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RESEARCH ARTICLE

Digital transformation and employee involvement: Employees' perspective in Saudi Arabia's public sector

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ABSTRACT

DT initiatives have a high failure rate. Thus, this research intends to explore the DT initiatives with specific focus on employee involvement, taking into account that this is Information System (IS) research. Organizations seek to maximize their efficiency and performance. One way of gaining such advantages is through Digital Transformation (DT). However, DT brings with it challenges and complexity. In respect of people, challenges include resistance to change, skills gap, and employee divide. The role of employees must be engaged in order to gain their support and overcome any challenges that arise as a consequence of the transformation. However, current research shows that little is known about this practice. Thus, this research aims to investigate the following research question: How does the current practice of DT initiatives enable employee involvement in Saudi Arabia's public sector? The research utilized the use of qualitative approach due to the exploratory nature of the study. A total of twenty interviews were conducted that included employees from different public sectors in Saudi Arabia. The research was motivated to study the public sector due to the fact the initiatives are led and funded by the government where there is a need to explore how it is managed by different entities especially when it comes to employee involvement. This research found that the implementation of DT is substandard when employee involvement is not at the required level. The data revealed that employees' participation in this process was limited to surveys at certain stages, with managers only being consulted, and this is reflected by some of the challenges faced by organizations, such as resistance to change and skills gap. This emphasizes the importance of employee involvement at all stages alongside further research and practice development to enable good practice, increase the success of DT and reduce the cost of DT initiatives failure.

Keywords: Digital Transformation; Users; Information System; Employees; Technology

1. Introduction

Research shows that traditional business models have been revolutionized by the concept of DT, which has gained significant popularity across industries and practices recently[1–3]. According to Oludapo [4], in this era, DT may be the most essential phenomenon where such technology development needs to be investigated. This becomes more important considering the fact that about 80% of DT initiatives fail [4–7]. Organizations need to understand that DT means integrating digital technology into every facet of their business operations in order to increase productivity, enhance customer experience, and maintain

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competitiveness in an increasingly digital environment [3,8,9]. This change in operations primarily addresses the growing use of data and information technologies, which present significant issues in many areas of an organization and where people and corporations both need to be able to adapt [10]. Organizations expect changes in structure, culture, leadership, and skills [10,11]. Knowing that DT projected failure rates are significant [7,12], it is crucial to investigate such a phenomenon. A key aspect in such a failure, when DT efforts are not monitored, is that disagreements between middle and high management about the technique and process of involving users can occur [4]. As this research investigates DT from an IS perspective, this research is motivated to explore the role of users due to the impact they have on the success of DT. When talking about DT in organizations, the employees are subject to such transformation. Thus, the problem is that poor practice may lead to DT failure and this, in turn, can cause major issues including a negative social culture toward DT. The objective is to explore the practices followed by organizations during DT, including employee involvement, and this can be achieved through the following research question.

RQ: How does the current practice of DT initiatives enable employee involvement in Saudi Arabia's public sector?

This research is structured as follows. The next section is the literature review where the research gap is explained. This is followed by methodology, findings and discussion, and conclusion.

2. Literature review

The intention of DT is to create new value for consumers, employees, and other organizational factors with emphasis on technology, business models, and processes [13]. Through automation, process simplification, and data-driven decision-making, DT can result in notable increases in operational efficiency [3,14,15]. Digital technologies automate operations, cut expenses, and simplify processes [16]. For example, using algorithms and big data analysis can enhance organizations' productivity and efficiency [17]. However, DT brings both opportunities and challenges [18]. In other words, it does not simply mean that organizations will maximize their performance without facing challenges [19].

For instance, resistance to change within an organization is one of the most significant barriers to successful DT, since employees may be hesitant to implement new technology or adjust established practices [20–22]. Indeed, Adama and Okeke [18] highlight resistance to change and fear of failure as key challenges when it comes to DT. These are among other challenges such as cybersecurity [3,22], data privacy and security concerns [16]. Thus, it is important organizations understand that DT is essentially characterized as the comprehensive and notable modifications that digital technologies can bring [11,23,24]. DT brings change in structure, culture, leadership, and skills [10,11]. However, a DT approach is seriously endangered by resistance to change, poor communication, and insufficient training and direction [4]. Therefore, organizations must create a digital strategy and fully engage employees with its implementation [17,25] which shows that organizations must involve their employees [3].

Consequently, it could be argued that in order for DT to be successful, it needs the active involvement of stakeholders, proactive leaders, and a distinct vision for the organization's future [21,26]. Indeed, one of the key areas for successful implementation of DT is strategic planning, in order to establish objectives, priorities, and roadmaps that are in line with corporate objectives [18]. This becomes even more important with the knowledge that, when it comes to DT projects, failure rates are significant [7,12]. In fact, according to Oludapo et al.[4], IS one of the reasons DT implementation fails. Within the field of IS, research on DT is still gaining attention [10,11,24]. Although the number of articles discussing various organizational and technological components of DT in IS has significantly increased, the corporate culture and work

environment have not received as much attention as they should [27]. This becomes crucial to avoid digital waste where there is a need to maximize the benefits and values that DT brings [28].

