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Leadership Styles and E-Commerce Adoption among SME Managers in Oman: Moderating Effect of Technology Readiness

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Abstract

This study investigates the moderating effect of technology readiness (TR) on e-commerce adoption in small and medium enterprises (SMEs) in Oman. Data were collected from 382 participants including owner, manager or both (both here means owner who also manages the business). The study used SPSS and SmartPLS 4 software for statistical analysis and hypothesis testing. The study found that technology readiness significantly influenced the relationship between leadership styles and e-commerce adoption. Transformational leadership positively influenced e-commerce adoption, while transactional leadership had a negative effect. The study also found that technology readiness moderates the relationship between leadership styles and e-commerce adoption. The findings suggest that companies should prioritise the development of transformational leadership styles and high technology readiness to enable effective e-commerce adoption.

Keywords

Leadership Styles, E-Commerce Adoption, Technology Readiness, SMEs, Oman

1. Introduction

When organisational leadership is effective, business performance often improves (Chaudhry et al., 2019). Due to the ever-changing business environment, economic competition is more complicated today than it was decades ago. To thrive and expand, every business needs a clear direction and strategy to deal with emerging and current business trends (Ryan & Tipu, 2013). Leaders define the mission to be accomplished and the roles required and ensure that the me-

chanisms are in place for the entire organisational team. The success or failure of an organisation depends on the leader's ability to make timely decisions (Ren et al., 2021). Many organisations are adapting to the rapidly changing business environment. These developments are a result of increased competition, rapid technological advancements combined with rising consumer expectations and changes in international laws and government regulations. Various businesses in Oman are constantly transforming to meet customer expectations in terms of product and service quality, innovation and price (Al-Shuaili et al., 2019). Business leaders set the vision and guide their organisations through change. To be successful, business leaders need to understand the drivers of technological growth in their field and respond to change.

The impact of leadership remains a well-studied subject in organisations (Cunningham et al., 2015). Extensive research indicates that leadership has a crucial role in predicting and influencing outcomes that are significant to an organisation (Kelloway et al., 2013). As a result, powerful leaders acknowledge the necessity of change and promptly take proactive measures when necessary. Managers can acquire and employ several leadership styles based on the specific situation, in order to provide direction, coordination, implementation, and motivation.

According to Kemp (2023), the quantity of individuals actively using the internet in Oman decreased to 4.44 million in January 2023, as opposed to 5.02 million in January 2022. The National Centre for Statistics and Information (NCSI) reported that Oman's population reached 5,036,000 in April 2023. Oman, with a population of 5,036,000 million, achieved an internet penetration rate of 96.4% in January 2023. However, numerous obstacles hinder the adoption and utilisation of e-commerce by SMEs. The obstacles to the development of e-commerce in Oman encompass an imbalance of IT proficiency, limited awareness, insufficient drive, inadequate marketing endeavours, and a lack of consumer trust (Ahmad, 2017). Only a limited number of studies have investigated the association between leadership styles and technology adoption in organisations in Oman. Previous studies have primarily concentrated on the connection between leadership styles and overall business performance, neglecting the specific relationship with technology adoption (Alraja et al., 2021; Chinnasamy et al., 2021).

Given the COVID-19 pandemic's acceleration of the demand for technological innovation in SMEs, which has resulted in changes to business practices and internal processes, it is crucial to determine whether leadership styles affect the pace at which SMEs adapt and innovate in response to this new reality. The core of these advancements is in the implementation of novel technology to digitise and automate procedures during this period of remote work. The level of comprehension and enthusiasm for technology is contingent upon one's leadership approach. Leaders have the power to determine whether organisations adopt e-commerce. SMEs in Oman must create strategies to support their digital transformation and offer technical prospects to enhance the adoption of technology

and boost the competitiveness of SMEs.

The NCSI (2022) reports that there are a total of 81,460 registered Small and Medium Enterprises (SMEs) in Oman. Oman is divided into eleven governorates, and Muscat is the leading region with 27,400 registered SME as of July 2022, accounting for 33.6% of the total. The ranking of governorates in terms of the number of SME is as follows: North Al-Batinah is in second place with 12,538 SMEs, A'Dakhiliyah is in third place with 9104 SMEs, Dhofar is in fourth place with 8584 SMEs, South Al-Batinah is in fifth place with 5975 SMEs, North A'Sharqiah is in sixth place with 5563 SMEs, South A'Sharqiah is in seventh place with 4928 SMEs, A'Dhahira is in eighth place with 4110 SMEs, and Al-Buraimi is in ninth place with 1617 SMEs. Al-Wusta and the governorate of Musandam had 1234 and 408 SMEs respectively as of January 2021. Oman's population, as of April 2023, stands at 5,036,000. The country has a significant and increasing internet penetration rate, with over 4.44 million active internet users, accounting for 96.4% of the population (Kemp, 2023). The available evidence on the leadership style and adoption of e-commerce by SMEs in Oman is still insufficient (Al-Matani, 2018; Chinnasamy et al., 2021). Nevertheless, there is a scarcity of empirical research on the implementation of e-commerce by SMEs in Oman. Conducting this study is imperative to address this knowledge gap and conduct a thorough empirical investigation of the use of e-commerce by SMEs in Oman.

This study investigates the impact of managerial leadership style on the adoption of electronic commerce in SMEs in Oman. Many SMEs in Oman are reluctant to adopt e-commerce due to a lack of success stories and poor understanding of the potential impact on their business operations (Alraja et al., 2021; Al-Shuaili et al., 2019). Despite extensive research on leadership in business, there is limited understanding of the qualities and behaviours that contribute to being a competent and influential leader (Alraja et al., 2021; Al Bekari & Supian, 2021; Rawash, 2021). Consequently, the authors emphasise the need for more research in SMEs to thoroughly investigate the complexity of the issue and suggest the most effective technological changes in management.

