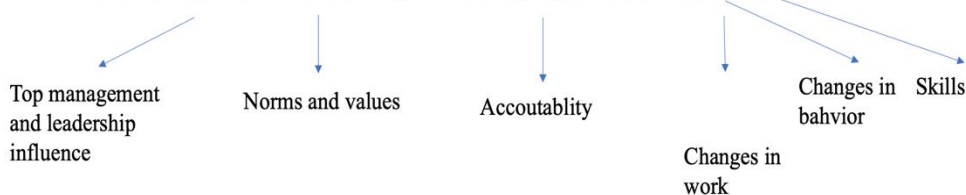
Figure 1 The theoretical framework detailing how DT impacts organizational culture change.

## 4. Methods

### 4.1 Qualitative methodology

This research adopted a qualitative methodology (Creswell, 2013) to establish how DT's introduction to a Saudi Arabian university can change organizational culture. This allowed the researcher to interpret various experiences related to DT and organizational culture, including focusing on the individual

reactions of relevant actors and participants. A qualitative methodology helps to explain how DT can prompt change in the culture of Saudi universities. The research instrument examined the role of employees, including IT specialists and managers, to establish the opinions of a variety of organizational members. It also explored the subsequent behavior of IT staff, to understand the factors that inform the university's success when using DT to adapt its culture.

## 4.2    Interpretive case study strategy

The researcher adopted an interpretive case study research strategy (Walsham, 1995; 2006), focusing on the phenomena of DT relative to changes to organizational culture at one Saudi university. Organizational culture theory selected as the main tool to guide the data collection and analysis. The data collection consisted of semi-structured interviews, with the chief sample being organizational managers involved in the implementation and use of digital systems. In addition, the researcher employed snowballing sampling as a method. The interviews were first transcribed, then the data was arranged into themes, which were subsequently interpreted using the theoretical framework, while drawing on the literature to support the findings.

Thus, this research study employed the interpretive method in IS research (Walsham, 1995; 2006), which is informed by constructivist ideology, which is considered appropriate for a study of DT and the transformation of organizational culture within a university setting. This study assumed a social constructivist perspective, due to its focus on how DT can support change in organizational culture, and the influence of employees' actions and interactions. This mirrored the social reality of the impact of DT on changing the university's culture

as being reliant on communication between the actors involved (Orlikowski and Baroudi, 1991).

### 4.3    A Saudi university as a case study

To identify the influence of organizational culture and how it represents wider organizational change, the researcher undertook an interpretive qualitative case study of a public university in Saudi Arabia, which had previously experienced a period of DT. The study therefore examined the challenges associated with DT in relation to shifts in organizational culture.

The university chosen for this case study is a major public university in Saudi Arabia, founded in the 1950s. As the university had commenced a period of implementation of DT prior to the start of this research, this is a retrospective study. Consequently, it provides an opportunity for employees to reflect on the significant incidents and challenges they encountered during the implementation process, as well as on how DT has changed the university's organizational culture. The university, and its employees, were therefore studied in detail, which provided a substantial degree of relevant data.

#### 4.3.1  King Saud University (KSU)

King Saud university (KSU history, 2023) was established in the 1950s and is located in the capital city of Riyadh. It was the first Saudi university. Over time, the university established new colleges improving the spread of its education and research profile. The College of Arts was the first college established in the early 1950s. Colleges that opened shortly after, include the Colleges of Business, and the College of Pharmacy and Science. The government granted the university independent status in 1961, according to  the university website, the

government allocate its budget and holding it accountable for promoting higher education and research. From 1965 to 1984 the university witnessed considerable development, establishing the College of Agriculture, The Colleges of Engineering and Education, the College of Medicine, the Arabic Language Institute, the deanships of admission and registration and student affairs and libraries, the College of Dentistry and the College of Applied Medical Sciences. The university established a graduate deanship in 1978, the main responsibility of which was to supervise all graduate programs throughout the university, including the College of Computer and Information Sciences and the College of Architecture and Planning. The university played a role in the establishment of other universitas in the country, as its branches were later turned into new universities, e.g., Qassim University (in 2006). The university is managed by a management board, its rector and deputy rectors, the main university council, college council and academic departments. It also has many administrative departments, such as finance, which have benefited from DT in recent years.

### 4.4 Data collection

The research process commenced in May 2023, and therefore some incidents that took place during the DT period may have been comprehended differently if they had been viewed in retrospect. This is one limitation of non-longitudinal studies undertaken over a short-time frame. Additionally, retrospective studies can prove challenging to participants' attempts to remember previous events accurately (Farrall, 1996).

This research used semi-structured interviews to gather data, offering a comprehensive understanding of how DT led changes to the university's organizational culture (Harrell and Bradley, 2009). Interviews were carried out with a small sample population comprising twelve university managers in various

university administrative roles (including Planning and Budgeting, Finance, Human Resources, Library, and IT departments) involved in the DT process, with each interview lasting between one hour and one and a half hours. This provided an overall picture of how DT impacted the university's organizational culture.

The interviews were all undertaken during July 2023, and based on questions developed to examine the main areas affecting DT, as set out in organizational culture theory (see Table 1).

Table1. The interview questions.

| The Interview Questions |
| --- |
| 1. How would you describe the process of DT historically? |
| 2. Do you think top management has an influence on changing organizational culture during the process of DT? |
| 3. How do you think DT impacted the norms and values of the university employees at your university? |
| 4. Has DT increased accountability at your university? |
| 5. Has DT contributed to or changed the meaning of the work conducted at your university? |
| 6. Has DT influenced your behavior at your university? |
| 7. Do you think DT has influenced the leadership at your university? |
| 8. Do you think that employees and people involved in the DT process have the skills needed to change the organizational culture at your university? |

The interviews were held in a conversational format, ensuring that all topics were addressed in an appropriate manner to obtain the required data, while the interviewer probed for further details when necessary.

### 4.5  Data analysis

Creswell (2013) sets out a systematic data analysis technique that can be is performed in six stages. Firstly, the data was prepared, which included transcribing the interviews. Secondly, the data was scanned to highlight key points from the interviewees pertaining to the research questions. Thirdly, the interview data was coded, by portioning the data into pieces of text, explaining the meaning of the specific sections (Creswell, 2013). Fourthly, the interview data was arranged into categories and classified according to participant type. Fifthly, coding was undertaken to develop themes to inform the analysis of how DT impacted organizational culture change in the university. Finally, the meaning of the data was interpreted by connecting the key findings with the existing literature.