DT demands a significant cultural shift where employees in organizations need to be equipped with a flexible skill set and digital literacy [27]. The goal of changing organizational culture appears to be challenging to accomplish [29]. Organizations may encounter difficulties finding, keeping, and developing talent in the field of technology [18,30]. In fact, research reveals the possibility of a skills gap [16,27], and the risk of an employee divide that receives less attention in literature [27]. This becomes even more crucial in understanding that DT is a journey [16] that never ends [24]. In addition, such transformation initiatives impact multiple levels of an organization and involve a variety of stakeholders [10]. In the same vein, Adama and Okeke [18] suggest that involving various stakeholders in organizations, such as partners, customers, employees, and executives, is important in order to secure support, alignment, and buy-in for DT initiatives. It is, therefore, clear that DT is about people and technology [27].

In fact, Baygi et al., [31] stress the importance of having an actor-centric approach in this digitally fluid era. Although technology is important when it comes to digital transformation, it is people who will use the technology and shape such a transformation [32]. For DT to be successful, human centricity is essential, and we must comprehend how technology affects people's attitudes, behaviors, psychology, and work-related factors [33]. Thus, employees are the real enablers and important stakeholders in the success of DT and, therefore, they must have an active role [33]. The majority of IS research focusses on technology rather than users, but the user perspective is crucial [34]. In fact, research increasingly shows that employees' support is essential in order for DT initiatives to be effective [7,12,35,36].

That said, Ullrich et al.[29], identified considerably less research focused on employee attitude and behavioral change, such as enhancing transformation acceptability or establishing shared values and boosting employee engagement, or on "softer" aims, which are often desirable in change projects. Indeed, Groenewald et al. [21], point out that more research is necessary to fully understand some aspects of DT, and this includes employee engagement and organizational culture. In the same vein, Adama and Okeke [18] emphasize that in order to help practitioners, policymakers, and researchers navigate the complexities of digital disruption and fully realize the potential of DT, more research is required to understand the roles played by organizational culture, leadership, and employee behaviors in successful DT. Indeed, research on how digital transformation affects management and leadership behavior is actively being conducted and given high priority [27]. That said, it should be noted that enabling users' engagement has never been simple, and things become even more challenging when you take into consideration individual characteristics like age, skill level, and education [37]. This is particularly important in light of the high failure rate of IS-led initiatives in the past [37–40].

When it comes to culture, and understanding employees' behavior and involvement, it is crucial to draw on theory that may assist in understanding the phenomenon. This research draws on Structuration Theory (ST), which was advanced by Giddens [41]. IS researchers frequently employ different variations of ST to examine the creation, application, and utilization of information technology (IT) in businesses [42,43]. Indeed, the theory is used to comprehend the evolution of user interactions with IT, the organizational implications of these interactions, and the strategies for addressing both intended and unintentional outcomes [42,44–46]. ST offers an understanding of human work as social interaction within a culture, mediated by artefacts such as tools, language, rules and procedures, and open to change where it may provide a way to look at the role and influence of organizational culture in the development and implementation of information systems [41].

According to this theory, social structure is produced and reproduced by the actors as they carry out their actions [47]. In other words, agency and social structure are interdependent; one cannot exist without the

other and, therefore, social structures are a source of inspiration for human agents, and the acts of these agents both create and perpetuate social structures [42]. As a result, this research argues that what both organizations and employees do today will shape the new structure. Thus, if the practices that are followed by organizations do not contribute towards a positive perspective of employees, it may create a social structure that is negative towards DT. It is believed, therefore, involving employees in the process of DT may assist in overcoming its challenges and contribute to building a social structure that is positive and adaptive to DT.

Combining an insightful point of view, Innovation Diffusion Theory (IDT) has also been an important lens in understanding DT when it comes to employees. According to IDT, change is essentially about how products and behaviors evolve or are "reinvented" to fully suit the demands of both individuals and groups [48]. Therefore, organizations could collectively evolve and customize DT through employee involvement so that it can fulfil their needs. It might also help them to better accept change. According to this theory, there are adopter groups: innovators, early adopters, early majority, late majority, and laggards [49]. Early adopters typically use innovation even when there is a great deal of uncertainty about its possible use and when the advantages of the innovation are not yet generally realized [49]. Thus, this means there are groups that will immediately accept change, some that won't and others in between.

As a consequence, and combining the insights of ST and IDT, it can be argued that organizations need to have a positive social structure toward DT. This can be achieved by realizing that individuals are different, and their reaction toward DT is also different whether or not they adopt. A way of solving such an issue is by involving employees so that they better understand the development.

In summary, literature has shown that organizations seek DT due to the value it could bring in various ways through the use of technology. However, this is not possible without addressing challenges such as cybersecurity. Moreover, there might be resistance to change due to the impact that DT has on skills, knowledge, culture and leadership. An important aspect relating to such a challenge is the role of IS users' perspective in such studies. Employees could support such a transformation, and yet, there is less known when it comes to employees' engagement. It is not clear whether employees understand DT, and the values and challenges that it can bring. It is also not clear to what degree employees are involved and how they are involved. This is crucial in building a positive social structure in organizations and the success of DT. As this is an IS research, it aims to respond to the gaps highlighted in the discussion in order to advance knowledge.