The introductory section of a research paper sets the context by outlining the research problem and objectives, often accompanied by a literature review in the following section. The methodology section provides a comprehensive overview of the procedures and techniques used in conducting the study. The results are presented in the results section together with the corresponding interpretation. The concluding section discusses the results and their implications and suggests possible avenues for future research.

2. Literature Review and Hypothesis

2.1. Transformational Leadership

The transformational leadership style assumes that those who inspire others will be followed (Bass & Avolio, 1990). A person with a compelling vision and zeal

can achieve amazing things. Working for a transformational leader can be an enriching experience, especially when passion and energy are at the forefront. The leader shows compassion and a desire for the success of their followers. This leadership style differs from transactional leadership in that it does not involve trading between leader and followers (Wongyanon et al., 2015; Bass & Avolio, 1990; Bass, 1985; Burns, 1978). The leader acts according to his or her own value system, which is different from that of others.

Many scholars (Purwanto, 2021; Cherry, 2023; Khajeh, 2018; Al-Dubai, 2016; Seyal, 2015; Wongyanon et al., 2015; Bass & Avolio, 1990; Bass, 1985; Burns, 1978) who have studied transformational leadership style agree that four theoretically distinct components characterise this leadership style. The first component is called idealised influence, in which the leader generates trust, admiration, respect and loyalty in subordinates through charismatic visions and behaviours. This quality is sometimes referred to as charisma. The second element is inspirational motivation, where the leader motivates subordinates by giving them a vision of the future, encouraging them to adopt new ideas and goals. Third, intellectual stimulation refers to the leader's ability to encourage and motivate their subordinates to challenge preconceived notions, re-evaluate problems and take new approaches to familiar situations. This fosters a culture of innovation within the workforce as employees complete the tasks assigned to them.

2.1.1. Idealised Influence (II)

This leadership component includes behaviours that inspire pride in followers to join the leader and is often referred to as charisma. It shows that a leader puts the interests of the group above his or her own and makes personal sacrifices for the good of others. A transformational leader with idealised traits conveys a sense of strength and confidence and reassures people that they can overcome obstacles (Bass & Avolio, 2004). Idealised leaders are the main drivers of strong morale and performance. Such benevolent leaders are the driving force behind an organisation's progress and are seen as the superiors of their subordinates.

2.1.2. Inspirational Motivation (IM)

In inspirational motivation, the leader builds trust with followers, maintains a connection to the vision, and persuades disaffected followers to join the vision of the organisation to which the leader presents an appealing and inspiring vision (Bass & Avolio, 2004). Leaders who inspire others set high standards for their followers because they demonstrate optimism about achieving future goals (Bass & Avolio, 2004). How well a leader communicates an appealing vision that inspires others to exceed expectations is inspirational motivation. Inspirational leaders have high expectations of their employees (Towler, 2020). They believe their employees can achieve their goals and emphasise the importance of all tasks and responsibilities. They push their employees to develop a strong sense of purpose so that they can move their group forward. As a result, employees

become more focused, enthusiastic and confident in their talents.

2.1.3. Intellectual Stimulation (IS)

Intellectually stimulated leaders are usually able to implement the vision while convincing their followers to take a different path. The leader has a limited understanding of details but is open to new ideas to achieve the new vision (Bass & Avolio, 2004). As a result, the leader sets bold goals, takes risks and seeks input from others. This type of leader stimulates and fosters creativity in their employees.

2.1.4. Individualised Consideration (IC)

Individual consideration requires the leader to maintain visibility and provide individual attention, act as a coach, listen to followers' problems and desires, advise and lead by example, motivate followers, and promote the vision to diverse groups (Bass & Avolio, 2004). The leader ensures that the followers are satisfied with the direction of the organisation and are focused on achieving the organisational goals. Leaders provide empathy, support and constant communication while challenging their followers. On the other hand, followers want to develop themselves and need intrinsic motivation to accomplish their task. Therefore, the following hypothesis is proposed:

*H*1: *There is a statistically significant relationship between transformational leadership style and electronic commerce adoption among SME managers in Oman.*

2.2. Transactional Leadership

The transactional leadership style views organisation, supervision and performance as an exchange between managers and employees (Amanchukwu et al., 2015). This leadership style is based on reward and punishment, i.e. the leader does whatever it takes to ensure that an employee does the work assigned to him or her, with consequences for completion or non-completion. Feranita et al. (2020) found that transactional leadership has a direct positive and insignificant effect on SMEs' innovation and performance. Employees who successfully complete their tasks are rewarded, while those who do not are disciplined (Cherry, 2023). However, the transactional leadership style is associated with the management concepts and practises of many organisations and is included in a number of leadership models. The transactional leadership style is characterised by two dimensions.

2.2.1. Contingent Reward (CR)

When members of a group actively engage in the task assigned to them and consistently strive to complete it, they receive some form of recognition or benefit. There is a trade-off between providing incentives to encourage perseverance and recognising exceptional performance. The term used to describe the reward an employee receives for successfully completing a task within the allotted time

frame is referred to as a contingent reward (Bass & Avolio, 2004). The manager ensures that the objectives are effectively communicated to the employees so that they can benefit from the incentive programme.

2.2.2. Management-by-Exception—(Active)

The manager exercises vigilant supervision and actively seeks out instances of non-compliance with established rules and standards before taking action to assist. According to Bass and Avolio (2004), the manager takes responsibility for monitoring all deviations from established policies and rules for employees. In such cases, the manager is expected to take appropriate corrective action. Nevertheless, persons in this role also demonstrate the ability to respond effectively to changes in management policy and regulatory requirements. The leader promotes a culture of staff commitment to the organisation's mission and intervenes only in cases where objectives have not been achieved within the intended timeframe and budgetary constraints. Based on the above premise, we formulate the following hypothesis:

H2: *There is a statistically significant relationship between transactional leadership style and electronic commerce adoption among SME managers in Oman.*

2.3. Technology Readiness (TR)

The readiness and acceptance of technology may be related to the perspective of the leader of an organisation. According to Parasuraman and Colby (2014), "technology readiness" refers to "people's propensity to adopt and use new technologies for personal and professional goals." This indicator measures a person's willingness to use new technologies rather than their actual skills in this regard (Saad, Bahadori, & Jafarnejad, 2021; Humbani & Wiese, 2017).