In addition, the data was analyzed using qualitative analysis techniques proposed by Creswell (2013) in combination with the theoretical understanding of organizational culture change derived from Alvesson and Sevningsson (2015). This involved clarifying the outcomes according to precise themes, while also utilizing theory segmented according to an iterative process of data collection and analysis (Walsham, 1995).

Table 2. Examples of analysis and interpretation.

| Theme | Evidence (Examples From Interviews) | Support for Analysis and Interpretation |
|---|---|---|
| Top management and leadership influence | If senior management does not adopt legislation, it will fail to implement DT, which demonstrates that it plays a key role in the process. (Manager A) | Supported by the literature and organizational culture change theory |

| | | |
|---|---|---|
| Accountability | How is he held accountable? Technology helps determine the place and any mistake. Whoever made the mistake is revealed. The transaction takes place first and the punishment depends on this. (Manager A). | Supported by the literature and organizational culture change theory |

## 5. Results

The results from this qualitative interpretive case study were derived adhering to the methodological principles outlined by Walsham (1995; 2006) to guide interpretive IS research. The study employed Alvesson and Sevningsson's (2015) organizational culture change theory, along with relevant IS literature, to formulate inquiries for semi-structured interviews. These interviews aimed to identify key influencers, such as IT personnel, organizational managers, and university employees to further understanding of the impact of DT on organizational culture change.

The sample comprised 12 individuals actively engaged in DT efforts within the organization, spanning IT personnel, managers, and various managerial departments. The data analysis commenced with interview transcription, followed by coding to categorize responses into main themes. These themes were substantiated with illustrative examples and insights gleaned from the interviewees. Each theme was contextualized through an introductory framework drawn from the existing literature, to afford a comprehensive understanding of the subject matter.

Furthermore, the discussion section expanded on the study's primary contributions, and systematically compared each result with relevant literature to establish an evidence base. This analysis also aimed to ascertain the degree of support for the study's findings, establishing meaningful links between the research outcomes and existing scholarly perspectives.

ological
history

The interviews outlined the history of the university, confirming that it was founded in the mid-1950s. Over time it had evolved from using traditional information recording and storage systems, adopting modern electronic systems and services. That is, the university had initially used paper-based systems to perform various administrative and academic processes, officially commencing the use of DT in 2007, as described by a university manager:

> "DT commenced in 2007, with the university transforming its financial and academic systems, including getting rid of the mainframe, converting the data into a structured and relational form. We have now entered a second stage, that of the transformation of business intelligence. The data office has data warehouses for academic matters, integrated with financial matters. Automation levels are considered a stage of DT, and maturing legislation plays a fundamental role in the process." (Manager A)

The evolution of various systems has included the introduction of an Information Management System (IMS) and Integrated Data Management System (IDMS). These gradually replaced paper-based processes, as the university adapted to using screens and electronic data transfer. The university has

dedicated a number of years to integrating the following systems, as described by Manager E:

> "The university has worked on four systems. The first was utilized at the university's inception and was a paper-based system. This was replaced by the IMS system, used to calculate salaries and allowances, while secondary procedures remained paper based. IDMS then took over the process of recording information, such as concerning vacations, to replace the simple checks previously in place, i.e. name, age, and number. The process of transferring salaries directly into bank accounts began in 1422 AH (2001 AD). This change faced some resistance, particularly due to a number of difficulties, including that the IMS did not transfer printed data. In the year 1425 AH, the IDMS developed by a mediator (company) able to extract data over the course of time, facilitating the data transfer process. In the past, all employment systems were paper based, while now they use web applications developed using modern programming tools, databases having become electronic after 1425 AH, including vacation balances, electronic services, and many additional procedures. The old ERP ran from 1431 AH to 1444 AH, using the net and server databases, and was converted into a SAP, which is a separate system." (Manager, E)

The library system also underwent significant transformation, evolving from utilizing paper cards for book classification to an automated system that includes features such as self-checkout devices, SMS notifications, and simplified services. According to one librarian:

"It was originally a single-library system using paper cards, and searching for a book involved searching classifications on paper. Then this was transformed into an electronic automated system, resulting in a single link between admission, registration, and the library, SMS messages, self-check devices, and loans... Automation clarified fines and loans, and services were connected in a simplified way. Creating the inventory used to take a long time in the past, but does not now." (Librarian, A)

One manager highlighted that the automation of work procedures represented a pivotal milestone in the university's DT journey. This involved moving from manual paper-based procedures to electronic ones. The manager also noted that:

"Currently, there is DT, which was introduced during the final stages of the automation of work procedures. There was a qualitative shift from paper based procedures to electronic ones, as happened with old ERP. However, some departments did not have their own model. There are still problems with the regulations, some of which have been addressed by the SAP system, such as electronic signatures." (Manager, B)

Overall, these responses provide an overview of how the university has embraced DT over time, by moving from paper-based to modern electronic systems, and how this transformation has impacted various aspects of the university's operations, i.e. libraries and Human Resources.

### 5.2 University traditions and customs in processes and work before and after DT

This section (see Figure 2) discusses the impact of DT on university traditions, customs, and work processes. It highlights how the adoption of digital technologies has altered work processes, and with the role of employees, as well as the overall organizational culture within the university.

### 5.2.1 Paper based processes vs automated workflow systems

Prior to DT, the university relied heavily on paper-based business processes, which had developed their own unique customs and traditions, i.e. manual approval workflows and documentation handling. Thus, recognizing the untapped potential of technology to overhaul these longstanding processes came to represent a critical endeavor for the university. In particular, both managers and leaders highlighted the importance of using technology to enhance workflows and efficiency. This was emphasized by Manager A, who explained how DT transformed various processes in human resources and planning, such as faculty requests for teaching load allowances and the procurement department's interaction with the remainder of the university:

> "For example, a faculty member asks for a teaching load allowance. A committee meets and the transaction is transferred between related employees from the university administration. You must complete this procedure. It is necessary to apply business intelligence and activate smart forms, to introduce artificial intelligence and improve procedure accordingly, and it is also important to align procedure with the transformation process. Digitalization is a vital tool, allowing me to transform my business according to the capabilities of technology." (Manager, A)

Manager D also noted:

