

Factors that Influence Digital Transformation Process in SMEs: Evidence from Oman

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ABSTRACT

This paper investigate the factors that influence the adoption of digital transformation process in Small and medium enterprises (SMEs). The study is motivated by the fact that the adoption of digital transformation especially by SMEs is still very far behind the adoption by large companies. In addition, studies regarding digital transformation adoption by SMEs are limited. Samples of 100 SMEs in Oman were included in study. The model developed in this study is built on the technological-organizational-environmental (TOE) framework model. Six variables are proposed as the factors that influence SMEs in adopting digital transformation.

Keywords:

Digital Transformation;
Influencing Factors; TOE
Model; SMEs; Oman

1. Introduction

Digital transformation has a significant impact not only on business support, it is considered as well one of the critical contribution drivers to economic growth (Hanafizadeh & Bohlin, 2020). It can be seen as a consistent networking for all of the economic sectors to adjust organizations to the new realities of the digital economy. Decisions in networked systems involve analyze and exchange data, determine and evaluate options, in addition to initiation of actions and the introduction of consequences (Schallmo, Willams, & Boardman, 2017).

Today, the firms who adopting and keeping up with this technological philosophy will be able to afloat in this rapidly increasing digital era, others who do not adopt will be left behind by adopters

(Ulas, 2019). Consequently, SMEs are striving to adopt digital technologies to maintain their competitiveness in today's digital era (Tortorella & Fettermann, 2018). Therefore, many governments in different countries give considerable attention to digital transformation process in SMEs through issuing policies and regulations to facilitate the transformation process (Rahayu, &

Day, 2015) ; for example, the Authority for SME Development in Oman launched program in 2021 called digitalization which seeks to empower SMEs by changing their technology paths, accelerate digital transformation and enhance competitiveness.

Recent studies have mainly discussed the adoption of digital transformation from large organizations 'perspective (Eller, Alford, Kallmünzer, & Peters, 2020), where some researchers focused on business model innovation (Hänninen, Smedlund, & Mitronen, 2018) and others focused on how large organizations lead digital transformation through case studies examples (Kaiser & Stummer, 2020; Sebastian et al., 2017), while some focused on factors that are effecting or obstructing from the perspective of innovation diffusion theory (Steiber, Alänge, Ghosh, & Goncalves, 2020).

In the context of SMEs, the Office for National Statistics (ONS) conducted a survey in 2014 that showed a visible gap between SMEs and large organizations in terms of technology implementation (Chege & Wang, 2020). The European Commission on Digital Entrepreneurship

showed similar results that emphasize that only 2% of SMEs make use of technological innovation (European Commission, 2015). Scholars have tried to investigate the reasons for the failure of SMEs to embrace technological innovations (Chege, Wang, & Suntu, 2020).

In spite of extensive academic research on the adoption of digital transformation, a gap between the factors influencing the digital transformation process and SMEs persists, and researchers' studies to explain that gap are limited particularly in Oman. In this regard, researchers chose

Oman to be the place in which the study was conducted. This study addresses this research gap by answering the following leading research question: What are the factors influencing the digital transformation in SMEs in Oman? This paper aims to identify some significant influencing factors from previous studies which are compatible with culture of Oman. Based on the TOE theory framework, these factors have been divided into three contexts, namely Technology, Organization, and Environment context.

The remainder of this paper is organized as follows. The following section discusses a literature review with detailed theoretical context that describes TOE theory related to the SMEs and hypotheses are

developed based on the proposed research model through TOE framework. While Section four discuss the research methodology that is adopted. This is followed by data analysis, results and discussion in subsequent sections. The paper concludes with the last section covers conclusions, limitations, and recommendations for future research.

2. Literature Review

A considerable amount of literature has been published on digital transformation process. To evaluate the implementation of a technology in any organization, there are many models and framework that can be used, including the Technology Acceptance Model (TAM) (Davis, et al., 1989; Tornatzky & Fleischer, 1990), Theory of Planned Behaviour (TPB) (Ajzen, 1991), unified theory of acceptance and use of technology (UTAUT) and TOE framework (Dwivedi, 2012). The factors were identified as per the Technology-Organization-Environment (TOE) framework (Setiyani, 2021) see figure 1.

2.1. Technological

The technological context concerns about the technologies which are currently used in the firms and technologies that are available in the market but not used by the firm (Dwivedi, 2012). Moreover, the technology drive SMEs to change their current services and that will

help SMEs to successfully do the digital transformation (Peillon & Dubruc, 2019). This paper will focus on two main factors which affect technology adoption like security concerns and relative advantages.