According to Meuter et al. (2005), technological readiness is crucial for trying and using new technologies. Technological readiness is an excellent predictor of technology-related behaviour. Parasuraman (2000) therefore argues that understanding individual technology readiness can help a company define its technology strategy and manage the relationship between consumers and technology. In a study by Haddad et al. (2019), the four variables of TRI were found to help predict technology adoption in varying percentages. This suggests that the TR model can be used to measure the readiness of businesses to adopt e-commerce in Oman. According to Parasuraman and Colby (2014), TR 2.0 can be a crucial moderating variable in multivariate framework studies.

Researchers can use TRI 2.0 to describe the dynamics of variables in a technology-intensive setting and use it as a diagnostic or control variable in studies. Parasuraman and Colby (2014) identified TRI 2.0 as a collection of four multidimensional constructs: Optimism, Innovativeness (motivators), Discomfort and Insecurity (inhibitors). The "motivators" contribute to technology readiness, while the "inhibitors" affect technology readiness.

2.3.1. Optimism

Optimism is a positive attitude towards technology when individuals believe that technology will improve their control, flexibility and efficiency. This indicates an encouraging attitude towards technology (Haddad et al., 2019; Parasuraman & Colby, 2014).

2.3.2. Innovativeness

According to Parasuraman and Colby (2014), innovativeness can be defined as the propensity to play the role of a visionary and a pioneer in the field of technology. The innovativeness dimension serves as a comprehensive measure of a person's perception of how committed he or she is to being at the forefront of technological advancement. Essentially, it refers to a person's propensity to become a pioneer in the field of technology. Alharbi and Sohaib (2021) assert that those who are quick to embrace technology give preference to innovation, regardless of their awareness of the benefits it offers.

2.3.3. Discomfort

According to Parasuraman and Colby (2014), discomfort can be characterised as the subjective experience of not being able to effectively regulate the use of technology and feeling overwhelmed by its presence. Broadly speaking, this dimension refers to the level of concern and apprehension that individuals feel about technology. Individuals who feel high levels of distress perceive technology as more complex, leading to a lower willingness to use it (Alharbi & Sohaib, 2021).

2.3.4. Insecurity

Insecurity is characterised by a "distrust of technology and fears about its ability to function effectively" (Parasuraman & Colby, 2014). The insecurity dimension is often about the fears people may have due to a technology-based transaction. People often lack confidence in technology or avoid using it because they are afraid of what might happen. As a result, they are afraid of using new technologies (Alharbi & Sohaib, 2021). Based on the literature review, technology readiness is an appropriate variable to moderate the relationship between the independent and dependent variables. Therefore, the following hypothesis is proposed:

H3: *There is a moderating effect of technology readiness on the transformational leadership style of SME managers and electronic commerce adoption in Oman.*

H4: *There is a moderating effect of technology readiness on the transactional leadership style of SME managers towards electronic commerce adoption in Oman.*

2.4. Current State of E-Commerce Adoption among SMEs in Oman

E-commerce adoption among SMEs in Oman is still at an early stage. According

to Prabhu (2019), only a small percentage of SMEs in Oman have an online, social media and other digital platform presence, and of these, only 1% have e-commerce features on their websites. This low adoption rate can be attributed to several factors, including lack of awareness, limited resources and inadequate technological infrastructure (Mordor Intelligence, 2023). One of the main barriers to e-commerce adoption among SMEs in Oman is lack of awareness. Many SMEs in Oman are unaware of the potential benefits of e-commerce and how they can grow their business. In addition, many SMEs lack the necessary skills and knowledge to implement and manage e-commerce platforms (Muthuraman, 2019).

Another factor hindering the adoption of e-commerce among SMEs in Oman is limited resources. Many SMEs in Oman have limited financial resources and are unable to invest in the necessary technology and infrastructure required to support e-commerce platforms (Alraja et al., 2021). In addition, SMEs often lack the human resources and technical expertise to effectively implement and manage e-commerce platforms. Inadequate technological infrastructure is also a major barrier to e-commerce adoption among SMEs in Oman.

From the literature review, the following research framework was developed and presented in **Figure 1**.

3. Methodology

This study aims to examine the impact of technology readiness on the correlation between leadership styles (namely transformational and transactional) and the adoption of e-commerce in SMEs in Oman. This study also investigates the impact of leadership style on the adoption of e-commerce in SMEs. The data for this study was gathered through an online questionnaire and quantitative research methodology.

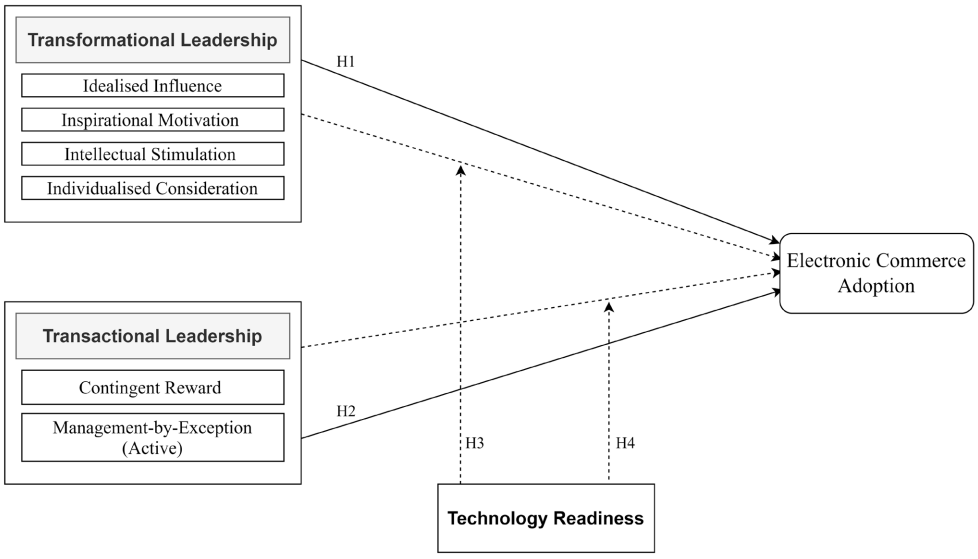

Figure 1. Research framework—Developed for this study.