3. Methodology

This study explores DT from the users' perspective where there is a need to understand their thoughts, emotions, and opinions. Research methods can be devised and justified by drawing on philosophy. Comprehending the philosophical foundations of a research study is crucial for elucidating its design [50]. Thus, this research argues that in order to understand a phenomenon, it will need to investigate human behavior in depth to study how this influences the outcome. In other words, people are likely to hold diverse ideas about DT. Therefore, this proves that the study is "interpretivist" in nature. According to interpretivist research, individuals are not like physical phenomena; people think differently depending on their culture and the environment in which they are doing the study, which might affect their depth of comprehension [51]. This justification, therefore, supports a qualitative approach. According to Peterson [52], qualitative researchers explore undiscovered ground, interpret participant language and behavior, draw conclusions from their data, compare their findings to existing literature, and offer new and innovative routes for their research. Thus, this research employed such an approach due to its exploratory nature. Qualitative research employs a

range of data collection techniques, such as observations, interviews with a single respondent or a group of respondents, and textual or visual analysis from books or movies, however, in-depth interview is one of the techniques most often employed [53]. Interviews work best when little is previously known about the topic under study or participants must provide in-depth information [54] where it might not be shown and disclosed just by responding to a series of questions in a questionnaire [53]. Consequently, in-depth interviews were utilized.

When it comes to the number of participants, Saunders et al. [55] suggested that there should be between 5 and 25 as a minimum. This research interviewed 20 participants using one-to-one, face-to-face in-depth interviews. The ethics committee at Taif University has approved the research which means the research followed ethical practices. All participants came from the public sector, regardless in what capacity, as the main goal is to understand the perspective of employees who work in Saudi Arabia's public sector, and access is gained through networking. It should also be noted that the participants are from different areas of the public sector. Although this might limit the generalizability of the study, which was chosen due to the government fund for Saudi Vision 2030 and clearly includes the development of technology. "We will also focus on innovation in advanced technologies and entrepreneurship" [56(p. p.36)]. "In technology, we will increase our investments in, and lead..." [56(p. 44)]. These are just two examples, among many others, that show the government's commitment and investment in technology. Thus, this motivated the researcher to explore the DT initiatives in the public sector with specific focus on employee involvement due to their importance as discussed above.

In respect of data analysis, numerous methodologies exist, including grounded theory analysis, discourse analysis, conversation analysis, narrative analysis, template analysis, and thematic analysis [57]. This research employed thematic analysis as, according to Clarke and Braun [58], this offers flexibility with respect to sample size, study goals, and available data gathering methods. Indeed, thematic analysis is a popular method because it is not limited to any one discipline or set of theoretical constructs [57]. According to Clarke and Braun [58(p. 297)], thematic analysis is 'a method for identifying, analyzing, and interpreting patterns of meaning (themes) within qualitative data'. The researcher followed six steps suggested by Braun and Clarke [59(p. 87)] which started by transcribing the data and continued until the findings, discussion and contribution of the research, as can be seen in **Figure 1**.

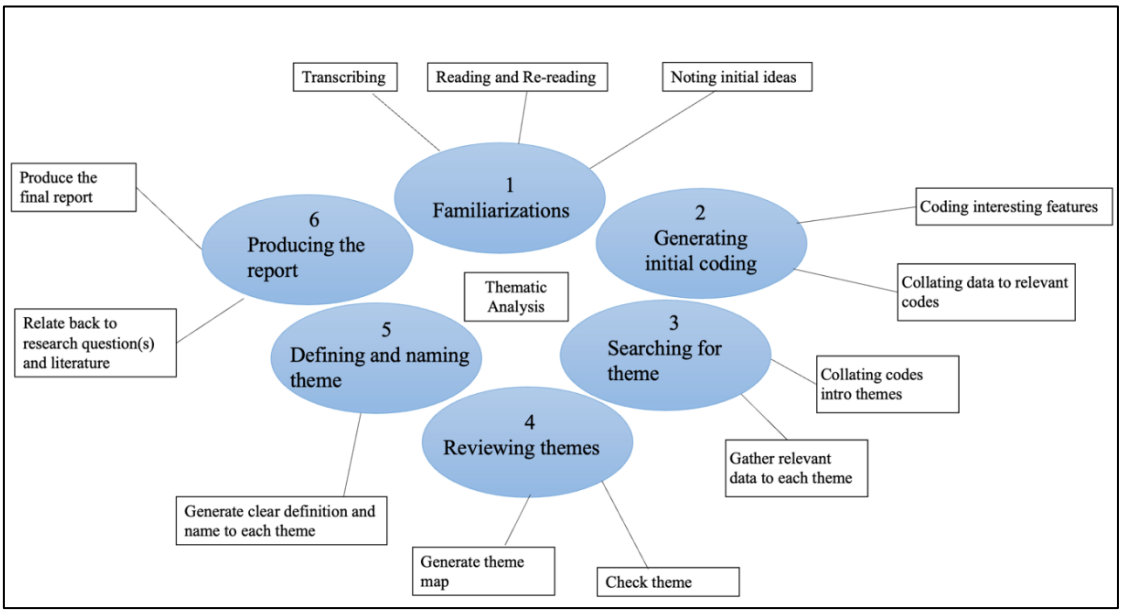

Figure 1. Data analysis steps as suggested by Braun and Clarke [59(p. 87)]: own figure.