"We have a direct relationship with the Procurement Department, which dictates that it submits both a financial letter and a digital document stating the relationship and the need. However, now the university uses technology, there is no longer a gap like as was under the old ERP financial system. Most of the data is saved on the system and we avoid using paper documentation. This allows us to prepare the draft budget and present those in authority with any necessary paperwork . Now 90% of these procedures have been included in the digital system. The old systems did not allow for purchasing management, but now it has been introduced, it ensures a purchase order can be sent to authorized personnel. However, workers' rights and entitlements are not yet fully linked, as there remain a number of issues concerning the correct use of the technical facilities. In addition, there is some resistance to change, with a particular problem being the number of employees engaged in the purchasing department continuing to send out physical paperwork." (Manager, D)

### 5.2.2  Reshaping performance

This indicates that DT has the potential to significantly reshape how employees perform their work. It is thus expected to serve a crucial role in the upcoming phases in the university's development, as elucidated by one manager, who highlighted the shift from paper-based to digital documentation, alongside the automation of procedures:

"DT is a necessity throughout the financial and administrative system, as it helps meet needs, transforms procedures, including the provision of self-service activities. Automation has ensured each transaction starts with the employee. As there are a large number of

employees, full automation is guaranteed to speed up procedures." (Manager, E)

### 5.2.3 Employee engagement

The previous culture did not encourage employees to discuss work-related issues and typically many hesitated to explore new ways of enhancing their work. However, the advent of DT has encouraged them to voice their opinions and ideas, some of which have been implemented following discussions with managers. This confirms the impact of DT on employee engagement and represents a consequent transformative shift, including an increased willingness to discuss work-related issues, share ideas for improvement, and collaborate with managers. This allows for more open communication and innovation, with one manager noting:

> "There are a large number of employees, 500 both male and female. This will fall if these procedures lead to complete automation, which will also improve efficiency. Many employees have ambition and a love of learning and most are accustomed to working under guidance. The organization has a long-established culture that did not previously allow for discussion or innovation" (Manager, E).

### 5.2.4 University adaptability to understand its needs

The university has gained valuable insights from its previous experience implementing digital systems, allowing it to make informed decisions and to select the most suitable form of implementation. This demonstrates the university's adaptability to understanding requirements and identifying the appropriate partners for meeting those needs. One manager highlighted the importance of selecting an appropriate partner, highlighting the

challenges encountered when transitioning from old to new systems, stating:

> "Now, with the new system, it was necessary to have a third party. We had a company and we were the beneficiaries. We also had the employees, and the project manager who asked the company to follow this up, so that we did not repeat the same mistakes (old ERP). The new system can now be developed by any company. We have transferred the data to SAP with the university providing the tools. As a project manager, you have problems to solve and you need to find the appropriate tools. But it is best to have a contract with a company." (Manager, E)

**5.2.5** The establishment of practices and customs

The company responsible for implementing the previous generation of administrative and managerial systems at the university had established practices and customs that significantly influenced employees' use of those systems and their implementation. These practices formed an integral part of the university's culture and business processes, and there was a notable impact when the decision was made to replace them with new digital systems. The rationale for doing so proceeded from various factors, including: firstly, the limitations of the old systems; secondly, the inability to develop self-service solutions; and finally, the need to retain knowledge within the organization. These factors contributed to the university's decision to replace the former systems with new digital solutions, as one manager explained, as follows:

> " 1 . Administrative. The company worked with this university and a number of others. We started the system from scratch and imposed the university's nine regulations onto the system. Other universities also benefited from this

system, which led to the university deciding to purchase the company. However, as a result of the work it had already done, the company set too high a price, which led to the university abandoning negotiations, as they considered there would be no tangible benefit from the purchase.

٢. The services. Those provided by (the old systems) were limited, and did not help the university evolve, particularly as the company did not help us to attain the required goals. The company helped us to integrate with other electronic tools at the university but requested high remuneration for its services.

٣. Inability to develop self-service procedures. Some of the problems arose from the fact that the university lacks the technical tools to solve existing problems. Since stopping the allowances, my department has dealt with 20,000 employees, six types of allowances, and 100,000 transactions.

٤. Retention of knowledge. If we send a request to the company about a problem and how it can be resolved, we often find that it is rejected as a result of the cost." (Manager, E)

The Saudi government currently assesses public organizations in accordance with their attainment of specific DT benchmarks. In addition, organizational culture, including the long-standing traditions and customs in processes and work (i.e. training, user experience, and satisfaction), typically take precedence over technical considerations.

"The authority controlling digital governance has evaluated the university's standard of DT as achieving 80% during the current year. Our transactions have been transferred from being paper based to electronic, which has been approved by the university. I should also point out that DT is broader than simply electronic transactions, including governance, and organizational culture, as well as training, user experience and satisfaction, and the use of mobile phones and websites. Thus, the majority of our services are now automated. Therefore, the best way to measure DT is according to digital government authority standards, with 20% involving technical challenges and the remainder being related to governance. DT can be updated annually as an aspect of automation, to which we have agreed."(Vice Dean, B)

Overall, the significant impact of DT on the university's culture, work processes, and overall efficiency emphasizes the significance of undertaking a cultural shift, as well as the importance of considering factors beyond technology when determining its success.

Impact of digital transformation on organizational culture change at the university

A. The university
1. The history
2. The traditions and customs in processes and work, and how work is conducted before and after digital transformation

Paper based vs automated wrokflow processess.

Reshaping performance.

Increases employees engagement.

University adaptabity to understand its needs and requirements.

The success of digital transformation is often overshadowed by the dominance of organizational culture, which prioritizes long-standing traditions and customary processes over technical considerations.

The company's implementation of digital systems, mirroring practices initially implemented in the university, was deeply entwined with the university's culture and business operations. This integration significantly influenced the decision to replace these practices with newer digital systems.
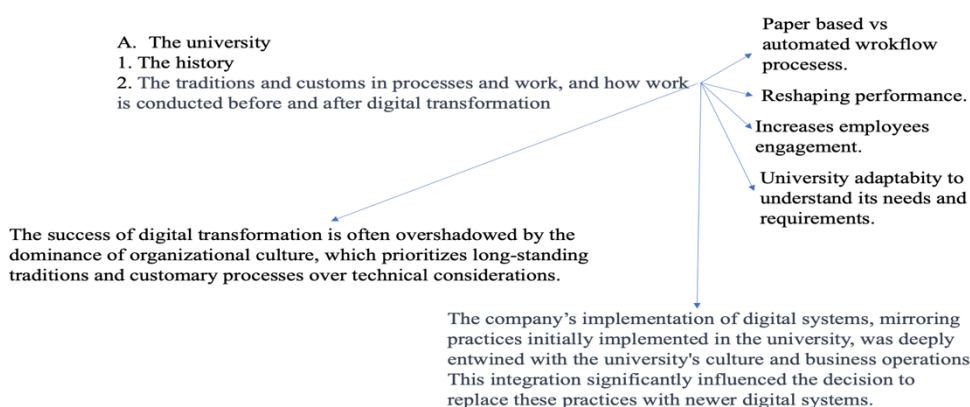
Figure 2 University traditions and customs in processes and work and how work is conducted now and before DT

## 5.3. How organizational culture change is impacted by DT(See Figure 3)?

### 5.3.1. Top management and leadership influence

The current section discusses the ways in which organizational culture is impacted by DT, and the crucial facilitation steps undertaken by top management and senior leadership.