The sample was selected from a population of managers, who may be owners, managers, or both, in SMEs in Oman. In order to gather a sufficient amount of data for analysis, this study obtained a total of 382 responses, encompassing SME owners, managers, and those who both own and manage SMEs. The Technology Readiness Instrument, comprising 10 items, was derived from Parasuraman and Colby's (2014) approach to assess the moderating impact between the independent and dependent variables. The Multifactor Leadership Questionnaire (MLQ) was derived from the works of Bass and Avolio (2004) and Bagheri et al. (2015). The leadership instrument comprises 18 items and serves to evaluate an individual's qualities and behaviour in various organisational settings, providing insights into their leadership style. The e-commerce adoption scale comprises five items. The measurement of all items was conducted using a Likert scale with a range of 1 to 5 points. This scale was used to assess the level of agreement or disagreement of the respondents with a series of statements related to the research topic.

The demographic characteristics of the samples were determined using SPSS for descriptive analysis. The reliability of the measured variables was assessed using Cronbach's coefficient. In order to accomplish the study's purpose, the acquired data was analysed using Smart PLS 4.0. In accordance with the suggestion made by Sarstedt et al. (2022), we employed PLS algorithms and bootstrapping to evaluate the dependability and (convergent and discriminant) validity of the measurement model, as well as the primary effects and moderating effects postulated in the structural model. SmartPLS 4.0 is an appropriate software for doing simultaneous analysis of multiple regression equations. It is known for its robustness and ability to incrementally forecast endogenous variables (Ringle et al., 2015; Hair et al., 2017). The analysis comprised two stages: the assessment of the measurement model and the assessment of the structural model.

4. Analysis and Result

The process of data analysis is important in all research endeavours and spans multiple fields such as the social sciences, economics and other academic disciplines (Simplilearn, 2024). Due to the increasing accessibility of data and the complex nature of research investigations, it has become necessary to use advanced software tools that enable effective analysis of data. In this part, the collected data was analysed using SPSS and SmartPLS.

4.1. Respondents Profile

As shown in Table 1, out of the 382 completed questionnaires, 255 (66.8%) of the respondents are male while 127 respondents (33.2%) identify themselves as female. The age of the respondents is spread across five different age groups, with most respondents between 35 and 44 years old (34.0%), followed by 45 to 54 years old (30.1%) and 55 years and above (17.3%), 25 to 34 years old (11.8%)

Table 1. General characteristics of samples.

		Frequency	Percentage
Gender	Male	255	66.8
	Female	127	33.2
Age	20 - 24 years	26	6.8
	25 - 34 years	45	11.8
	35 - 44 years	130	34.0
	45 - 54 years	115	30.1
	55 year or more	66	17.3
Educational Level	Primary School Certificate or below	31	8.1
	High School Certificate	106	27.7
	Diploma	95	24.9
	Bachelor's Degree and above	150	39.3
Management Position	Owner	155	40.6
	Manager	103	27.0
	Owner & Manager	124	32.5
Number of Employees	5 - 9 employees	153	40.1
	10 - 99 employees	229	59.9
Years of Internet Use	No experience	3	0.8
	Less than 5 years	21	5.5
	5 - 10 years	62	16.2
	10 years and more	296	77.5

and the least in the 20 to 24 years age group (68%). There were no respondents under 20 years old in the study.

4.2. E-Commerce Adoption

4.2.1. Company Website and Email

The data presented in **Figure 2** shows that 42.9% of small and medium-sized enterprises (SMEs) have a website, while the remaining 57.1% have no online presence. In contrast, **Figure 3** shows that 36.6% of small and medium-sized enterprises (SMEs) have a dedicated corporate email, while the majority, including 63.4% of SMEs, do not have such a communication channel. The term "corporate email" refers to the email address associated with a specific organisation, such as www.smeexample.om. An example of a corporate email address is managersandowners@smeexample.om. The findings suggest that SME in Oman are low users of e-commerce.

4.2.2. Website Maintenance and Online Ordering

The data presented in **Figure 4** shows that exactly 23.8% of SME have websites that are regularly updated and maintained either by a dedicated department or

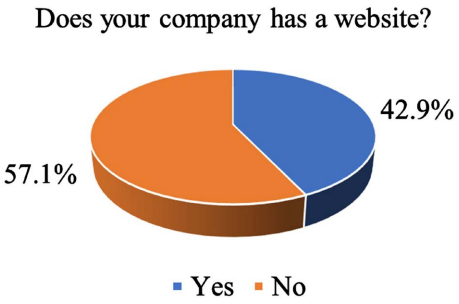

Figure 2. Company website.

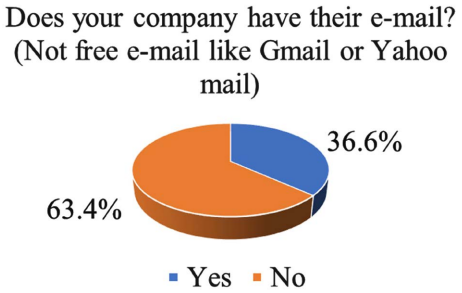

Figure 3. Company email.