Once each interview was conducted, it was immediately transcribed and read multiple times.

This allowed the researcher to become familiar with data where the initial ideas started to appear. For example, multiple participants showed that they were not involved because they are not managers, or their managers only were involved. This gave the researcher the initial idea that involvement might be limited to managers. As more interviews were transcribed and read, the researcher generated the initial codes, such as manager involvement, to represent multiple quotes that lead to the same phenomenon. With more data coming and being analyzed, the researcher started to believe that some codes can be part of a theme as they have same characteristics. For instance, managers' involvement and importance of involvement are both related to "involvement" and can be combined in one theme. Once all themes had been generated, the researcher checked that they were consistent and represented the codes. This allowed the researcher to map the themes and apply to discussions as represented in the next section.

4. Findings and discussion

Twenty-six pages of transcripts totaling around 6200 words comprise the data collected for this research. Prior to analysis, every interview was transcribed. Fifteen sub-themes and four themes were identified from the data (**Figure 2**).

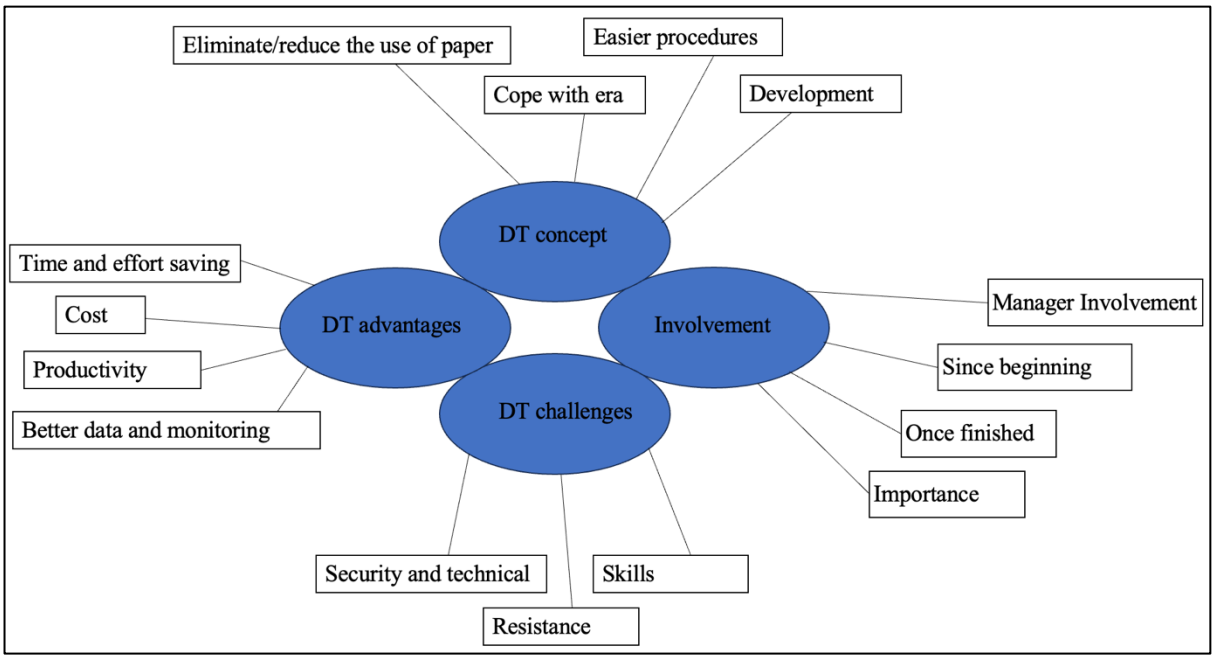

Figure 2. themes and sub-themes identified from the data: own figure.

The themes were extracted from interview data which was designed to go from broader to narrower insights. For example, participants were asked to explain their understanding of DT so that this could be evaluated by the researcher before proceeding to the main phenomena of the study which is employee involvement. Understanding what participants think is crucial as, for example, if the majority do not understand what DT is, then there are even more complex issues to be understood. Knowing the benefits and difficulties that participants perceive as a part of the DT journey was also crucial. A key reason being that if participants perceive more challenges and negative thoughts of DT, then it is more likely they will not be involved or will have negative input that might impact the development negatively. Finally, the involvement theme discusses explicitly what has been raised when it comes to employee involvement. Overall, although

these three themes might not seem connected to the phenomenon of the study, they provide direct and indirect insight to the research on participants' thoughts, and therefore to the fourth theme. Knowing what participants think helps the researcher to assess and understand how well-developed employees' thoughts are, and whether they just need to be involved. Each theme is covered in detail in this section along with its contribution to literature.

What is Digital Transformation?

This section explores DT concept theme which explains how DT is understood in the public sector in Saudi Arabia. Participants have shown that DT means the ability eliminate the need for paper, instead using technology so that organizations can introduce easier procedures, cope with the requirements of digital era and develop their structure and infrastructure. In fact, the variety of answers received has encouraged the researcher to contribute to literature with a definition of DT that is more exclusive and representative of DT.

First, participants highlighted the fact that, since their organizations have been transformed, they have not used paper. Participant HRM claims that means:

> "Automation, for example transferring from paper-based procedures to technology based."

