**Advances in Social Sciences Research Journal – Vol. 11, No. 11**
**Publication Date:** November 25, 2024
**DOI**:10.14738/assrj.1111.17847.
AL-Ghaili, M., Mahomed, A. S. B., & Yusof, R. N. R. (2024). Driving Digital Transformation: The Impact of SME Digitalization on Technology Acceptance and Usage in Small and Medium Enterprises of Yemen. Advances in Social Sciences Research Journal, 11(11). 89-105.

# Driving Digital Transformation: The Impact of SME Digitalization on Technology Acceptance and Usage in Small and Medium Enterprises of Yemen

**Mohammed AL-Ghaili**
School of Business and Economics, UPM, Malaysia

**Anuar Shah Bali Mahomed**
School of Business and Economics, UPM, Malaysia

**Raja Nerina Raja Yusof**
School of Business and Economics, UPM, Malaysia

## ABSTRACT

**This research investigates the relationships between digitalization, perceived usefulness, attitudes toward using technology, and actual system use of technologies within the context of small and medium-sized enterprises (SMEs) in Yemen. Using a two-step structural equation modelling approach, the research investigates both direct and mediating effects. Data were gathered from 392 SMEs in Yemen by employing a survey research design. The measurement model was estimated to evaluate the constructs' accuracy, while the structural model was analyzed to investigate the proposed relationships. Findings reveal that SME digitalization significantly enhances perceived usefulness, which positively influences users' attitudes toward technology adoption and subsequently drives actual system use. Specifically, the analysis shows that improvements in digitalization practices lead to heightened perceptions of usefulness and favorable attitudes, ultimately resulting in increased actual system use. Moreover, the results indicate that perceived usefulness and attitudes serve as significant mediators between digitalization and system use. This research contributes to understanding how enhancing perceived usefulness and fostering positive attitudes can facilitate technology adoption in SMEs, providing important implications for practitioners, policymakers, and researchers focused on digital transformation. Overall, the findings emphasize the importance of strategic digitalization efforts to improve operational efficiency and promote successful technology acceptance in small and medium enterprises.**

**Keywords:** Technology Acceptance Model, SME Digitalization, Perceived Usefulness, Attitude Toward Using, Actual System Use.

## INTRODUCTION

In the ever-evolving digital landscape, the successful integration of technology has become a crucial factor for the growth and sustainability of Small and Medium Enterprises (SMEs). The influence of SME digitalization on the attitude toward using and actual system use of technology remains a crucial topic of research, especially in the context of developing countries like Yemen. SMEs play a crucial role in the economic development of Yemen, contributing to employment

generation and economic growth. However, SMEs in Yemen have lagged in adopting digital technologies compared to their larger counterparts [1, 2]. The digital transformation of SMEs in Yemen faces several challenges, including a lack of capital, shortage of skilled staff, and limited technological resources [3, 4]. Mainly, the ongoing development of the digital economy has caused SMEs in Yemen to face significant dilemmas in digital transformation across three dimensions: technology, organization, and environment [5, 6]. SMEs in Yemen often lack the digital transformation awareness due to their limited knowledge reserves and management capacity, leading to a digital divide between large enterprises and SMEs in the country.

However, SMEs play a crucial role in Yemen's economy, significantly contributing to employment, income generation, and overall economic stability. Recent reports indicate that SMEs represent approximately 99.6% of all businesses in Yemen, underscoring their dominance in the economic landscape [7-9]. This substantial presence translates into qualitative impacts, such as job creation and poverty alleviation, which are vital in a country facing numerous socio-economic challenges [10, 11]. The importance of SMEs in Yemen extends beyond their sheer numbers. They are pivotal in fostering economic growth and development. For instance, SMEs have been identified as key drivers of innovation and strategic performance within the manufacturing sector, which is essential for enhancing competitiveness in the global market [12-14]. Economic contribution is critical, especially in a context where larger enterprises may not be as prevalent or effective in addressing local market needs.

Moreover, SMEs are instrumental in promoting sustainable development in Yemen. They contribute to various dimensions of sustainability, including economic, social, and environmental aspects [8]. The empirical study conducted by Ghaleb and Ekrem [15] highlights the role of SMEs in enhancing sustainable development indicators, which is crucial for the long-term viability of the Yemeni economy. Additionally, the integration of innovative practices within SMEs can lead to improved operational efficiencies and better market responsiveness, further solidifying their role in economic resilience [9, 12].