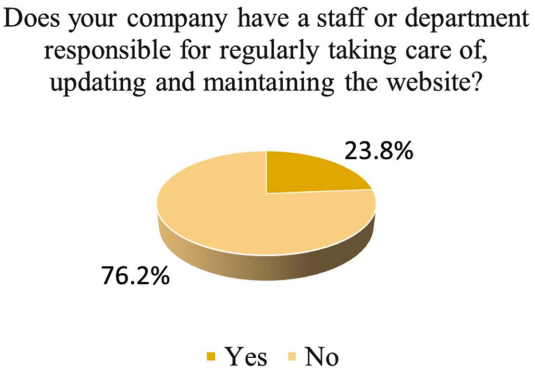

Figure 4. Website maintenance.

by their employees. However, the vast majority of SMEs, namely 76.2%, do not have dedicated staff or a specific department in charge of the routine maintenance and timely revision of their website. This statement is a reliable indicator of how small and medium enterprise (SME) managers in Oman view the adoption of e-commerce. Nevertheless, it is worth noting that according to Figure 5, only 16.2% of small and medium enterprise (SME) websites have the capability to process online orders and payments. The vast majority of SMEs, namely 83.8 %, do not offer their clientele comprehensive online ordering and payment options.

4.2.3. E-Commerce Adoption Level

When respondents were asked whether they offer online ordering and payment, the empirical result (see Figure 6) shows that 26.7% belong to information-based e-commerce; these SMEs have a website and email but do not offer online ordering

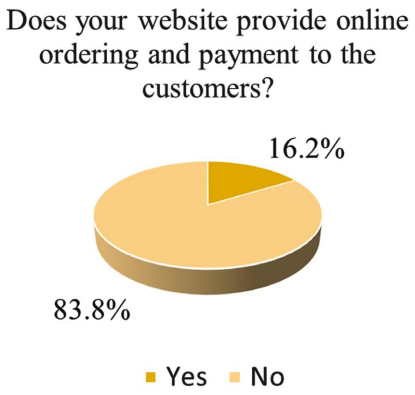

Figure 5. Online ordering and payment.

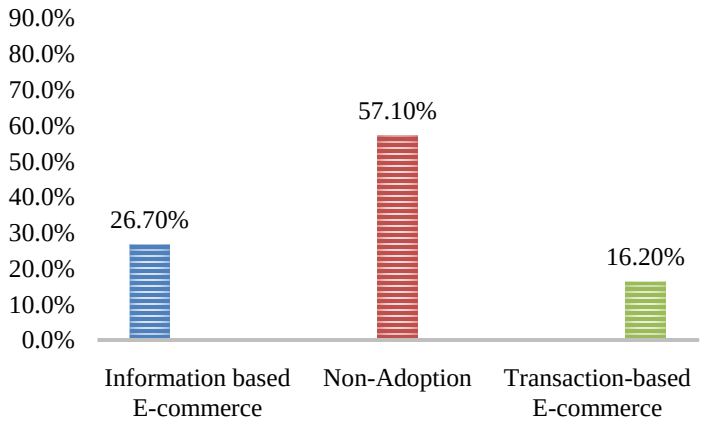

Figure 6. Level of e-commerce adoption.

and payment for customers (Zhu & Kraemer, 2002). Non-adoption is highest with 57.1% of SMEs not having a website. However, the result also shows that only 16.2% of SMEs in Oman offer their customers the option to order and pay online through their website.

4.3. Assessment of Measurement Model (Outer Model)

A confirmatory factor analysis (CFA) was performed to authenticate the dimensions and items of the measurement model. The evaluation of the measurement model, known as the outer model in SmartPLS, was conducted by examining the relationships indicated by the stated hypotheses. In SmartPLS 4.0, the implementation of PLS-SEM involved selecting the indicators of the latent variables with loadings greater than 0.50. This criterion is considered acceptable for exploratory research, as stated by Hair et al. (2019).

4.3.1. Internal Consistency Reliability and Convergent Validity

The internal reliability of the constructs can be assessed by analysing their composite reliability (CR). **Table 2** shows that all CR values exceed the defined threshold value of 0.60 (Hair et al., 2013). Convergent validity, as defined by Hair et al. (2013), refers to the extent to which a hidden concept explains the variability

Table 2. Reliability and validity of constructs.

Constructs	Items	Standardized Factor Loadings	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted
E-commerce Adoption	ECA1	0.813	0.795	0.805	0.859	0.553
	ECA2	0.723				
	ECA3	0.598				
	ECA4	0.757				
	ECA5	0.805				
Transformational Leadership	TRFL1	0.814	0.945	0.945	0.952	0.627
	TRFL2	0.841				
	TRFL3	0.855				
	TRFL4	0.893				
	TRFL5	0.852				
	TRFL6	0.712				
	TRFL7	0.698				
	TRFL8	0.757				
	TRFL9	0.689				
	TRFL10	0.901				
	TRFL11	0.763				
	TRFL12	0.685				
Transactional Leadership	TRSL1	0.656	0.808	0.853	0.857	0.502
	TRSL2	0.575				
	TRSL3	0.699				
	TRSL4	0.798				
	TRSL5	0.732				
	TRSL6	0.770				
Technology Readiness	TROPT1	0.874	0.926	0.946	0.940	0.691
	TROPT2	0.774				
	TRINN3	0.830				
	TRINN4	0.830				
	TRINN5	0.846				
	TRDISC1	0.765				
	TRDISC2	0.894				
	TRINS3	Deleted				
	TRINS4	Deleted				
	TRINS5	Deleted				

*ECA = E-commerce adoption, TRFL = Transformational leadership, TRSL = Transactional leadership, TROPT = technology readiness optimism, TRINN = Technology readiness innovativeness, TRDISC = technology readiness discomfort, TRINS = technology readiness insecurity.

observed in its measurements. In addition, each construct must explain at least 50% of the variance (AVE ≥ 0.50). **Table 2** shows that all values exceed the threshold of 0.5. As stated by Hair et al. (2013), the cross-loadings for each construct must exceed a threshold of 0.5. Thus, all constructs show a high degree of internal consistency reliability.