2.1.1. *Relative Advantage*

Relative advantage is defined as the level of benefits organization views in using technology (Dwivedi, 2012). Furthermore, it is also shows the extent to which technology can add to the firms. Technology as per (Gui, A., et al., 2020) can provide the firms many benefits by increasing productivity and efficiency.

H1: There is a significant relationship between relative advantage and digital transformation adoption among SMEs.

2.1.2. *Security Concerns*

As all organizations, Small and Medium Enterprises (SMEs) face a variety of cyber threats in a daily basis and sometimes they are often more attacked than the larger organizations. This is because cybercrime has resulted in billions of dollars being lost, computer systems malfunctioning, critical information being destroyed, network integrity and confidentiality being compromised, and so on (Al. Abubakar, 2015).

H2: There is a significant relationship between security concern and digital transformation adoption among SMEs.

2.2. **Organizational**

According to Mahakittikun, et al.,2020.

Organizational characteristics of a company refers to its resources, size, scope, and structure. Moreover, Organization characteristics are important as it is directly affecting the SME. They are related to its operating procedures, company size, costs and expenses and location. Also, it might be affected by the human capital considering the education level, age of employees, culture and skills. In this paper we will be highlighting two of these important variables required to drive the digital transformation which are: Organizational size and Cost.

H3: There is a significant relationship between organization size and digital transformation adoption among SMEs.

2.2.1. *Organizational Size*

Organizational size affects the flexibility in adopting digital transformation. According to (Kosasi, S., 2017) the larger the organization size is the more the firm tends to adopt technology innovations. It got affected by the human capital which is presented by their education level, age and skills of employees required to implement the digital transformation (Ferreira et al., 2019).

2.2.2. *Cost*

A narrow studies that used Technology, Organization, and Environment framework to recognize direct and indirect costs barriers in implementing digital transformation in SMEs. These costs cannot be reduced unless the following issues will be covered and solved, such as: lack of telecommunication infrastructure, lack of qualified staff to implement the digital transformation, customer's skills limitations in using internet (Jansen, M., et al, 2016), high internet security requirements costs and cost of access (Srinuan & Bohlin , 2011).

H4: There is a significant relationship between cost and digital transformation adoption among SMEs.

2.3. Environmental

The environmental context describes factors that influence the adoption of technology. It concerns about the firm structure, the availability of technology service providers, customer and competitive dynamics, location of the firm, regulatory environment and structures, economic factors and globalization (Tornatzky & Fleischer, 1990; Mehrstens et al., 2001). Furthermore, this study will consider two factors which play a main role in technology adoption. Those factors are: Government support and Competitive pressure.

2.3.1. Government Support

Government regulation can either encourage or discourage technology adoption and innovation. When governments put new rules they might put limits on industry activities. These rules can be requiring service licenses, establishing or operating telecommunication networks, pollution- control devices, safety requirements and testing requirements which can delay innovation in some industries (Gui, A., et al., 2020). Also, government regulations could be an obstacle in digital transformation, especially in case of producing new materials which extensively need to be tested before it can be used. Also, these rules in some firms where privacy requirements are highly required may prevent firms from adopting new ways for customers to access their account information (Baker, J., 2012).

H5: There is a significant relationship between government support and digital transformation adoption among SMEs.

2.3.2. Competitive Pressure

In the environmental context, adopting digital transformation in SMEs is affected by competitive pressures and pressure from trading partners (Bagale, G., 2014). The presence of competition is a factor that leads and encourages firms in order to create a competitive

advantages and stay ahead of their competitors. Moreover, since the number of firms which adopt digital transformation increases, SMEs have more leaning to adopt digital transformation to sustain their competitive position (Sparling, et al., 2007).

H6: There is a significant relationship between competitive pressure and digital transformation adoption among SMEs.