This points to the importance of technology as a tool to transform procedures, so that they are technology based instead of paper based.

Second, participants have also shown that DT means easier and different procedures. For example, Participant HM1 suggests that DT is:

> "A service that used to be provided on paper, moving to become technology based with less process, not the same process."

Thus, this indicates that DT means changing the way procedures are carried out. In other words, it is not only about the use of technology, but how it can become clearer and easier for employees to complete the same procedures but with less steps.

This brings the discussion to the third point where the role of structure and infrastructure have been raised. Participants highlighted the importance of this era's requirements when it comes to technology such as AI, as suggested by Participant HM4:

> "The ability to cope with this era when we talk about AI and big data."

Or structure and infrastructure where there might be a need for change, as claimed by Participant YAS:

> "The digital transformation will highlight some of procedures and structure that you don't need, what traditionally took five steps to complete can be done in two digitally."

In fact, participants have also shown that DT can result in a change of job description, effectively requiring employees' duties, rights and responsibilities to be updated. For example, Participant SNS states:

> "DT brings changes, and it is important to update/change job descriptions, and also enable governance so that employees know their duties and rights."

Thus, this theme shows that DT is not only about changes in technology, it goes beyond that to include job description, rights and duties, structure and procedures. This is a very important aspect to both research and practice; there is a need to ensure employees and their job descriptions are updated to reflect what they

will be doing, not what they used to do. This aligns with the findings of Kutzner et al. [10] and Vial [11] in literature that DT brings changes to various elements of an organization, including the structure.

Therefore, based on the discussion of this theme, this research defines DT as the way that organizations use technology to change their procedures, structure and infrastructure to become clearer, easier and reflect this era's requirements. The discussion of this theme also shows that employees' thoughts in respect of DT are well-developed. In fact, the points raised, such as changing job descriptions, indicates that their thinking is advanced. This means employee involvement is a value added to the development of DT in their organizations and needs to be exploited. The next sub-section discusses the potential value DT could offer organizations.

Is there a value of DT?

This section discusses DT advantages which addresses what has been mentioned by participants in respect of the value DT could bring to organizations. Different elements were highlighted by participants such as increasing productivity, time and effort saving, better data and monitoring, and cost reduction.

When in it comes to financial considerations, Participant FBH showed that DT helps organizations to save on costs:

> "First of all, saving cost where possible so that the money can be used for other things…"

This participant suggests that DT allows organizations to automate different procedures in order to save on costs and the money can be invested in something else.

Additionally, it saves time and effort. For example, Participant MMS claimed that what used to take time, can now be completed more quickly:

> "I used to finish things in days, now I get it done in a few hours…"

This means that easier procedures lead to less time and effort. This also reflects the previous point where organizations reduce cost due to savings in effort and time. In fact, this is also aligned with literature. According to Joel et al. [16], digital technologies automate operations, cut expenses, and simplify processes. This illustrates and confirms the link between DT and procedures and cost.

Participant KFK also claimed that productivity is the greatest value that DT brings to organizations:

> "Productivity, this is the most."

In the same vein, Participant ME2 said that, besides productivity, DT enables Key Performance Indicators (KPIs):

> "First of all, having more control impacts procedures and productivity and the way we can measure things. It enables KPIs and allows decision makers to make decisions based on data."

Thus, both participants suggest that automation means the ability to have clearer and easier procedures whereby employees could produce more. Additionally, these procedures which are automated allow management to identify effective KPIs based on the data generated by the procedures. These can be used to monitor various aspects of an organization. Indeed, Tomat and Trkman [17] clearly state that using big data analysis enhances organizations' productivity and efficiency. In same vein, Atadoga, et al.[14], Odeyemi, et al[15] and Onesi-Ozigagun et al. [3] point out that through automation, process simplification, and data-driven decision-making, DT can result in notable increases in operational efficiency.

Therefore, this sub-section has shown that DT allows organizations to better use their resources where they can automate different procedures that reflect on cost, time, and effort. These advantages reflect what employees think, and how positive their attitude is towards DT. This means that employees understand that DT is valuable to them, and their involvement, alongside these thoughts, could positively enhance the development of DT. The next sub-section discusses the other side of DT, namely the challenges.

What challenges to DT do we expect?

This sub-section discusses what has been highlighted by participants and how this responds to literature when it comes to DT challenges. The previous sub-section has shown that DT brings value to organizations in various aspects. However, it is also known that DT brings with it many challenges. Participants identified challenges such as technical issues, cybersecurity, skills gap and resistance to change.

For instance, Participant ME3 claimed the concerns that DT brings relate to technical issues and the problems it can cause, such as data loss:

> "…technical issues, concerns about data loss because of internet disconnection or server issues."

In the same vein, KFK said:

> "Technical issues, if something happens, all work just shuts down."

This is supported by Participant HRM who argued that:

> "One of the key drawbacks is technical issues; cybersecurity."

Indeed, technical issues are a concern as they could result in the loss of data. This would have serious consequences for an organization as they almost all rely on data in all operations. Cybersecurity, as mentioned by Participant HRM, is also an issue. When asked what the biggest challenge would be when it comes to DT, Participant HM1 stated clearly:

> "Cybersecurity and hacking."