Despite their importance, SMEs in Yemen face numerous challenges, including limited access to financing, inadequate infrastructure, and a lack of skilled labor [16]. The role of microfinance institutions has been highlighted as a potential solution to these barriers, providing essential business development services that can enhance the operational capabilities of SMEs [17, 18]. Furthermore, the digitalization of SMEs is seen as a pathway to overcoming some of these challenges, enabling businesses to reach broader markets and improve their service delivery [16, 19].

SMEs in Yemen also face significant challenges in adopting technologies, which significantly hampers their growth and competitiveness. These challenges can be broadly categorized into financial constraints, infrastructural deficiencies, lack of skilled personnel, and socio-cultural barriers. One of the most pressing issues is the lack of financial resources [4-6]. Many SMEs in Yemen struggle to secure adequate funding for technology adoption due to limited access to credit and high-interest rates [18]. This financial barrier is compounded by the overall economic instability in the country, which discourages investment in new technologies. As noted by Hussein Alghushami, Zakaria [20], the scarcity of financial resources is a critical impediment to the adoption of cloud computing and other modern technologies in various

sectors, including SMEs. Furthermore, the high costs associated with acquiring and implementing new technologies can deter SMEs from pursuing digital transformation [21, 22].

In addition to financial constraints, the technological infrastructure in Yemen is often inadequate. Many SMEs operate in environments where internet connectivity is unreliable, and access to necessary technological tools is limited [6, 16]. This lack of infrastructure not only hinders the adoption of e-business solutions but also affects the overall efficiency and productivity of these enterprises. The study by Saleh and Manjunath [1] highlights that the technological landscape in Yemen is still developing, which poses significant challenges for SMEs aiming to integrate advanced technologies into their operations. Another significant barrier is the shortage of skilled labor. Many SMEs lack employees who are trained in modern technologies, which creates a gap in the knowledge required for effective technology adoption [3-6, 16]. The absence of qualified personnel to implement and maintain new systems can lead to resistance among SME owners and managers, who may feel overwhelmed by the complexities of new technologies [20, 21, 23]. This situation is exacerbated by the general educational deficiencies in the country, which limit the availability of a skilled workforce capable of driving technological innovation within SMEs [18, 24].

Socio-cultural factors also play a critical role in the challenges faced by SMEs in Yemen. There is often a lack of awareness regarding the benefits of technology adoption, which can lead to resistance to change among business owners [16]. Additionally, cultural attitudes towards technology and innovation may hinder the willingness of SMEs to invest in new systems, as traditional practices are often deeply ingrained in the business culture [20]. The fear of unemployment resulting from automation and technological advancements further complicates the situation, as employees may resist changes that threaten their job security [21, 25].

The literature on the impact of digitalization on SMEs in Yemen reveals a significant gap regarding how digitalization influences attitudes toward technology use and actual system usage. While there is a growing body of research on digital transformation and its benefits for SMEs globally, specific studies focusing on the Yemeni context remain scarce. Digital transformation is recognized as a critical factor for enhancing the performance of SMEs, with various studies indicating that the adoption of digital technologies positively impacts operational efficiency and competitive advantage [26-28]. However, the relationship between digitalization and user attitudes, particularly in the context of Yemeni SMEs, has not been thoroughly explored. For instance, while Teng, Wu [29] emphasize the foundational role of digital technologies in the transformation process, they do not specifically address how these technologies affect user perceptions and attitudes within specific cultural and economic contexts like Yemen.

Moreover, the Technology Acceptance Model (TAM) has been widely used to understand technology adoption, highlighting the importance of perceived usefulness and perceived ease of use as critical determinants of user acceptance [30, 31]. However, studies that explicitly apply this model to Yemeni SMEs and investigate how digitalization influences these perceptions are limited. For example, while literature also discusses the performance outcomes of digitalization in SMEs, it lacks a focus on the mediating role of perceived usefulness and ease of use in shaping attitudes toward technology adoption [26, 32]. Additionally, the challenges


**URL:** http://dx.doi.org/10.14738/assrj.1111.17847

faced by SMEs in adopting digital technologies, such as financial constraints and infrastructural deficiencies, are well-documented [1, 33]. However, the specific impact of these challenges on perceived usefulness and ease of use, and consequently on attitudes toward technology, has not been adequately addressed in the literature. This gap is critical, as understanding these relationships could provide insights into how to better support Yemeni SMEs in their digital transformation journeys.

