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Determinants of Social Media Adoption among SMEs in Syria: Analyzing Depth of Usage through the TOE Framework

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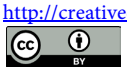

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Abstract

Small and medium-sized enterprises (SMEs) are pivotal to the economic development of both small and large economies. The performance and operation of these SMEs are significantly influenced by their use of technology, including social media. Social media has emerged as a vital tool for fostering the growth and resilience of SMEs, especially in conflict-affected economies, thus contributing to their overall economic development. However, the adoption of social media among SMEs, especially in conflict-affected regions, remains underexplored. This study addresses this gap by investigating social media adoption and depth of social media presence among SMEs in war-torn Syria, using the Technology, Organization, and Environment (TOE) framework. The study analyses survey data and in-depth interview from 525 and 18 SMEs, respectively using robust Logistics, Tobit and Method of Moment Quantile regression. The findings reveal technological factors such as compatibility, trust, trialability, and observability, environmental factors like market scope and customer pressure, and organizational factors including top management support, are crucial factors that affect social media adoption among SMEs. Based on these results, policymakers and SME owners should leverage supportive factors and address barriers to enhance social media adoption.

Keywords

Social Media Adoption, SME, TOE Framework, Depth of Social Media,

Syria

1. Introduction

The small- and medium enterprises (SME) sector serves as a cornerstone for both developed and developing economies, driving economic growth through job creation, innovation, and fostering social cohesion (Fan et al., 2021; Lutfi et al., 2022). In Syria, SMEs play a pivotal role, comprising over 99 per cent of businesses, as reported by the Syrian Central Bureau of Statistics in 2020. However, unlike their counterparts in more developed economies, Syrian SMEs primarily focus on traditional sectors such as agriculture and handicrafts, often lacking in innovation capabilities. This mirrors a broader challenge faced by SMEs in emerging countries, where transitioning into larger enterprises and contributing significantly to exports remains elusive.

Despite their economic significance, SMEs encounter hurdles in adopting modern technological applications to compete with larger firms (Vrontis, Chaudhuri, & Chatterjee, 2022). The process of globalization has intensified the need for enterprises to embrace modern technologies to remain competitive and foster innovation, thereby driving business growth (Dahnil et al., 2014). Central to this technological transformation is the emergence of social media, which has revolutionized various aspects of enterprise operations, including marketing, operations, finance, and human resource management, offering them a competitive edge (Daood, Wang, & Oppong, 2024; Qalati et al., 2021; Qalati et al., 2022).

In the context of Syria, the significance of social media adoption by SMEs has gained prominence, particularly in the aftermath of the Syrian war and COVID-19. The widespread use of social media platforms for information dissemination has prompted businesses to leverage these platforms to expand their reach among, disseminate information, collect customer feedback and most importantly, improve sales (Akkad & Mouselli, 2023). However, despite the recognized importance of social media adoption in Arab countries like Syria, there remains a dearth of research on its specific implications for business operations.

Successful adoption of social media by SMEs requires a culture that supports adopting new technologies and encourages employees to learn and embrace it. While many studies have explored the use of social media from a business-to-customer perspective, such as its impact on brand loyalty and consumer buying decisions, there is a growing need for research that specifically examines the context of SMEs operating in Arab countries and, most importantly, War-torn countries such as Syria where social media adoption offers a new opportunity for the survival of SMEs. To address this gap, our study utilizes the technology-organization-environment (TOE) model to identify the determinants of social media adoption and depth of social media presence among SMEs in Syria. By

identifying these determinants, our research seeks to provide valuable insights for SMEs aiming to optimize their marketing activities, enhance customer engagement, and select suitable social media platforms. Moreover, our study extends the existing literature by examining how future technologies can address the evolving needs of SMEs.

This paper proceeds as follows: Section two outlines the methodology and data analysis approach. Sections three and four present the findings and conclude the study, respectively.

2. Literature Review

The adoption of social media by Small and Medium-sized Enterprises (SMEs) has garnered significant attention in recent years, particularly due to its potential to enhance business performance, customer engagement, and competitive advantage. In the context of SMEs in Syria, understanding the factors influencing social media adoption is crucial given the challenging business environment. This literature review employs the Technology-Organization-Environment (TOE) framework, a robust theoretical model first introduced by (Tornatzky & Fleischer, 1990), to examine the determinants of social media adoption among SMEs.