In fact, cybersecurity was highlighted in literature by Onesi-Ozigagun et al. [3] and Jejeniwa et al. [22] among data privacy and security concerns as identified by Joel et al. [16]. Thus, organizations must be prepared for such a challenge and follow best practice to ensure the safety of their organizations and their data.

Another challenge that emerges from the data is resistance to change. In fact, when Participant AST was asked about the biggest challenge, they stated clearly:

> "Resistance to change."

Similarly, HM4 supported such a challenge, and added loss of people and power.

> "…resistance to change, and mostly they are afraid they will lose people and power.'

This participant suggested that employees and employers both fear DT because they are afraid that they will lose their status and authority (power) or their staff will resist change. Literature shows that resistance to change is one of the biggest challenges organizations face when it comes to DT due to potential hesitation and fear of employees [18,20–22]. Therefore, it is crucial that organizations address such a challenge if they want to avoid failure.

Finally, participants highlighted the role of skills and the gap that might be created. For instance, Participant SNS raised the issue of skills gap:

> "I would say the gap between the employees' skills and the transformation."

Participant YAS added the issue of knowledge transfer:

> "The issue that affects me the most is knowledge transfer.'

This participant pointed out that when organizations are digitally transformed, there is a need to transfer knowledge to fill the gap, especially those who have the 'know-how'. Literature showed it is challenging for organizations to ensure the skills of their employees using technology [18,30] which suggests the possibility of a skills gap [16,27], and the risk of an employee divide [27]. As highlighted in the literature review, DT is a journey [16] that never ends [24]. Consequently, organizations need to raise the awareness of their employees and recognize the importance of a collaborative approach. Additionally, there is a need for organizations to know the skills of their employees, asses the gap and work out how it can be filled. Otherwise, there is a high risk of digital waste where the value of DT is not achieved [28].

Overall, the points raised in this sub-section suggest the importance for organizations to establish a relationship and good communication with their employees so they have their full support and understanding that DT is a journey. Additionally, the challenges raised here can be seen from two points of view. First, that employees are worried about their organizations, with concerns such as cybersecurity and technical issues. This is a positive insight to the research as it shows that their way of thinking supports their organization. Second, their concerns about loss of power or lack of skills indicates that some participants need to be educated. This is a very important aspect towards their understanding that DT is a tool to help and protect them instead of replacing them or taking away some of their authority. The discussion of this theme clearly indicates the importance of establishing a relationship with employees that allows organizations to understand the challenges and concerns, and therefore overcome such challenges. A key part of this relationship is the employee involvement which will be discussed in the next sub-section.

Were employees involved?

This section addresses the involvement theme and what has been discovered about the involvement of employees during organizations' DT. Overall, participants have stated that the involvement of employees was very limited. For example, some participants received an invitation to participate in surveys or workshops, but only at certain stages. Participant MMS showed that their participation was through surveys:

> "We get messages through email or SMS where they send us links to share our opinions."

This was supported by Participant ME2, who stated:

> "At the beginning it was one strategic level but later on we were involved through surveys."

Thus, this shows that their involvement was limited to certain methods (e.g. surveys) and certain stages (e.g. once the decision is made) which means they are not fully involved but they might be asked for their opinion at some point via a survey. This should not be the case when it is known that DT demands a significant cultural shift [27] which is challenging to accomplish [29]. Literature shows that employees are the real enablers, and they need to have an active role [33]. This is alongside the challenges that were mentioned

earlier, such as resistance to change, where employee involvement is needed in order to gain their support. Therefore, it could be argued that employee involvement is not to the level it should be.

What is surprising is the involvement of managers in this process. Some participants have shown that they were involved because they are managers, and others have said that only their managers were involved.

Participant HRM stated:

> "…I was involved later, not since the start, as I was not in a leading position. However, staff can report to their heads if the system has an issue but any decision has to be taken by the manager."

In the same vein, Participant YAS said:

> "They have only asked managers and, unfortunately, some managers don't give their staff a voice. They give their opinion only as a manager and not as collective opinion with staff."

This gives a clear indication that full involvement is only for managers which raises the question of why involvement has become exclusive to a certain group of employees, with some being excluded, when both groups will be impacted by the transformation. In fact, participants have shown the importance of employees being involved from the beginning. They are the fundamental group who will be affected by these changes as well as their input being required to avoid resistance and mistakes that might emerge due to employees not being involved.

Participant SNS claimed:

> "Any transformation always has resistance to change and one of the key reasons in avoiding such resistance is participation."

An interesting point raised by Participant FAT is the role of users in helping technicians.

> "Technicians talk in coding language so if they don't collaborate with users this is an issue, they need to complement each other."

Thus, participants, who are all employees in the public sector, have an awareness of their role and the value that they have. Consequently, the data shows that participants ease the process for technicians as they have a better understanding of requirements.

In response to Groenewald et al. [21] and Adama and Okeke [18] who indicate the need for more research to better understand the role of employees and leaders, this section has shown that the employees' role was limited and replaced by that of managers. This shows a shift in their role, which is crucial for successful DT. This pattern of managers involvement shows that involvement is exclusive to managers and those in a strategic position. However, it is very important that all groups are involved to reduce resistance, better understand staff and avoid DT failure.