Furthermore, while some studies have explored the external factors influencing technology adoption, such as competitive pressure and market dynamics, the internal factors related to user attitudes and perceptions remain under-researched [34]. This is particularly relevant in the Yemeni context, where socio-cultural factors may significantly influence attitudes toward technology use. In general, the existing literature highlights the significant impact of perceived usefulness and ease of use on the adoption and utilization of technology within SMEs. However, the specific mechanisms by which digitalization influences these perceptions and subsequent technology usage are not well understood, particularly in the Yemeni context [35]. The existing literature indicates a clear gap in understanding how digitalization impacts attitudes toward using technology and actual system use among Yemeni SMEs, particularly through the mediating roles of perceived usefulness and ease of use. Future research should aim to fill this gap by exploring these relationships in depth, considering the unique socio-economic and cultural context of Yemen.

Hence, this research aims to investigate the influence of SME digitalization on attitude toward using and actual system use of technology, with a specific focus on the mediating roles of perceived usefulness and ease of use. The study builds on the Technology Acceptance Model as the theoretical framework, which has been successfully tested in the Yemeni context [36]. Survey-based research is employed within SMEs in Yemen, exploring the relationships between digitalization, perceived usefulness, perceived ease of use, attitude toward using, and actual system use. The findings of this study contribute to the existing body of knowledge by providing empirical evidence on the intricacies of the digitalization-technology adoption process in Yemeni SMEs.

The remaining sections of research are arranged as follows: The theoretical framework and development of the hypotheses are presented in Section Two. The methodology of the study is presented in detail in Section Three, and the data analysis and findings are covered in Section Four. A discussion and the research's conclusion are given in the final sections.

## THEORETICAL BACKGROUND

This study examines how digitalization affects Yemeni entrepreneurs' attitudes toward using technology and their actual system usage, focusing on the mediation effects of perceived usefulness. The research is framed using the Technology Acceptance Model (TAM), which offers a solid base for understanding how technology is adopted and integrated within SMEs. Originally developed by Davis, Bagozzi [37], TAM has been widely used in many studies to explore how users adopt new technologies. It is rooted in the Theory of Reasoned Action (TRA) Ajzen [38] and the Theory of Planned Behavior (TPB) [39]. TAM highlights perception of usefulness as a key factor that determine user intentions and behavior toward technology adoption [37]. Perceived Usefulness refers to how much a person believes that using a particular technology will improve their performance [37]. According to TAM, perceived

usefulness directly influences users' intention to adopt technology [35]. This connection suggests that when people find technology easy to use, they are more likely to see its benefits, which increases the chances of adoption [40].

The main components of TAM include Perceived Ease of Use, Perceived Usefulness, Attitude Toward Use, Behavioral Intention to Use, and Actual System Use [41]. External factors, such as personal characteristics, organizational settings, and environmental influences, can also impact these perceptions, making TAM a flexible model that fits many different situations [42]. Research has often shown that perceived usefulness has a bigger impact on user behavior than ease of use, with usefulness being the strongest indicator of technology acceptance [43, 44]. Furthermore, users' views on how effortless technology is and how much it boosts their performance greatly shape their attitude and willingness to adopt it [45]. This study uses TAM to evaluate Yemeni entrepreneurs' attitudes toward technology adoption, by incorporating SME digitalization as organizational setting factor along with TAM variables, such as perceived usefulness, attitude toward using, and actual system use to understand technology adoption. By using this integrated model, the study explores how individuals' perceptions of the usefulness of technology-shaped by their organizational context-drive digitalization in Yemeni SMEs. This theoretical approach aims to offer practical insights on how to overcome obstacles to digital entrepreneurship in developing economies.

## LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### SME Digitalization and Perceived Usefulness

In the context of Yemeni SMEs, SME Digitalization and Management factors, specifically the opportunities to exploit the market and the integration of technology and innovation, play a crucial role in forming the perceived usefulness of technology among Yemeni entrepreneurs [46, 47]. This perception is the key component of the technology acceptance model, influencing Yemeni entrepreneurs' attitudes toward technology and its actual system use [48]. Moreover, exploiting market opportunities through digital means is seen as a significant advantage of digitalization, enhancing these technologies' perceived usefulness [49]. Besides, when Yemeni entrepreneurs recognize that digital tools can open new market paths for SMEs, improve customer reach, and provide competitive visions, their inclination to adopt SME digitalization will be increased [50].