### 5.3.1.1 Top management responsblities for DT

This study found that top management (including senior leaders and executives) plays a critical role in the success of DT within an organization. It is responsible for: firstly, understanding the need for digitalization; secondly, establishing an appropriate context; and thirdly, providing leadership to guide the organization through the process of transformation (Wrede et al., 2020). Additionally, leadership competences are important as mechanisms for successfully establishing DT and providing the organizational culture needed for such changes (Nahrkhalaji et al., 2018). DT requires a profound cultural shift, which thus depends on the vital role of management in facilitating learning to support both digital and traditional employees (Nadkarni & Prügl, 2021). However, top management also tends to drive the move towards DT, with digital managers becoming key enablers (Schneider & Kokshagina, 2021). The literature also indicates the positive impact of leadership (AlNuaimi et al., 2022), highlighting its pivotal role in successful DT implementation and adoption (Weber et al., 2022).

### 5.3.1.2 New legislation

The data from the current research reveals that it is essential for new legislation to be supported by top management to ensure

the success of DT. This accords with the literature, which identifies how decisions from senior management can assist in the success of the transformation management (e.g., Schneider & Kokshagina, 2021), with one manager observing: "If senior management does not adopt new legislation, it will fail to implement DT, which demonstrates that it plays a key role in the process" (Manager A).

### 5.3.1.3 Fininical and moral support

Successful implementation of DT relies on the university's leadership, in particular leaders' provision of financial and moral support for the team to implement change. The literature supports similar findings, stating that leadership now plays a significant role in ensuring change (Larjovuori et al., 2018). The active involvement of leaders is therefore vital for establishing an effective change of culture, as stated by Manager B:

> "Leadership has an impact on managing the required change, and individuals with authority need to play an important role in changing the organizational culture. Leadership support can be both financial and moral." (Manager, B)

### 5.3.1.4 Productivity

This study found that top management supported DT, taking steps to identify its impact on the productivity of business processes, but also noting that some employees have high productivity levels, even in the absence of digital systems. In addition, senior management's support for DT involved the allocation of financial resources, to provide the necessary technology and equipment, while insisting on organizational alignment with the transformation goals. Manager D

emphasized that such support can accelerate business processes and increase productivity:

> "The university administration is pressing for the implementation of DT and has spent large sums. Senior management has supported the provision of the systems both financially and technically, including: (1) licenses, (2) hardware and equipment, and (3) technical support. However, technology is a double-edged sword, particularly when errors are caused by the user. Transactions that used to be delayed now take only seconds and, although verification remains problematic, there are few errors. The technology requires governance and the identification of data entry errors. All the same, responsibility rests with the individual, with a conscientious employee being productive regardless of technology." (Manager, D)

### 5.3.1.5 Incentives

One problem faced by the university departments concerns the lack of incentives for those supporting change:

> "Senior management was supportive, but there were no real incentives. We have 500 male and female employees, and there is no benefit in terms of their remuneration as a group." (Manager, E)

### 5.3.1.6 Participatory approach

This study found that, throughout the organization, senior management made decisions based on feedback received from managers and employees. This participatory approach allowed for a more informed decision-making process, ensuring that the transformation aligns with the organization's needs:

"As an end user with employees, I find senior management responds to feedback, recognizes the situation and examines the impact of initiatives on the deans and the employees, and that the work is participatory." (Librarian, A)

### 5.3.1.7 Setting aims and systems of rewards

In addition, Manager A identified the important role played by leadership in setting aims, stating that:

"Leadership must reward and punish as a result of using technology. Once the goals are clear and the KPI is obvious, technology becomes a tool that helps you achieve your goals and transform your business." (Manager A)

While Manager D noted that:

"They influenced us in terms of their orientation by providing financial and moral support, they supported us and met with the company and the dean to discuss the challenges and how they could be overcome." (Manager, D)

Thus, it emerged that the leadership was responsible for setting clear goals and Key Performance Indicators (KPIs) concerning the use of technology. In addition, the university's leadership established a system of rewards and consequences based on the adoption of the technology, including related performance measures.

### 5.3.1.8 Mindful leadership

Dean A described this process as 'mindful leadership', emphasizing the importance of developing awareness of an organization's needs and challenges, as well consideration when undertaking the required action.

### 5.3.2 Norms and values

This section discusses the impact of DT on organizational norms and values within a university context. Organizations often resist changes, particularly those related to technology (Almatrodi et al., 2023b), as employees who are accustomed to certain ways of doing things frequently prove hesitant to embrace new technologies involving change. This results in a number of difficulties, including resistance to the use of technology, thereby leading to challenges with implementation. Furthermore, DT promotes a more open and collaborative culture, potentially resulting in the emergence of new norms and values (Kraus et al., 2021) and a shift in organizational culture. In addition, DT addresses the issue of existing skills, norms and values that can obstruct organizational change (Piccinini et al., 2015), providing opportunities to reevaluate and update key aspects of the organization.