3. Methodology

3.1. Sample and data collection instruments

The main objective of this paper is to investigate the factors that influence digital transformation process in SMEs in Oman. The research gathered data by using a quantitative research methodology. A questionnaire was designed based on previous studies and the proposed theoretical framework that shown in Fig.1. The items on technological context were adapted from (Johnson, et al., 2019) to measured relative advantage and security concerns from (Yarosh, S., et al., 2014; Molla, A., & Licker, P. S., 2005; Umam, B., et al., 2020). To measure Organizational size, Three items were adapted from (Premkumar, G., & Roberts, M., 1999; Molla, A., & Licker, P. S., 2005), and cost was

measured using four items adapted from (Premkumar, G., & Roberts, M., 1999). Three items adapted from (Abdekhoda, M., et al., 2018; Premkumar, G., & Roberts, M., 1999) measured government support. Competitive pressure was measured using three items adapted from (Abdekhoda, M., et al., 2019; Premkumar, G., & Roberts, M., 1999). The Smart PLS3 evaluated and analyzed the data obtained from survey questionnaires. The survey instruments were validated in a pilot study of 5 SME's experts who were familiar with digital transformation to confirm the appropriateness of the measurement instrument. All of the items were evaluated using the five-point Likert-type-scale, where 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree, and 5 = strongly agree).

3.2. Sampling Procedure

The primary units of the research were targeting the senior managers of SMEs in Oman. To test the research hypotheses, the questionnaires was sent by mail and addressed to the most senior person at the enterprise as they possess in-depth knowledge towards digital transformation process in their enterprise, hence these respondents are selected using purposively sampling to represent the target population required to evaluate the influencing factors of the research model. The research questionnaire

implemented from 5th Dec to 1st of Jun 2022. In the survey questionnaire the participants were given a brief overview about the research. The first part of the questionnaire covers research overview. Next, is the demographic data of the respondents and their corresponding enterprises. Then the questions to measure each variable of the research model. More than 500 respondents were distributed and invited to partake in the survey. At the end, out of the 500 requests sent, a total of 104 responses were collected and all were usable.

The research usable responses show that 69% of the respondents were male. Nearly half of the respondents fell in the 26 -35 age group. The age bracket with the most respondents fell in the 26- 35 age group bracket (63%), half of the participants (53%) had a bachelor degree education, while 17% had gained a master degree and above and 30% had a diploma degree. One third of the enterprises (36%) had between one to five employees; enterprises with more than 16 employees were the next most common (30%).

4. Data Analysis and Results:

The survey data were analyzed using the Partial Least Square-Structural Equation Modeling technique (PLS-SEM) with SmartPLS software as a statistical tool (Hair et al 2017). Although there are other data analysis tools such as correlation, regression, and analysis of variance,

the PLS-SEM is well suited to this study as it is a widely used technique for quantitative data analysis. PLS approach is preferable since it imposes less restrictions on sample size and distribution without depending on normalcy assumptions (Chin et al., 2003). The research followed Anderson and Gerbing's guidelines and used a two-step strategy to test the measurement model, followed by a structural model evaluation.

4.1. Assessment of Measurement Model

All constructed items were tested in the measurement model for examine their contribution to the suggested research mode. Moreover, the measurement model evaluated the convergent validity by assessing the outer loading, average variance extracted, and composite reliability. The assessment results in eliminating 3 of 21 items in this study. Also, the results were supported by the employment of cross-loading and validity evaluation for more accuracy. Two other types of validity criteria evaluations can be used such as The average variance extracted (AVE) and the discriminating validity (Hair, J. , et al, 2019).

4.1.1. Reliability and Convergent Validity

This study used both convergent and discriminant validity to assess the assessment items and constructs. Table 1 lists the tests for reliability and convergent validity and results of the measurement model. First, the Composite reliability determined reliability, with values approximately higher than 0.5 considered satisfactory (Leguina, 2015) (Memon, et al., 2017). Then the item loadings and average variance extracted (AVE) for each construct check convergent validity, which assesses the degree of items' connection to the construct as theoretically (Leguina, 2015) (Memon, et al., 2017). All item loadings were higher than 0.5. And for AVE, all constructs were between 0.4 and 0.8. The results showed that the measuring model had appropriate related validity.

4.1.2. Discriminant Validity

The discriminant validity of the latent construct define the degree of diverge between constructs. Comparing shared variance with other constructs in the path model with the latent manifest variable, where the cross-loading value in the latent variable is greater than all other constructs (Sarstedt, et al., 2014). To test the validation of the variables, each latent construct's Average Variance Extracted (AVE) was calculated. The Average Variance Extracted (AVE) is the

average variance amount for indicator variables. The square root of AVE should be higher than the squared internal correlations among research constructs (Fornell & Larcker, 1981). Table 2 indicates that most of the AVE values were more than 0.5, as a result of that the discriminant validity was achieved for this study model. These results shows that the assessments highlight the reliability and validity of the measurement items which allowing hypothesis testing.

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