Similarly, combining technology and innovation within SME operations is perceived as a compound for business growth and efficiency, further supporting the perceived usefulness of digital tools [51]. Due to that, perceived usefulness positively impacts the attitude of Yemeni entrepreneurs toward technology adoption, leading to a greater possibility of its actual usage [52, 53]. Additionally, the actual application of these technologies is effective in realizing the benefits of SME digitalization and management factors, thereby facilitating digital transformation in Yemen [54]. Therefore, this relationship emphasizes the importance of aligning digitalization strategies with market exploitation opportunities and innovative practices to enhance the perceived value and actual utilization of technology in Yemeni SMEs [46, 47, 55]. Therefore, this study posits the following hypothesis:

- H1. SME Digitalization and Management has a positive influence on the perceived usefulness of technology.


**URL:** http://dx.doi.org/10.14738/assrj.1111.17847

### Perceived Usefulness and Attitude Toward Using

Perceived usefulness is the degree to which an individual believes technology will enhance a Yemeni entrepreneur's performance by driving digital entrepreneurship and digitalization management among Yemeni SMEs [20, 46, 48] Moreover, research suggests that when entrepreneurs perceive technology as valuable and relevant to their business goals, it becomes good support with a positive attitude toward using technology and leads to actual system use among Yemeni entrepreneurs [37, 47]. Also, this increase in system use directly impacts digitalization management by enabling efficient operations with improved decision-making of SMEs and enhanced business operations in Yemen [56]. Therefore, addressing these challenges through targeted involvement and a capacity-building strategy program is central to unlocking the full potential of digital entrepreneurship and empowering Yemeni SMEs in the globalized economy [47, 50, 56]. Therefore, this study posits the following hypothesis:

- H2: Perceived usefulness of technology acceptance has a positive influence on attitude towards using.

### Attitude Towards Using and Actual System Use

The relationship between the attitude towards using technology and actual system use plays a central role in the use of SME digitalization management among Yemeni entrepreneurs [16, 37, 56]. Moreover, this relationship is supported by the technology acceptance model that assumes a good attitude toward technology significantly drives the actual deployment of SME digitalization among Yemeni businesses [16, 52]. Due to that, when Yemeni entrepreneurs translate this vision into reality, the result will be positive perceptions, and the attitudes towards digital tools will directly influence their practical adoption of digitalization in business operations [53].

Additionally, this attitude is formed by TAM factors such as perceived benefits, ease of use, and the compatibility of technology with business strategy in Yemeni SMEs [51]. Moreover, the actual use of technology is a central step in the digitalization of Yemeni SME management. It illustrates Yemeni entrepreneurs' development from theoretical acceptance to practical implementation [1]. This development is significant for Yemeni SMEs as it enables them to influence digital technologies to develop the operational efficiency of digitalization management [52]. Accordingly, this approach is essential for the development of the Yemeni digital economy, where technology is not only available but also actively used for SME business growth and development [50, 51]. Hence, this study posits the following hypothesis:

- H3: The attitude toward using technology has a positive influence on the actual system use.

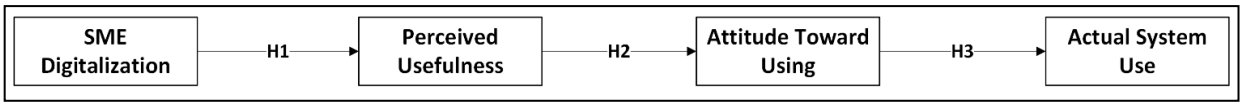


**Figure 1. Conceptual Framework**

## RESEARCH METHODOLOGY

This study explored the relationship between SME Digitalization and the Technology Acceptance Model (TAM) [37, 46]. It followed a quantitative approach and employed a survey method, distributing a questionnaire to gather information on factors influencing actual system use of technologies among Yemeni entrepreneurs. The questionnaire used a five-point Likert

scale, representing '1' as 'Strongly Disagree' to '5' as 'Strongly Agree' to collect data on Yemeni entrepreneurs' perceptions. Constructs such as SME Digitalization (SD) are based on Franco, Godinho [46], while perceived usefulness (PU), attitude toward use (AT), and actual system use (AS) each employ five-item scales adapted from studies like Davis, Bagozzi [37], Kitsios, Giatsidis [57].