2.1. Theoretical Framework

The TOE framework is widely recognized for its comprehensive approach in analyzing various factors impacting the adoption of information and communication technologies (ICTs) in SMEs. It encompasses three primary contexts: technology, organization, and environment, each with specific determinants that influence adoption decisions (Tornatzky & Fleischer, 1990).

The technological context refers to the internal and external technologies relevant to the firm. Factors such as perceived complexity, relative advantage, and compatibility play crucial roles in technology adoption decisions. For instance, social media platforms that are perceived as easy to use and compatible with existing systems are more likely to be adopted (Alshamaila, Papagiannidis, & Li, 2013). Moreover, the relative advantage of social media in terms of marketing and customer interaction can drive adoption among SMEs in Syria, where traditional marketing channels might be limited due to economic and political instability.

The organizational context includes internal characteristics such as firm size, management support, and technological readiness. Larger SMEs with more resources and better technological infrastructure are often more capable of adopting new technologies like social media (Ramdani, Kawalek, & Lorenzo, 2009). Furthermore, top management support is critical, as decisions related to technology adoption in SMEs typically fall under the purview of the CEO or owner (Abdullah, Wahab, & Shamsuddin, 2013). In the Syrian context, where SMEs may operate with constrained resources, the role of entrepreneurial orien-

tation and the innovative mindset of the leadership becomes even more significant.

The environmental context involves external pressures such as competition, regulatory environment, and support infrastructure. In a volatile business environment like Syria, external pressures can significantly influence the adoption of social media. Competitive pressure, in particular, can drive SMEs to adopt social media to maintain or enhance their market position (Tehrani & Shirazi, 2014). Additionally, external support from government policies and industry associations can facilitate adoption by providing necessary resources and training.

2.2. Empirical Studies Using the TOE Framework

Several empirical studies have applied the TOE framework to investigate technology adoption in SMEs across different contexts, demonstrating its robustness and adaptability. For example, (Ifinedo 2011) explored the adoption of Internet-based technologies among Canadian SMEs, highlighting the significant impact of organizational readiness and external pressures. (Alshamaila, Papagiannidis, & Li, 2013) studied cloud computing adoption in the UK, emphasizing the roles of technological attributes and environmental factors. Similarly, (Premkumar & Roberts, 1999) examined ICT tools adoption in the US, noting the influence of organizational size and competitive pressure. In the context of e-commerce adoption, (Thong, 2012) in Singapore and (Kuan & Chau, 2001) in Hong Kong (China) identified compatibility, relative advantage, and external pressure as key determinants. These studies provide valuable insights into the multifaceted nature of technology adoption in SMEs. However, they also reveal limitations, such as a primary focus on technologically advanced regions and a lack of consideration for SMEs operating in more challenging environments.

While the TOE framework has been extensively applied, previous studies often exhibit a narrow geographical focus, predominantly examining SMEs in technologically advanced and economically stable regions. This leaves a significant gap in understanding how SMEs in less stable environments, like Syria, navigate the complexities of adopting new technologies. Moreover, many studies tend to emphasize organizational and technological contexts, sometimes underestimating the critical role of environmental factors, particularly in regions with volatile political and economic landscapes (Amin & Hussin, 2014; Tehrani & Shirazi, 2014). Furthermore, while the role of CEO characteristics is acknowledged (Hashim, 2007; Abdullah, Wahab, & Shamsuddin, 2013), the interplay between individual leadership traits and broader environmental pressures remains underexplored. This is particularly relevant for Syrian SMEs, where leadership adaptability and resilience might significantly influence technology adoption decisions.

The TOE framework provides a comprehensive lens through which the adoption of social media among SMEs in Syria can be analyzed. By considering tech-

nological, organizational, and environmental contexts, this framework facilitates a nuanced understanding of the factors driving or hindering adoption. However, the current body of literature exhibits a geographic and contextual bias, underscoring the need for empirical studies within the Syrian context. Addressing these gaps will not only enhance the applicability of the TOE framework but also provide actionable insights for policymakers and business leaders aiming to support SME growth and resilience in challenging environments.

3. Methodology

This section examines the research methodology used in this study's empirical approach. It covers the research approach, data collection, and the choice of data that underlie the sampling approach. This section also describes the individual variables used in the empirical study and provides a rationale for the data analysis methods.

3.1. Research Approach

The study employs a mixed research approach to assess the factors affecting social media adoption among SMEs. The mixed research approach is a robust methodology that seamlessly blends qualitative and quantitative methods, offering a holistic and comprehensive understanding of complex phenomena (Johnson & Onwuegbuzie, 2004). This approach addresses concerns about validity and reliability by allowing researchers to triangulate findings from different data sources, strengthening the study's credibility (Creswell & Clark, 2011).