The assessment of discriminant validity is necessary for the estimation of the outer model and provides information about the distinction between the constructs of the model. There are two commonly used techniques for assessing discriminant validity in PLS SEM: the Fornell-Larcker criterion and the hetero-trait-monotrait correlation ratio (HTMT). In the study, the criterion of Fornell and Larcker (1981) was used to determine discriminant validity. The values in the bold diagonal represent the square root of the average variance extracted (AVE), while the other values indicate the correlations between the variables. The condition is that the values in the prominent diagonal must be greater than the other values in the corresponding rows and columns. This condition is met, as you can see in **Table 3**.

According to Henseler et al. (2015), the HTMT ratio they introduced should be either below the more cautious threshold of 0.85 or the more lenient threshold of 0.90. These thresholds indicate that the average correlation between different constructs is significantly lower than the average correlation within constructs. To ensure that the HTMT ratio is well below 0.85 (or 0.90), the maximum value of the percentile-based bootstrap confidence interval (one-sided) using 10,000 bootstrap samples must be less than 0.85 (or 0.90). To perform a more thorough analysis, the researchers also considered the hetero-trait-monotrait-ratio (HTMT), which is shown in **Table 4**. The values of all variables are below 1, indicating strong and well-established discriminant validity (Franke & Sarstedt, 2019).

Table 3. Discriminant validity.

	ECA	TR	TRFL	TRSL
ECA	**0.743**			
TR	0.508	**0.831**		
TRFL	0.444	0.411	**0.792**	
TRSL	−0.140	−0.086	−0.028	**0.709**

* ECA = Electronic commerce adoption, TR = Technology readiness, TRFL = Transformational leadership, TRSL = Transactional leadership.

Table 4. Discriminant validity. Heterotrait-Monotrait ratio (HTMT).

	ECA	TR	TRFL
TR	0.564		
TRFL	0.501	0.430	
TRSL	0.173	0.109	0.083

*TR = Technology readiness, TRFL = Transformational leadership, TRSL = Transactional leadership, ECA = Electronic Commerce Adoption.

4.3.2. Assessment of Structural Model

The statistical technique commonly used in social sciences and economics to study complex interactions between latent variables is PLS-SEM (Sarstedt et al., 2021). This method includes a basic component called a structural model. Partial Least Squares Structural Equation Modelling (PLS-SEM) allows researchers to simultaneously examine the measurement model, which includes both reflective and formative indicators, and the structural model, which includes causal relationships.

After assessing the measurement model, the next step is to assess the structural model, also known as the inner model, to conduct hypothesis testing. The evaluation of the structural model includes various criteria, such as testing multicollinearity, t-statistics, path coefficients, coefficient of determination (R^2), standardised path coefficients (β), significance level (p), effect size (f^2) and predictive relevance of the model (Q^2). The use of the variance inflation factor (VIF) was used to assess multicollinearity.

The VIF assessment in **Table 5** demonstrates that all values are below the threshold of 5, suggesting the absence of multicollinearity in the dataset. According to the studies conducted by Hair et al. (2017) and Ringle et al. (2015), the recommended threshold value for Variance Inflation Factor (VIF) is 5.

Table 6 clearly shows that all hypotheses are supported based on the standard P-value (0.05). The structural model shows the direct effect of the relationships as well as the t-value and p-value to prove the significance of the hypotheses. The result shows that transformational leadership has a positive and significant effect on e-commerce adoption (TRFL - > ECA: β = 0.194, $P < 05$), which is in line with (Rehman et al., 2019; Seyal, 2015) who investigated technology adoption by examining the role of transformational leadership style. Transactional leadership has a negative and significant impact on e-commerce adoption (TRSL - > ECA: β = −0.082, $P < 0.05$), this result is consistent with the work of (Rehman et al., 2019; Nazarian et al., 2017).

The relevant statistics for the moderating effects analysis are presented in **Table 6**. According to the results, H3 is supported (β = −0.143, t = 3.3963 and $P <$ 0.05), which proves that there is a significant moderating effect of technology readiness on the relationship between transformational leadership style and E-commerce adoption. Second, according to the results, H4 is rejected (β = 0.081, t = 1.356 and $P > 0.05$), which means that the moderating effect of technology readiness between transactional leadership style and e-commerce adoption is not significant. However, the rejection of H4 means that the moderating effect of technology readiness on the relationship between transactional leadership style and e-commerce adoption could not be empirically demonstrated because the path was not statistically significant.

The value of the R-squared (R^2), as shown in **Table 7**, is a measure of the proportion of variation in the value of the variable of interest that can be explained by the variable it influences. When a study uses more than two independent

Table 5. Multicollinearity assessment.

	VIF
Transformational Leadership	1.206
Transactional Leadership	1.008
Technology readiness	1.212

Table 6. Hypothesis testing result (structural model) & moderation analysis result.

H No.	Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	*p* values	Decision	R^2	F^2
H1	TRFL -> ECA	0.194	0.188	0.087	2.235	0.026	Supported	0.350	0.109
H2	TRSL -> ECA	−0.082	−0.089	0.038	2.144	0.032	Supported		0.016
H3	TR × TRFL -> ECA	−0.145	−0.147	0.043	3.396	0.001	Supported		
H4	TR × TRSL -> ECA	0.081	0.085	0.059	1.356	0.176	Rejected		

*TRFL = Transformational leadership, TRSL = Transactional leadership, TR = Technology readiness, ECA = Electronic commerce adoption.

Table 7. R-square adjusted.