A random sampling technique within the probability method was implemented to draw a sample for data collection. Given that the target population is Arabic speaking, the researcher initially developed the questionnaire in English and then translated it into Arabic. Two bilingual specialists in digital entrepreneurship and SME digitalization reviewed both versions to ensure clarity, relevance, and accurate back-translation. This approach, which validated that both language versions conveyed consistent meaning and measured the intended constructs, has been commonly utilized in other studies [3, 58-61].

To assess the constructs' validity and reliability, a pilot study was carried out with a sample of 50 Yemeni entrepreneurs, representing the target population. Cronbach's alpha values for all variables were above 0.70, confirming reliability. Specifically, Cronbach's alpha ranged from 0.922 (for Perceived Usefulness) to 0.762 (for Opportunities to exploit the market), both exceeding the suggested minimum of 0.70 [62-64]. Hence, the variables showed strong internal consistency, with all items retained.

During the final data collection, 380 responses were collected, surpassing the sample size requirement and enabling robust Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis. This research employed PLS-SEM method for data analysis due to its effectiveness with complex, exploratory models and its suitability for small to medium samples [4, 13, 14, 62, 65-67]. This method is especially useful for models with mediating effects, where PU and AU serve as serial mediators. The PLS-SEM process involved a two-step analysis: measurement model evaluation for reliability and validity, followed by structural model assessment to test the hypotheses.

## RESULTS

### Common Method Variance

First, in accordance with Kock [68] recommendations, a full-collinearity test was performed to determine the issue of common method variance in the data. Common method bias in the SEM can occur as a result of the measurement technique, which may affect the indicators' shared variance and responses. All of the study's latent variables were utilised as predictors in the regression analysis, and a random variable was created in SPSS to serve as the dependent variable in order to get the full collinearity coefficients.

As suggested by Kock [68], Al-Refaei, Abdulsamad [69], all variance inflation factors (VIFs) were below the threshold value of 5. This is shown in Table 1. This implies that common method variance has no effect on the model.

**Table 1: Full Collinearity Testing.**

| | SD | PU | ATU | ASU |
|---|---|---|---|---|
| VIF | 1.221 | 1.905 | 1.772 | 1.940 |


**URL:** http://dx.doi.org/10.14738/assrj.1111.17847

## Measurement Model

The two-step procedure was employed in this study to evaluate the model [65, 66, 70]. In the first stage, the measurement model was assessed using Hair and Alamer [62] criteria to assess validity and reliability of the constructs. Factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR) were among the important metrics computed. These measures had the following thresholds: AVE had to be greater than 0.5, CR had to be greater than 0.7, and loadings had to be at least 0.5. The majority of the loadings, as shown in Table 2, were adequate, with all CR values over 0.7 and all AVE values above the 0.5 threshold. The validity and reliability test results for the constructs are also included in Table 2, demonstrating their robustness.

Henseler, Ringle [71] recommended adopting the Heterotrait-Monotrait Ratio of Correlations (HTMT) technique to verify discriminant validity. Table 3 shows that all HTMT values were less than 0.85, which suggests that respondents were able to discriminate between the constructs under study. Hence, the findings validate the constructs' validity and reliability of the measurements.

**Table 2: Measurement Model.**

| Constructs | Items | Indicator Reliability | Internal Consistency | | Convergent Validity |
|---|---|---|---|---|---|
| | | Outer Loadings>0.5 | Cronbach Alpha > 0.7 | Composite Reliability >0.6 | AVE > 0.5 |
| SD | 1 | 0.850 | 0.928 | 0.939 | 0.609 |
| | 2 | 0.794 | | | |
| | 3 | 0.634 | | | |
| | 4 | 0.705 | | | |
| | 5 | 0.730 | | | |
| | 6 | 0.850 | | | |
| | 7 | 0.815 | | | |
| | 8 | 0.804 | | | |
| | 9 | 0.821 | | | |
| | 10 | 0.773 | | | |
| PU | 1 | 0.871 | 0.924 | 0.943 | 0.768 |
| | 2 | 0.868 | | | |
| | 3 | 0.859 | | | |
| | 4 | 0.906 | | | |
| | 5 | 0.876 | | | |
| AT | 1 | 0.925 | 0.931 | 0.948 | 0.787 |
| | 2 | 0.895 | | | |
| | 3 | 0.789 | | | |
| | 4 | 0.896 | | | |
| | 5 | 0.923 | | | |
| AS | 1 | 0.871 | 0.904 | 0.929 | 0.724 |
| | 2 | 0.890 | | | |
| | 3 | 0.810 | | | |
| | 4 | 0.874 | | | |
| | 5 | 0.807 | | | |