Overall, this theme shows that employee involvement is not as it should be. Considering discussion of the three themes above, employees have good insights to share when it comes to the concept and advantages of DT. Employees have shown that they support the development of DT although some have concerns in regard to some aspects such as cybersecurity. However, as this theme has shown substandard practice of employee involvement, it could negatively impact the way employees think. This might create a negative insight where employees feel undervalued. The next section discusses how these themes contribute to literature and practice.

Contribution

The discussion above has shown that DT relies on technology. However, organizations should not focus solely on technology.

Theme *DT concept* has shown that DT brings changes to structures, and it is necessary for organizations to reflect on their structure and responsibilities as part of the solutions to overcome DT challenges. In other words, the necessity to see if they need new departments or to eliminate others. This also includes the procedures that employees follow which, as an example, might go through two steps instead of five. This implies that employees are then more likely to have easier procedures and save time and effort. Therefore, organizations could make better use of their resources as a result of digitization and this is also reflected in costs, as discussed in theme *DT advantages*.

On the other hand, theme *DT challenges* addressed the issue that organizations need to be aware of possible cybersecurity challenges as well as any technical issues that might lead to a loss of data.

Resistance to change was another challenge identified where employees, or even employers, might resist any change that might happen as well as the potential loss of power or staff due to the use of technology. The other challenge raised was the issue of a skills gap. Organizations need to know the skill set of their employees, how these match the DT and in what ways they need to fill any gaps and enable knowledge transfer among their employees. A key solution, as discussed earlier, is employee involvement so they are enabled, can share their thoughts and, therefore, add value (e.g., updating job descriptions), or flag up potential issues to the organization (e.g., lack of skills). Either way, this allows organizations to become proactive as well as gaining employees' trust. The last theme, *involvement,* shows that employee involvement was very limited, and their input replaced by that of managers. In fact, the discussion above showed that some managers did not even meet with their employees regarding DT, instead, they only raised their own thoughts as managers. This shows a shift where, instead of managers involving employees and raising their concerns, they provide their own opinions only. This goes against the principles of IS and could lead to DT failure due to employees' resistance and the skills gap that were discussed earlier.

In answering the research question, employees show that they have well-developed opinions in respect of DT and are also aware of the advantages. They also have crucial insights about the challenges, and feel it is important to address such insights through their involvement. However, this study argues that current practices of employee involvement are not sufficient and need to be changed and enhanced so that employees are enabled. If the current practice is continuous, it is more likely that employees will shape a new social structure that perceives DT as a negative change, according to ST. In fact, from the discussion on themes, it is clear that these challenges mostly relate to employees, including resistance to change, skills gap, knowledge transfer and so on. This partly means organizations do recognize or distinguish between different groups of adopters when they need to work on these groups and their needs so that they can increase the percentage of early adopters [49]. In fact, this emphasizes that employees had already started to have negative feelings towards DT during their interaction with various technology applications and roles as part of the transformation. This interaction will impact the new organizational culture as highlighted by Indeje and Zheng [41]. The discussion of the involvement theme has also proven that these challenges are related to the substandard practices that are implemented when it comes to employee involvement. Omar et al. [47] point out that social structure is produced and reproduced by the actors as they carry out their actions. In this case, this means the new organizational culture rejects the transformation and this could impact the outcome of the project negatively. In fact, even if employees do not mean to impact the project negatively, the theory is clear that the outcome might be intended and unintended [42, 44–46]. A possible explanation is that organizations do not

understand the fact that change is essentially about how products and behaviors evolve where it suits the demands of both individuals and groups [48].

As a consequence, and in combining the insights of ST and IDT, it can be argued that organizations need to have a positive social structure toward DT. This can be achieved by understanding that individuals are different, and their reaction toward DT is also different whether or not they adopt. A way of solving such an issue is by involving employees so that they better understand the development as well as organizations being able to understand individuals' needs.

Besides the knowledge contribution highlighted during the discussion of themes earlier, this research suggests a framework inspired by ST and IDT that advances research and practice in DT especially when it comes to IS. The discussion earlier shows various challenges that might emerge as part of technology (e.g., cybersecurity) or as part of the substandard practice of employee involvement (e.g., resistance to change). This is mainly because the development is not actor-centric and does not take into account that there are different groups of adopters and their needs. Both data and literature showed that DT should be actor-centric and, therefore, it is not about technology. It is crucial to build a positive social culture to ensure the success of the transformation. Data also shows substandard practices from management leading DT initiatives. Thus, this research suggests a framework that is believed to improve the current practice of DT especially when it comes to employee involvement (**Figure 3**).