5.3.2.1 The indirect influence of norms and values
As observed by a manager at the university, employees' norms and values have an indirect influence on DT. Thus, the university adapts its culture and norms when needed:

> "Employee norms and values were changed indirectly through DT." (Manager A)

5.3.2.2 The challenge is not technological but culture
Moreover, the interviewees agreed that the primary challenge posed by DT is cultural rather than technological or technical. However, the support of top management allowed the organization to identify changes to previous norms and customary methods of working. This underscores the fact that technology itself is not the primary obstacle, but rather that the mindset and culture of an organization needs to align with the necessary changes. However, the Vice President of the

university represented the support of top management, which plays a crucial role in facilitating the changes commonly associated with DT, including those that are cultural in nature. In addition, Manager B noted that DT prompted changes in employees' working habits; i.e., the purchasing department moved from using Excel sheets to SAP. Such changes took time to fully implement and comprehend, but also represented a shift in norms and values linked to work processes:

> "The challenge is not technical. Technology executes what is required, and the other challenge is in the culture and mindset. This would not have been possible without support from the university, and in particular the Vice President, who supervised the project. Feedback from different departments has identified a change in the culture, especially with regard to employees' habits. This includes members of the purchasing department, who previously worked on Excel sheets, but now complete all their work in SAP. However, it is too early to judge whether this change will be fully implemented, as it requires time and effort, and such changes cannot be fully comprehended for at least a year." (Manager, B)

### 5.3.2.3 The value of technology and learning

The interviews also revealed that DT increased the value of technology and learning to the organization. For example, employees began to see technology as a tool capable of improving their working efficiency and speed of learning. The benefits of learning to use technology were also recognized by the university, including how it enhances levels of learning, as explained by Manager D:

"In the (old ERP) system, we demanded review powers under pressure from senior management. I used to see mistakes and go to the competent employee and tell them. The employee is learning and giving value to the technology as it helped with levels of achievement and increased the speed of learning." (Manager, D)

### 5.3.2.5 DT influence on norms and values

Thus, it appears the university considered DT to have a positive influence on norms and values, as many services had become automated, thereby improving communication between employees, making it easier for them to interact and request services:

"It had a positive impact on employees' norms and values. Communication is now by e-mail, and we have requests, with employees being able to print from their devices." (Manager, E)

In addition, this study found that DT introduced new norms, including hybrid and remote working. Meanwhile, it removed spatial and temporal limitations, increased employee satisfaction and flexibility, as noted by Librarian A:

"Spatial and temporal limits have been lifted, even when it comes to problems outside working hours. This includes the ability to work remotely from home, and for administrative systems to determine levels of satisfaction and values, as well as ease of obtaining a book." (Librarian, A)

This study also identified that DT has improved organizational performance. Thus, processes that had previously been

managed manually became digitized, leading to increased efficiency and convenience. The performance of organizational members improved, which was also attributed to DT:

> "The performance changed. For example, the computer allowance can now be applied online, and deal with it online." (Vice Dean, B)

In summary: this section has highlighted the ways DT can challenge and reshape the norms and values of an organization, leading to a more open and collaborative culture. It also emphasized the importance of leadership support for driving change, along with its positive impact on employee satisfaction and performance.

### 5.3.3. Accountablity

This section discusses accountability in the context of DT within the university, highlighting how this can be improved within an organization. Thus, DT has a role to play in improving and assuring accountability within organizations (Cordergy et al., 2023), also supporting transparency in terms of governance (Shenkoya et al., 2023).

#### 5.3.3.1 Digital systems and accountability

Digital systems help to determine the individuals responsible for mistakes by tracking the place and timing of transactions, providing a clear evidence trail, which makes it easier to attribute responsibility, as noted by Manager A:

> "How is he held accountable? Technology helps determine the place and the mistake. Whoever made the mistake is revealed. The transaction takes place first and the punishment depends on this." (Manager A)

#### 5.3.3.2 Data dependency

By providing access to data, digital systems can facilitate the management of employees and the oversight of budget-related issues. This data dependency also infers that those who input the data must bear responsibility for its accuracy, with accountability being a notable issue for the organization, as stated by Manager D:

> "With technology, it has become easier to deal with employees, including addressing problems related to the budget. We asked for reinforcements and future requests to provide the data we need. This means that the employee has become dependent on the data, and the data has become the responsibility of those who enter it." (Manager, D)

### 5.3.3.3 The power of managers

This interviewee noted the issue of user accounts being shared among employees, increasing accountability. Employees are afraid of being questioned about their performance, as the user name that appears on a task attributes responsibility. Manager E highlighted that this serves to enhance the power managers have over employees:

> "A problem with these powers is that an employee can hand responsibility to anyone, as the user's name appears, regardless of who has actually been working on the file. At the same time, the named user is held accountable. This fails to recognize the need for follow-up procedures and denotes indifference to protecting user data and confidentiality." (Manager, E)

### 5.3.3.4 Digital systems improve employee evaluation.

In addition, Librarian A noted that DT has improved the evaluation of employees' performance, focusing on both the quantity and quality of their work:

"When it comes to reviewing the progress of work in the deanship, there is improved quantity and quality of performance, as well as commitment to the work itself." (Librarian, A)

The example of implementing fingerprint-based attendance tracking at a university suggests such technological measures improve accountability and transparency, attributing specific actions to employees and making them more accountable for their attendance, leading to fewer delays. Dean A confirmed this, stating:

"To some extent, and what was hoped for, is that adding the ability to use fingerprints has increased employees' attendance and accountability, while minimizing delays. We find that employees are asking more questions, and there is increased transparency." (Dean, A)

5.3.3.5 Digital systems indirect influence of accountability Vice Dean B emphasized that, while digital systems may not provide a direct measure of accountability, they can enhance it by demonstrating where processes are taking place within an organization. This indicates that digital systems can provide visibility in terms of workflows and responsibilities, making it easier to track accountability, as observed by Vice Dean B:

"You can't measure it; however, it can increase accountability and it can show where the process is." (Vice Dean, B)

In summary: This section has highlighted the ways DT can increase accountability within an organization by providing tools and systems that: firstly, attribute responsibility for the actions of employees; secondly, improve data accuracy and

dependency; thirdly, facilitate an accurate evaluation of performance; and finally, increase transparency in various aspects of an organization's operations. This has illustrated the potential benefits of embracing DT when ensuring accountability and transparency.

## 5.3.4 Changes in working practices

This section discusses various aspects of changes to working practices, particularly in the context of DT, highlighting the transformation in the structure of work (Schwarzmüller et al., 2018).