**Table 3: HTMT Results.**

| | AS | AT | PU | SD |
|---|---|---|---|---|
| AS | | | | |
| AT | 0.703 | | | |
| PU | 0.634 | 0.506 | | |
| SD | 0.170 | 0.116 | 0.351 | |

## Structural Model

The output of the structural model is presented in Figure 2 below. Table 4 summarizes the main results of hypothesis testing for the direct effects, shedding light on the relationships between the various constructs and their significance levels. The findings indicate significant relationships that help to clarify the overall model's dynamics. For instance, the effect of SME digitalization (SD) on perceived usefulness (PU) shows a positive and significant impact ($\beta = 0.330$, $p < 0.05$). This suggests that as digitalization efforts improve within SMEs, users are more likely to perceive the system as beneficial and useful in their operations. Likewise, the analysis reveals that perceived usefulness (PU) significantly influences attitudes toward using (AT) with a coefficient of ($\beta = 0.471$, $p < 0.05$). This means that when users perceive a system as useful, it directly shapes their positive attitude toward adopting and engaging with the technology. Lastly, attitudes toward using (AT) show a strong and significant positive influence on actual system use (AS) ($\beta = 0.649$, $p < 0.05$), emphasizing that favourable attitudes are a key determinant of whether users will actively adopt and utilize the system.

The model's overall explanatory power is represented by the $R^2$ value of 0.42, indicating that the predictor variables included in the model account for 42% of the variance in actual system use. These results highlight the importance of SME digitalization in shaping users' perceptions of system usefulness, which in turn positively affects their attitudes and actual usage behaviour. This chain of relationships highlights the essential role of digitalization efforts in driving technology adoption within SMEs.

**Table 4: Hypothesis Testing of The Direct Effects**

| Relationship | Beta | LL | UL | SE | T-stat | P-value | Result | |
|---|---|---|---|---|---|---|---|---|
| SD -> PU | 0.33 | 0.25 | 0.398 | 0.045 | 7.313 | 0 | Significant | 0.107 |
| PU -> AT | 0.471 | 0.38 | 0.551 | 0.052 | 9.14 | 0 | Significant | 0.22 |
| AT -> AS | 0.649 | 0.544 | 0.735 | 0.057 | 11.407 | 0 | Significant | 0.42 |