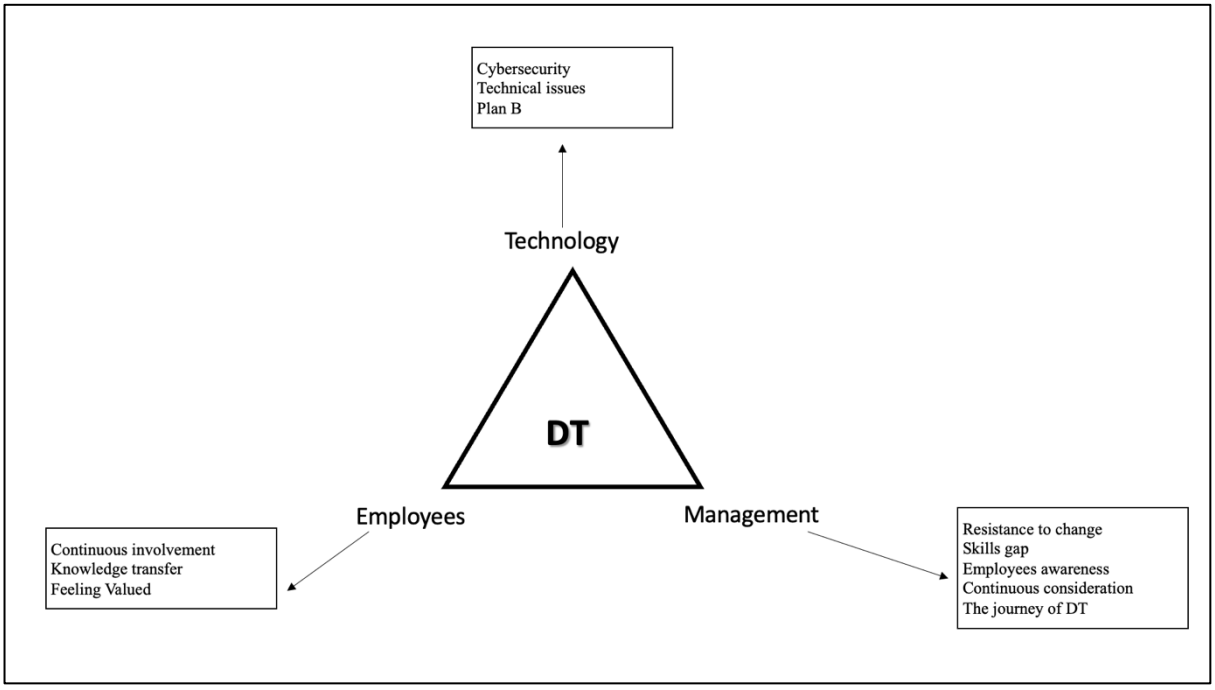

Figure 3. A suggested framework for DT best practice: own figure.

This framework visualizes DT in three main pillars: management, employees, and technology. Although the pillars might seem broad, it is believed that each pillar is significant to improve the practices that are followed and, therefore, enhancing employees' involvement. The management pillar should reflect ways management can ensure the best practice of DT with emphasis on creating a positive experience for employees that will impact their perspective. This includes how to increase the awareness of employees and employers and address any skills gaps, for all groups of adopters, that might emerge to avoid resistance to change. Moreover, management is important to understand that DT is a journey. Thus, they need to ensure continuous consideration for all pillars. It is believed that such a practice means employees better understand

the transformation and, therefore, they produce a new positive social structure within the organization. In the employees' pillar, organizations must have a strategy to ensure employee involvement, how they are enabled, encouraged to transfer their knowledge and, more importantly, that they feel valued and can, therefore, support the transformation further.

This should also include the different groups of adopters and their needs. Organizations must ensure in their strategy that this should not be a one-time involvement; it should be continuous and at all stages due to the nature of DT projects. Finally, in the technology pillar, organizations should ensure best practices are implemented to cope with this era and maximize the use of technology to have easier procedures, increase productivity and save time and effort. It should also consider challenges such as cybersecurity and technical issues and the procedures that should be put in place if something happens.

Overall, this framework is an eco-system where all elements impact each other to achieve better results. Although this framework does not give in-depth details about strategies, it provides an overview of what each element should ensure and cover to develop a best practice. The core of this framework is to enable employee involvement through different pillars so that their insights are reflected on the development of DT which impact the intended and unintended outcome. This is inspired by ST and IDT where there is a need to establish a positive social change instead of negative change by applying practices that consider all groups and their needs. It is believed that such a framework moves the discussion and practice towards a focus on developing strategies that result in a positive perception of DT.

5. Conclusion

This research responded to a literature gap and an important phenomenon in IS research. DT literature shows that less attention has been given to culture, work environment, skills gap, employee divide, employee engagement, and leadership and employee behaviors. Thus, this research investigated the role of employees in the public sector to explore the practice that is followed. Data showed that practices were substandard and do not reflect best practice. This work contributes to existing knowledge by providing patterns that should gain more focus. These include employees' resistance to change, knowledge transfer, skills gap, loss of power, and managers' involvement. These patterns indicate a serious threat to DT. Thus, this research strengthens the importance of further research to be conducted in such areas with more solutions to be suggested. The findings of this study have implications for future practice, in particular, DT needs to pay more attention to previous patterns where a clearer policy is needed. The empirical findings in this study provide a new suggested framework. It shows three pillars of DT where each pillar has its importance towards the success of DT which contribute for both knowledge and practice. That said, the question raised by this study is how these patterns affect the success or/and the failure of DT. This would require a case study of an organization that has been on the journey of DT for a while, in order that it can be assessed. In addition, it is believed that larger samples could enhance the findings and suggested framework. Finally, this research is limited to the public sector of Saudi Arabia and, therefore, further studies might benefit from comparison to private sectors or/and other countries' public sectors.

Conflict of interests

The author declares no conflict of interest.

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