### 5.3.4.1 The nature of changes to digital systems in work structure

However, the following statements from the interviewees in this study present two contrasting viewpoints concerning the nature of changes in relation to work. Firstly, Manager A argued that it is not technology itself that changes the meaning or nature of work, but rather the use of rewards and punishments that can bring about behavioral change:

"I can't imagine that DT changes the meaning or nature of work for individual employees, including aspects such as engagement, but those with many problems will continue to experience them, and employees who are late will continue to be late. Consequently, nothing will really change unless the organization implements rewards and punishment. It is the punishment that ensures change, not the technology. The tools used for this aspect, in conjunction with the technological system is what increases employee efficiency." (Manager A)

Secondly, Manager D proposed that DT indeed facilitated changes to working methods, tools, and locations, and that these have resulted in increased productivity and adaptability:

> "DT helps employees to work anywhere (i.e. home) and their productivity increases, whether they work at home or in the workplace." (Manager, D)

### 5.3.4.2 The impact of the COVID-19 pandemic on accelerating the use of DT

The interviewees highlighted the impact of the COVID-19 pandemic in accelerating the use of DT, particularly as the ability to work from anywhere became critical during this period, with digital tools playing a significant role in the success of the transition to online working. Additionally, the pandemic emphasized the need to remove any residual reliance on paper-based processes:

> "DT allowed us to dispense with paper during this period, assisted by the restrictions imposed by the COVID-19 virus." (Librarian, A)

### 5.3.4.3 Job redesign

The interviewees also noted that the university was considering redesigning its posts, including implementing intelligent business tools and decision support systems. This indicates that organizations are now recognizing the need to adapt job roles and processes to leverage the potential of digital systems and data-driven decision-making. Thus, the university redesigned some posts to leverage the potential of digital systems:

"When it came to job redesign, we founded a new office and drew up a plan to have intelligent business tools and decision support systems in place by next year, based on the university's needs." (Vice Dean, B)

In summary: This section has discussed how DT is currently reshaping work within the target organization, including making changes to working culture and processes. In addition, it highlighted a number of different perspectives concerning the role of technology, explaining the significance of rewards and punishment for driving change in the workplace. Moreover, it considered how the restrictions imposed by the COVID-19 pandemic became a catalyst for many of these changes, with organizations actively redesigning jobs and processes to align with the capabilities of digital systems.

5.3.5 Changes in behavior

This section discusses the impact of DT on workplace behavior within the target university setting. The study found that once adopted DT alters workplace dynamics (Foerster-Metz et al., 2018), including the process of integrating digital technologies and tools into various aspects of an organization's operations. However, it is vital that organizations understand employees' needs when exposed to change, particularly if they wish to efficiently digitize their business. Undoubtedly, changes to behavior and organizational structure prove considerably more important to the successful integration of DT than the technology itself (Genzorova et al., 2019). Thus, it is apparent that employees need to be both willing and capable of embracing new technologies and workflows, which may require training.

5.3.3.1 Impact of digitalization on employee behavior

In the university under study, the impact of digitalization on employee behavior was found to enhance managers' ability to control behavior, suggesting that technology can have a positive impact in terms of increasing discipline from the perspective of managers. However, Manager A also acknowledged that it remains essential to also retain the loyalty and trust of employees:

> "The employee's behavior is important and DT ensures they become more disciplined, while digitalization helps control their behavior. But for a loyal employee the opposite is true." (Manager A)

However, not all the participants in the study (including the managers) agreed on this point. For example, Manager D believed that technology has limited impact on employee behavior, particularly when work is seasonal, or when the work involves considerable pressure. However, it should be recognized that this was a minority viewpoint:

> "Work is seasonal for us. There are times when the pressure is high, and the work is completed quickly and efficiently. I have not observed any influence of technology on the behavior of the employees." (Manager, D)

In addition, Manager E suggested employee behavior was more likely to be influenced by incentives than technology or digitalization, in particular rewards:

> "What changes employees' behavior depends on both the individual and on the available incentives." (Manager, E)

In summary: This section has highlighted the complex relationship between DT and employee behavior. Some of the managers interviewed believed technology can exert a positive impact on employee behavior and discipline, while others considered its influence minimal, emphasizing the role of incentives instead. Overall, the researcher found that understanding and managing employee behavior forms a critical aspect of the successful implementation of DT in organizations.

5.3.6 Skills

This section discusses the importance of skills, particularly in relation to digitalization, in the context of both DT and changes in organizational culture. It also highlights the challenges associated with willingness to adopt technology across different generations of employees. Research has revealed that organizations familiar with emerging technologies (i.e. artificial intelligence, robotics and internet of things) value digitization, and consequently focus on developing such skills in their employees (Sousa et al., 2019). This implies that in the current rapidly evolving technological landscape, organizations need their employees to be capable of effectively navigating these digital tools and technologies.

5.3.6.1 Digital skills and age

The interviewees also pointed out the challenges associated with dealing with employees from different generations, and in particular the capacity (and readiness) of older and younger generations to adapt to DT:

"We found that older people experience greater difficulties than the younger generation when it comes to working with technology, particularly as younger people have more familiarity with technology in general and are better at

using electronic services. Their lack of skills means the older generation find decision-making procedures more difficult, but they also have fewer positions involving decision-making. What we need is to re-engineer our procedures." (Manager A)

Some managers also highlighted that many employees possess certain basic skills before joining the organization; i.e., familiarity with Word and Excel. This suggests some foundational digital skills are now commonplace, but that there is still a need to develop more advanced or specialized skills:

"The skills were there even before they started to work here. Most of the employees' work is with Excel, Word, and other applications." (Manager, E)

### 5.3.6.2 Digital skills and training

In contrast with the above, some of the participants highlighted important challenges associated with training. Manager D mentioned various limitations, suggesting that organizations can encounter difficulties in providing sufficient training to enable their employees to acquire the necessary digital skills. This could be due to a variety of factors, including lack of resources, along with various constraints and the absence of suitable training programs:

"We have considerable limitations when it comes to training." (Manager, D)

Vice Dean, B also emphasized the importance of promoting organizational culture and training. This implies that critical aspects of successfully fostering digital skills comprise both creating a culture that encourages digitalization and investing in effective training programs. Thus, the skills themselves may be

regarded as insufficient, as the organization needs to also foster an environment in which such skills are valued and nurtured, as in the case of the university:

"When it came to skills, we needed more work in terms of culture and training." (Vice Dean, B)