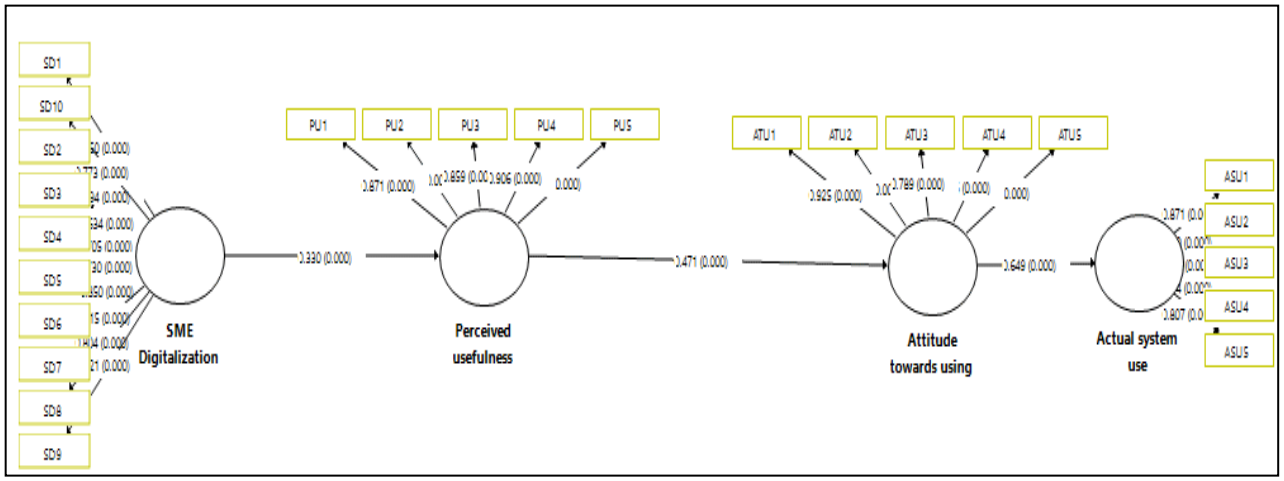


**Figure 2: Structural Model Output**

## Mediating Analysis

In addition to assessing the direct effects, the structural model in this study is also set up to examine the mediating effects between the variables. The results, reported in Table 5, demonstrate a significant and positive indirect influence of SME digitalization (SD) on actual


**URL:** http://dx.doi.org/10.14738/assrj.1111.17847

system use (AS). Specifically, SME digitalization (SD) exerts an effect on actual system use (β = 0.101, p < 0.05), and this relationship is mediated through the sequential pathway of perceived usefulness (PU) and attitude toward using (AT). This serial mediation is significant at the 1% level, indicating that the positive impact of digitalization efforts within SMEs on actual system usage occurs through a process where enhanced perceptions of usefulness lead to more favourable attitudes toward using the system, ultimately encouraging users to engage with the technology. The mediation findings highlight the critical role that perceived usefulness, and attitudes play in translating the benefits of SME digitalization into actual usage. Essentially, as SMEs adopt digital technologies, users' perceptions of these systems' usefulness improve, which fosters a positive attitude toward using the system. This, in turn, increases the likelihood that users will fully integrate the system into their daily operations. These results emphasize that digitalization alone is not enough; fostering positive perceptions and attitudes is equally important for ensuring successful technology adoption and usage within SMEs.

**Table 5: Specific Indirect Effect**

| MEDIATIONS | BETA | LL | UL | SE | T | Sig |
|---|---|---|---|---|---|---|
| SD -> PU -> ATU -> ASU | 0.101 | 0.067 | 0.138 | 0.022 | 4.520 | 0.000 |

## DISCUSSION

Given the ongoing digitalization, SMEs in Yemen are encountering continuous challenges. This research seeks to provide valuable insights that can assist authorities and management in fostering digital entrepreneurship. This study investigates the relationships between SME digitalization, perceived usefulness, attitudes toward using technology, and actual system use within the context of small and medium-sized enterprises. Findings demonstrate that the digitalization of SMEs in Yemen significantly impacts the perceived usefulness of digital tools and technologies, which in turn enhances the attitude towards using these systems and leads to increased actual system use. This sequence of effects is crucial for understanding how digital transformation can drive business success in Yemeni SMEs. Basically, digitalization refers to the adoption and integration of digital technologies into business processes. When SMEs undergo digitalization, they often experience improvements in efficiency, productivity, and overall business performance. These improvements make digital tools and technologies appear more useful to employees and managers. For instance, digitalization can automate routine tasks, streamline workflows, and improve data management, thereby demonstrating clear, tangible benefits that enhance perceived usefulness.

As perceived usefulness is a key factor in shaping the attitude towards using a particular technology. When employees and managers in Yemeni SMEs recognize that digital tools can significantly improve their job performance and business outcomes, their attitude towards using these tools becomes more positive. A favourable attitude is crucial because it reflects the willingness and openness to adopting new technologies. It indicates a belief that these technologies are valuable and worth the effort to learn and integrate into daily operations. In turn, a positive attitude towards using digital technologies naturally leads to increased actual system use. When the perceived usefulness is high and the attitude towards using the technology is positive, employees and managers are more likely to adopt and consistently use digital tools in their work processes. This increased usage can further reinforce the perceived benefits of digitalization, creating a virtuous cycle of adoption and utilization. Particularly, in the context of Yemeni SMEs, where resources and infrastructure may be limited, the impact of

digitalization can be precisely transformative. By showcasing clear benefits through digitalization, SMEs can overcome resistance to change and foster a culture of innovation and continuous improvement. Enhanced perceived usefulness, driven by the tangible benefits of digitalization, can thus play a vital role in encouraging the adoption of digital tools, improving business processes, and ultimately contributing to the growth and competitiveness of Yemeni SMEs.