Variable	R-square	R-square adjusted
Electronic Commerce Adoption	0.449	0.439

variables, the adjusted r-squared (adjusted R^2) should be considered (Purwanto, 2021). The R^2 value in this study indicates that the independent variable explains 43.9% of the variation in the dependent variable of the e-commerce adoption, while the remaining 56.1% is influenced by other variables. This result is considered satisfactory given the rule of thumb R^2 of 0.25—weak, 0.50—moderate, R^2 of 0.75—substantial (Hair et al., 2013) and $R^2 < 0.19$—weak, R^2 0.33—moderate and $R^2 > 0.67$—substantial (Chin, 1998).

4.3.3. Simple Slope (Moderation Analysis)

The use of simple slope diagrams is a common way of presenting the results of moderator analysis, as can be seen in the results report. **Figure 7** and **Figure 8** show a simple slope diagram illustrating the correlation between transformational and transactional leadership styles and e-commerce adoption, with the moderating factor being related to technological readiness.

The results presented in **Figure 7** indicate a statistically significant negative moderating effect of technology readiness on the relationship between transformational leadership style and e-commerce adoption ($\beta = -0.145$, $t = 3.396$, $P < 0.05$). The graph illustrates a more pronounced and upward slope for technological readiness as opposed to transformational leadership. The results of this study suggest that the impact of transformational leadership on e-commerce adoption depends on the level of technological readiness of SMEs in Oman. Put

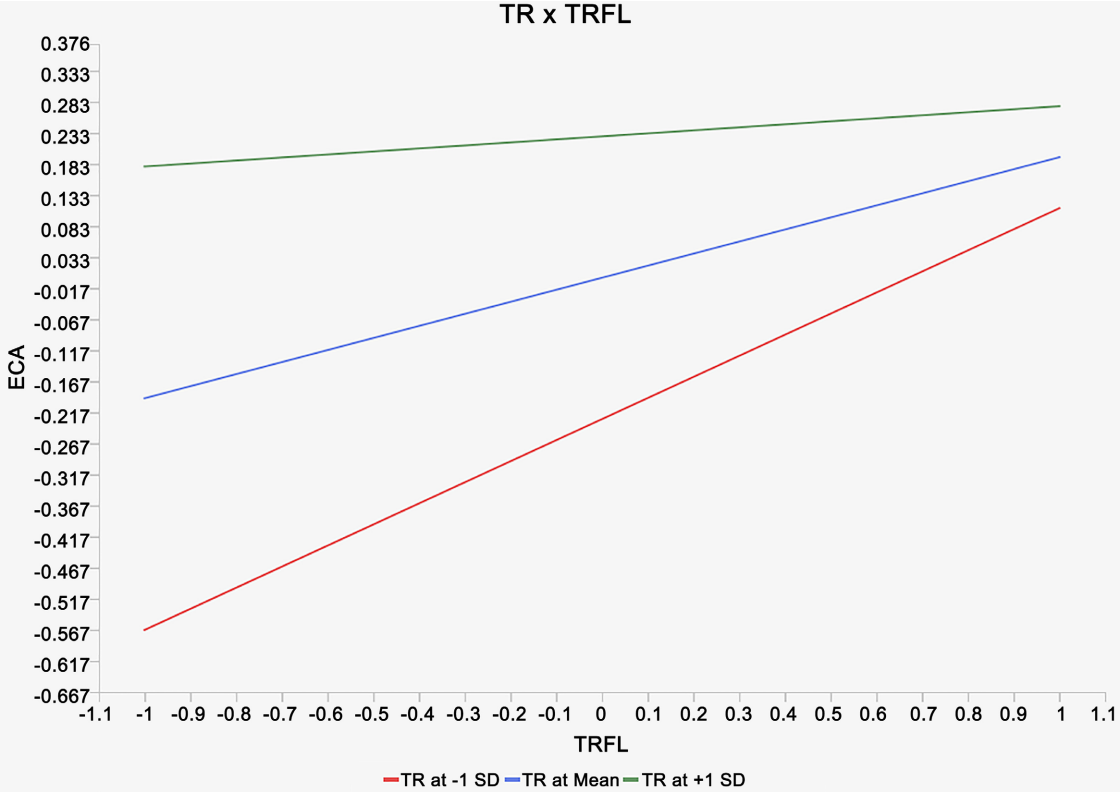

Figure 7. Interactive effect of technology readiness on transformational leadership style and e-commerce adoption.