In summary: This section has underscored the significance of the adoption of digitalization skills in modern organizations, along with the need to address generational differences. It has also acknowledged the importance of training and organizational culture to ensuring all employees are able to effectively contribute to DT.
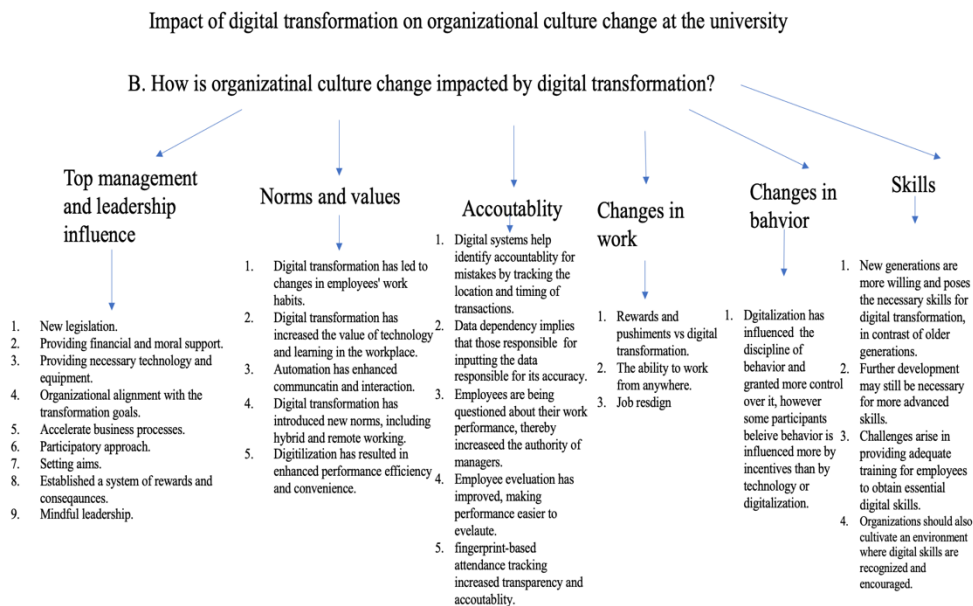
Impact of digital transformation on organizational culture change at the university

B. How is organizatinal culture change impacted by digital transformation?

**Top management and leadership influence**
1. New legislation.
2. Providing financial and moral support.
3. Providing necessary technology and equipment.
4. Organizational alignment with the transformation goals.
5. Accelerate business processes.
6. Participatory approach.
7. Setting aims.
8. Established a system of rewards and conseqaunces.
9. Mindful leadership.

**Norms and values**
1. Digital transformation has led to changes in employees' work habits.
2. Digital transformation has increased the value of technology and learning in the workplace.
3. Automation has enhanced communcatin and interaction.
4. Digital transformation has introduced new norms, including hybrid and remote working.
5. Digitilization has resulted in enhanced performance efficiency and convenience.

**Accoutablity**
1. Digital systems help identify accountablity for mistakes by tracking the location and timing of transactions.
2. Data dependency implies that those responsible for inputting the data responsible for its accuracy.
3. Employees are being questioned about their work performance, thereby increaseed the authority of managers.
4. Employee eveulation has improved, making performance easier to eveleate.
5. fingerprint-based attendance tracking increased transparency and accoutablity.

**Changes in work**
1. Rewards and pushiments vs digital transformation.
2. The ability to work from anywhere.
3. Job resdign

**Changes in bahvior**
1. Dgitalization has influenced the discipline of behavior and granted more control over it, however some participants beleive behavior is influenced more by incentives than by technology or digitalization.

**Skills**
1. New generations are more willing and poses the necessary skills for digital transformation, in contrast of older generations.
2. Further development may still be necessary for more advanced skills.
3. Challenges arise in providing adequate training for employees to obtain essential digital skills.
4. Organizations should also cultivate an environment where digital skills are recognized and encouraged.

Figure 3. How organizational culture change can be impacted by DT (the contribution of this study)

## 6. Discussion

**6.1** Novel contributions and findings in relation to prior literature

1.     The results of this study document how the target university transitioned from paper-based methods to digitized and electronic business processes over time.

2.     The main contribution is the development of the theoretical framework, based on the participants' views, contributing to the theory of organizational culture change theory set out by Alvesson and Sevningsson (2015). The study adds to the theory by offering evidence of the impact of DT on cultural change in a higher education institution in a developing country, specifically Saudi Arabia.

3.     It resulted in a comprehensive list of factors (See figure 3) drawn from the case study evidence, revealing how DT has collectively impacted organizational culture change, thereby improving the theory of organizational culture change relative to DT. The theoretical framework and list of factors shows how DT impacted organizational culture change.

4.     It provided an interpretation of how DT has affected organizational culture change.

5.      One of the main results references the university's customs and traditions, while demonstrating how digitization improved employee performance. This result is supported by the previous literature concerning the implementation of DT in universities (Purwanto et al., 2023), also identifying an improvement in the performance of tasks in private companies; i.e. insurance companies (Guzmán-Ortiz et al., 2020). This is due to the role played by DT in terms of influencing the customs

and traditions at the university, with the potential to improve performance, alongside modifying established customs and traditions. One example is the process required of university faculty members when requesting a teaching load allowance, which had previously been sent to management for approval and execution in the early stages of digitization. Thus, although the request was electronic, it required the approval of both the Dean and the Human Resources department. Once the university became completely electronic, the way Human Resources received requests, as well as undertook tasks, enabled the department to provide accurate information, leading to fewer errors and more rapid completion of procedures. This therefore improved the performance of managers. This has implications for other organizations wishing to enhance their performance, as it highlights the impact of digital technologies on the customs and traditions of business management, as well as clearly establishing which approaches would benefit from adaptation, along with the implementation and use of new processes.

6.      In addition, this study revealed that DT provided an opportunity for the university's employees to express their views and opinions regarding how best to improve their working environment and consequently their organizational culture. Furthermore, DT offered an arena in which all those involved in the implementation and use of digital technologies can share their views, especially as its success required the involvement of all parties. This also prompted continuous involvement, with users' opinions taken into consideration, due to top management recognizing the importance of employee participation to minimize resistance to change. This also demonstrates that DT created a culture of valuing

employees' opinions. This adds to the literature of DT and organizational culture change, showing that DT increases the tendency of employees to express specific views regarding the development initiatives led by DT.

7.      The study found that the university's lengthy experience implementing IS played a beneficial role in its introduction and use of DT. This has also been reported to be the case in other types of organizations, establishing that prior use of IS can increase the likelihood of successful digitalization (de Cássia Arantes et al., 2021). This is because organizational knowledge refers to the ability to learn from previous experiences in order to avoid future failure. This organizational learning is another example of how DT impacted organizational culture change. For example, it enabled the university to identify issues with its previous ERP implementation company, leading it to change supplier to resolve problems.

8.      This research also found that top management support for DT can take many forms, including leading the process of change (e.g., Wrede et al., 2020) by supporting new government legislation requiring digitalization. This is significant as the need to adhere to legislative requirements plays a role in pushing senior management to support DT. Thus, the request from the government that the university implement DT led to the compliance of senior management, ensuring the necessary changes in organizational culture. For example, the government required certain standards from public organizations in relation to DT (i.e. training and user satisfaction), resulting in the adoption of certain practices by the university. In addition, top management provided the financial and moral support the university

required to implement DT. For example, the leadership put forward certain aims to assist both the implementers and the users of the new digital systems. In addition, having achievable aims facilitated the transformation of organizational culture by fulfilling the necessary requirements, and establishing a clear vison of how the university would benefit.