Previous literature also offers substantial support to our above discussion. In the context of Yemeni SMEs, digitalization and management factors, particularly the opportunities to exploit the market and the integration of technology and innovation, are crucial in shaping the perceived usefulness of technology. Perceived usefulness is a key component of the TAM model, which significantly influences the attitudes of Yemeni entrepreneurs towards using technology and its Actual System Use in SME digitalization and management [46, 47]. The ability to exploit market opportunities through digital means is a significant advantage of digitalization, enhancing the perceived usefulness of these technologies. For Yemeni entrepreneurs, recognizing that digital tools can open new market paths, improve customer reach, and provide competitive insights increases their inclination to adopt SME digitalization [49, 50]. This perception is vital as it directly impacts their attitude towards technology adoption and its practical application in their business operations.

The combination of technology and innovation within SME operations is also perceived as a driver for business growth and efficiency. This compound effect further supports the perceived usefulness of digital tools among Yemeni entrepreneurs [51]. As perceived usefulness positively impacts their attitude towards technology adoption, it leads to a higher likelihood of actual system use in managing their SME's digitalization and business practices [52, 53]. Furthermore, the actual application of these technologies is essential for realizing the benefits of SME digitalization and management. Effective digital transformation and management facilitate the alignment of digitalization strategies with market exploitation opportunities and innovative practices. This alignment enhances the perceived value and actual utilization of technology in Yemeni SMEs [47, 54]. In general, it is argued that the digitalization of SMEs in Yemen significantly impacts the perceived usefulness of digital technologies, which in turn enhances the attitude towards using these technologies and leads to increased actual system use. By recognizing and leveraging market opportunities and integrating innovative practices, Yemeni SMEs can effectively enhance the perceived value and utilization of digital tools, contributing to their growth and competitiveness in the global market.

## CONCLUSION

This study offers various insights on the relationships between SME digitalization, perceived usefulness, attitudes toward using technology, and actual system use within the context of small and medium-sized enterprises. The findings indicate that SME digitalization significantly enhances perceived usefulness, which subsequently shapes users' attitudes and drives actual system use. The results highlight the importance of improving users' perceptions of digital tools and fostering positive attitudes to facilitate technology adoption. Furthermore, the study identifies a mediating effect of perceived usefulness and attitude in the relationship between digitalization and actual system use, emphasizing that a sequential approach to enhancing technology acceptance is crucial for successful implementation. In summary, the evidence supports the assertion that digitalization efforts in SMEs not only improve operational


**URL:** http://dx.doi.org/10.14738/assrj.1111.17847

efficiency but also play an essential role in shaping technology acceptance behaviours among users. By focusing on enhancing perceived usefulness and nurturing positive attitudes, SMEs can increase the likelihood of successful technology adoption and usage.

The findings of this study carry significant implications for practitioners, policymakers, and researchers involved in the digital transformation of SMEs, particularly in developing economies. The implications of these findings are significant for SMEs seeking to enhance their digital transformation efforts. To ensure successful technology adoption, it is not enough to simply implement digital tools; businesses must also focus on improving users' perceptions of the system's usefulness and fostering positive attitudes toward its use. Providing training and support, highlighting the benefits of digital technologies, and encouraging positive attitudes will be critical to achieving higher levels of technology acceptance and usage. This research suggests that SME owners and managers should prioritize digitalization initiatives that clearly demonstrate the benefits of new technologies to their employees. Providing training and support that emphasizes the usefulness of digital tools can help improve users' perceptions, leading to more favourable attitudes and higher levels of system use. It is essential for SMEs to create a supportive organizational culture that encourages experimentation and innovation. By fostering an environment where employees feel comfortable exploring digital technologies, organizations can enhance overall technology acceptance.

Authorities and policymakers should consider developing policies that support digitalization efforts in SMEs. This could involve providing financial incentives, technical assistance, and training programs to equip SMEs with the necessary skills to effectively adopt and utilize digital technologies. Initiatives aimed at raising awareness about the benefits of digitalization and technology adoption among SMEs can help foster a more conducive environment for digital transformation. Lastly, for the researchers, this study suggests that future research should explore deeper into the various factors influencing technology adoption in SMEs, including organizational culture, leadership styles, and external environmental influences. Understanding these dynamics can provide a more comprehensive framework for enhancing digital transformation efforts. Moreover, longitudinal studies could further examine how changes in technology perception and attitudes over time influence actual system use and overall performance within SMEs.

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