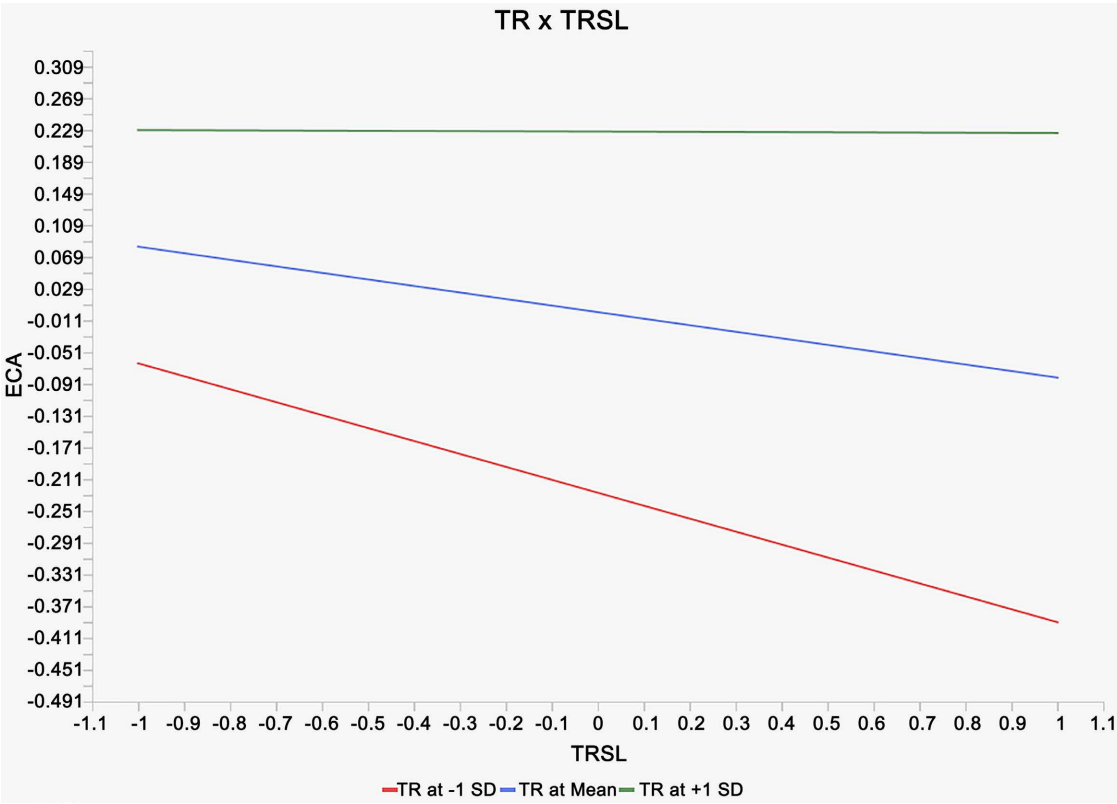

Figure 8. Interactive effect of technology readiness on transactional leadership and e-commerce adoption.

Table 8. Summary of hypothesis testing on the effect of the variables.

H. no	Statement	Beta (β)	*p*-values	*Status*
H1	There is a statistically significant relationship between transformational leadership style and electronic commerce adoption among SME managers in Oman.	0.194*	0.026	*Supported*
H2	There is a statistically significant relationship between transactional leadership style and electronic commerce adoption among SME managers in Oman.	−0.082*	0.032	*Supported*
H3	There is a moderating effect of technology readiness on the transformational leadership style of SME managers and electronic commerce adoption in Oman.	−0.145**	0.001	*Supported*
H4	There is a moderating effect of technology readiness on the transactional leadership style of SME managers towards electronic commerce adoption in Oman	0.081	0.176	*Rejected*

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

simply, the influence of transformational leadership on e-commerce adoption is more pronounced when firms have a higher level of technological readiness. In contrast, in situations where technological readiness is lacking, the influence of transformational leadership on e-commerce adoption may be lower.

The results presented in **Figure 8** show that there is no significant moderating effect of technology readiness on the relationship between transactional leadership style and e-commerce adoption (β = 0.081, t = 1.356, $P > 0.05$). The graph shows that the slope of technological readiness is more pronounced and negative compared to the slope of transactional leadership style. This result indicates that there is no significant relationship between the level of technological readiness and the influence of transactionall leadership style on the adoption of e-commerce among managers of SMEs (see **Table 8**). The results suggest that a decrease in technological readiness is associated with a stronger influence of transactional leadership style on e-commerce adoption.

5. Discussion, Conclusion and Recommendation

The findings of this study show significant correlations between transformational leadership styles and the adoption of e-commerce in SMEs in Oman. Consequently, an increase in the implementation of transformational leadership style is associated with a greater likelihood of e-commerce adoption in SMEs in Oman. Conversely, this study shows a significant negative impact of transactional leadership style on e-commerce adoption in small and medium enterprises in Oman (Feranita et al., 2020). These divergent findings suggest that the im-

pact of transactional leadership style on e-commerce adoption may vary compared to its impact on overall innovation and performance. This suggests that the use of a transactional leadership style may impede the development of e-commerce, possibly due to a lack of innovation and a reluctance to adopt new technologies. There are several reasons why the adoption of e-commerce in Oman may be negatively affected by transactional leadership. Factors contributing to this problem include a low willingness to adapt, insufficient focus on fostering new ideas and nurturing employees, limited communication and collaboration, and a tendency to avoid risks.

It is crucial to identify the leadership styles that are conducive to the successful adoption of e-commerce technologies in the Omani context (Al Harthy et al., 2021). The results of this study show that SMEs in Oman have limited use of e-commerce. 42.9% of the surveyed enterprises have a corporate website, while the remaining 57.1% do not have an online presence. Furthermore, the empirical results show that only 16.2% of SMEs offer comprehensive online ordering and payment facilities.

The research findings show that technology readiness plays a significant role as a moderator in the "leadership style and e-commerce adoption" relationship (Parasuraman & Colby, 2014). This was evidenced by an increase (8.9%) in the R2 value of e-commerce adoption. The significant moderating effect of technology readiness suggests that SMEs with higher levels of technology readiness are better able to reap the benefits of transformational leadership in e-commerce adoption. This result also suggests that the relationship between transactional leadership style and e-commerce adoption is not influenced by the level of technology readiness in SMEs.

This study investigated the moderating effect of technology readiness of SME leaders in Oman on e-commerce adoption. According to the results of the study, the majority of SMEs in Oman have not yet adopted e-commerce. The results of the study confirm that it is important for SMEs to advocate for an appropriate leadership style that can contribute to the adoption of e-commerce in SMEs in Oman.

Future studies should consider examining contextual elements and cultural influences in light of the limitations in this study. This study aims to assess the influence of contextual elements and cultural dimensions on the correlation between leadership style and e-commerce adoption. Further research can be conducted to explore other leadership styles with the aim of testing and contrasting the findings in this area. Investigating how industry factors, company size and cultural values affect the success of different leadership styles in e-commerce adoption may be of interest to researchers. Future studies could conduct comparative research in other countries or regions to examine the impact of cultural, economic and institutional aspects on the relationship between leadership style and e-commerce adoption. This study has the potential to facilitate the identification of cross-cultural differences and provide valuable insights into the adap-

tation of leadership strategies in different contexts, such as Oman or other countries.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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