9.      Furthermore, this study found that the norms and values of employees tended to exert an indirect impact on DT. One study demonstrated that is possible for a flexible organization to change its norms and values as a result of the introduction of digital technologies (Eller et al., 2020). This occurred as the university automated many of its processes, allowing improvements to the way jobs were performed, in particular moving from focusing on operational activities towards decision making and observing.

10.      A change in organizational culture was also evident in how DT facilitated accountability in the university. Similar changes have been observed in many other organizations adopting emerging technologies (Eswari et al., 2015) in response to government pressure to demonstrate the productivity and effectiveness of employees.

11.      This study also found that some employees only agreed to the use of this technology from fear of facing sanctions from the university administration. The imposition of sanctions played a role in the overall acceptance, as fear of the consequences of resistance can undermine and affect employees' advantages.

12.      Any changes to how work is performed require that employees be offered support, practically, morally and financially. One of the results identified was the

success of DT as a direct result of support being extended by the university's senior management. Other examples of changes to working practices concern the ability to undertake hybrid and online working during and after COVID-19, as a result of the implementation of DT.

13.     The research also highlighted that organizational culture was changed by DT as it provided a mechanism to ensure greater discipline amongst employees. This included the systems used to record individuals arriving at and leaving work, as well as task completion. The system also expects individuals to remain in their posts, to respond to electronically delivered requests. However, it emerged that, in the case of the university, incentives played a more important role in promoting discipline than the technology itself.

14.     The study data revealed that the availability of the required skills (in particular the training provided by the university) also informed the extent and nature of cultural change. This indicates that ensuring personnel acquire the appropriate technical and managerial skills for DT can significantly enhance the chances of successfully realizing cultural change.

6.2 Does comparison with old systems allow for a clear understanding of the impact of DT and its potential advantages over previous systems at a Saudi university?

Comparison with old systems augments understanding of the impact of DT and its potential advantages over previous systems at the Saudi university, because:

1. Productivity and efficiency of employees when using DT solutions was increased relative to previous systems, and can enhance understanding of this impact, as DT

will improve administrative processes and workflows when compared with previous systems.

2. Information is better used and gained with DT, as it enables access to information from different parts of the university to improve decision making. The example of how overtime bonuses were paid to faculty by Human Resources shows how the university addressed requests previously by collecting the information needed manually on paper based systems. These are now fully electronic, which means collecting the information needed to pay such bonuses to make decisions easily and execute requests quickly is now automated.

3. Organizational communication using old systems was problematic, but has now improved with DT throughout the university, increasing collaboration among employees. Following DT, employees started to engage better and state their views regarding development in the university, engaging more with DT initiatives.

4. DT increased organizational learning in the university, as knowledge of previous systems challenges the lessons provided regarding how to adopt DT in the university.

## 7. Conclusions

This study collected data in the form of an interpretive case study to inform the building of a theoretical framework. It aimed to determine how the university in question has experienced and navigated the transformation from paper-based methods to digitized and electronic business processes. It also examined how DT has an impact on organizational culture change. The case study revealed that changes in the university's organizational culture encompassed aspects and factors related

to: firstly, the support of top management and leadership; secondly, the establishment of norms and values; thirdly, accountability; fourthly, changes in working practices and behavior; and finally, the acquisition of appropriate skills.

The broader significance and contributions of this study include the addition of information concerning the digital impact of organizational change theory to Alvesson and Sevningsson's (2015) work. It also contributes to the IS literature in developing countries and in university contexts that lack qualitative case studies of such concern. How this work relates to the existing literature is multifaceted, for example: (1) it concerns how DT increases performance in organizations as outlined and discussed previously, which supports the findings of existing studies and literature such as that by Guzmán-Ortiz et al. (2020) offering an interpretation that can explain how such performance is associated with DT and other factors such as governmental support for such efforts; (2) this work showed that the impact of DT on organizational culture change can be impacted by the accumulation of organizational knowledge of its previous experience of IT in the organization (de Cássia Arantes et al., 2021); so the study provided insights for such organizational knowledge showing how DT affected and impacted organizational culture change; (3) top management support for DT was noticed mainly to encompass responsibility for leading the process of change, as noted in previous studies (e.g., Wrede et al., 2020), differing from the role they played in traditional IS implementation, where incentives, rewards and punishments were more relevant; (4) it points to a change in the organizational norms and values as a result of digital systems (Eller et al., 2020), noting also that work habits and the perceived value of technology shifted as a result of DT; and (5) level of accountability was observed to have changed, echoing

findings from many other types of organizations, and affecting organizational culture change (Eswari et al., 2015), and was also explained to be a result of the impact of data dependability.

This research therefore has significant implications for a variety of organizations, emphasizing the importance of acknowledging the profound impact of DT on all aspects of organizational culture. Furthermore, it underscores the importance of being prepared to adapt practices, customs, values, norms, work processes, behaviors to implement DT initiatives, along with the skill of employees to transform organizational culture. This study has also highlighted the impact of DT on organizational culture, identifying the key factors that contribute to successful transformation.

The current study has some limitations, as it is a qualitative case study, employing semi-structured interviews with university managers to collect retrospective data and insights. It is related to the time of implementing digital systems in the university which started from 2007 until the present, which means that some events may be interpreted and remembered differently by the respondents due to the time that has elapsed. The findings are also limited to a university in the developing country (Saudi Arabia).

The main findings of the study are that: (1) managers have to be aware of the role DT has on organizational culture change, and consider at the time of implementation and adoption the factors mentioned in Figure (3); (2) managerial support for overcoming the challenges of DT and its resistance depend heavily on understanding the significance of organizational culture; and (3) managers' understanding of the history of IT/IS implementation and their current organizational culture plays a

role in the success of efforts of DT to influence organizational culture change.

The researcher therefore wishes to make several recommendations for future studies. Firstly, that future research should emphasize the applications of this study with regard to culture change and extend its findings to other contexts. Secondly, that studies should focus on both the theoretical and practical implications of emerging technologies and DT in diverse organizational contexts. It is also recommended to encompass both qualitative and quantitative research methods and examine a wider range of organizational types, including in both the public and private sectors. Finally, that an exploration of additional case studies will provide valuable lessons that are applicable to a wide variety of organizations.

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