The study uses a survey of 525 small and medium-sized enterprises (SMEs). The questionnaire was developed based on existing literature (see Amoah et al., 2023; Bruce et al., 2022; Vrontis, Chaudhuri, & Chatterjee, 2022). To ensure the accuracy of our respondents, we defined SMEs following the new definition of SMEs proposed by the Syrian Ministry of Economy and Industry. The ministry has also recently issued a revised definition for SMEs, which includes two standards based on the number of employees and annual sales. To qualify as an SME, an organization must employ no more than 99 workers and have a yearly turnover of 1 billion SYP. This definition is consistent across all sectors and has been widely adopted by governmental and private bodies.

To ensure a more robust conclusion of the factors underlying the adoption of social media by SMEs in Syria, we interviewed 18 SMEs in Damascus and Rif Dimashq randomly. It was conducted at the location of the facility or factory. These two cities were adopted because they serve as Syria's Commercial and industrial cities, where most SMEs are located. The interview focused on the owner-managers of the SMEs. **Appendix 1** presents the thematic presentation of the 18 SMEs interviewed. According to Myers and Newman 2007, the owner determines the organization's nature, scope, and IT investments. The interviews provided detailed information about the factors influencing the decision to adopt social media (Schultze & Avital, 2011). The data from the interviews are ana-

lyzed thematically. Table 1 presents the themes and coding of our variables.

Table 1. Factors affecting social media adoption.

No	Theme name	Abbreviation	Code
1	TC Technology	RAV	Relative advantage
2		CPX	Complexity
3		CPT	Compatibility
4		TRB	Trialability
4		OBV	Observability
6		IMG	Image
7		INT	Interactivity
8		TRT	Trust
9	OC Organization	SZE	Size
10		TMS	Top Management Support
11		INV	CEO Innovativeness
12		PIE	Prior IS Experience
13		PLT	Perceived lack of Managerial Time
14	EC Environment	IND	Industry
14		MKS	Market Scope
16		CMP	Competitive Pressure
17		CSP	Customer Pressure
18		FFI	Family & Friends Support

Source: Author.

3.2. Econometric Modelling

The study investigates the factors influencing the adoption of social media by small and medium-sized enterprises (SMEs) using a binary dependent variable. The decision to adopt social media, is binary (coded as 1 = adopt, 0 = do not adopt). Following the works of (Alshamaila, Papagiannidis, & Li, 2013; Vrontis, Chaudhuri, & Chatterjee, 2022), we analyze the data using Logistics Regression (LR). LR handles both categorical and continuous independent variables (Sheahan & Barrett, 2014), making it a versatile tool for this type of analysis.

$$P_i = \beta_0 + \beta_1 X_1 + \beta_2 X_3 \cdots \beta_k X_k \quad (1)$$

In the current study, the dependent variable represents the possibility of a successful adoption decision by SMEs concerning the likelihood (p) of falling within a specific category. The constant, defined by the coefficient β_0, serves as the intercept for the dependent variable. The coefficients represent the model's independent variables β_1, β_2, β_3, with β_k, representing the coefficient for the last independent variable, where k equals 18 (the number of constructs in the

TOE-related components). Binary logistic regression was selected as the best analysis method to fit the data since the adoption of social media is binary, where we assign one if a firm uses social media and 0 if otherwise.

The full model is of the form:

$$\begin{aligned} p_{0i} = {} & \beta_0 + \beta_1 \mathrm{IND}_i + \beta_2 \mathrm{Size}_i + \beta_3 \mathrm{SCP}_i + \beta_4 \mathrm{RAV}_i + \beta_5 \mathrm{CMX}_i + \beta_6 \mathrm{CMB}_i \\ & + \beta_7 \mathrm{TRB}_i + \beta_8 \mathrm{OBV}_i + \beta_9 \mathrm{INT}_i + \beta_{10} \mathrm{TRT}_i + \beta_{11} \mathrm{IMG}_i + \beta_{12} \mathrm{TMS}_i \\ & + \beta_{13} \mathrm{INV}_i + \beta_{14} \mathrm{PIE}_i + \beta_{15} \mathrm{PLT}_i + \beta_{16} \mathrm{CMP}_i + \beta_{17} \mathrm{CSP}_i + \beta_{18} \mathrm{FFI}_i + \varepsilon \end{aligned} \quad (2)$$

The variables used in this study include IND (industry of the SME), Size (number of employees), SCP (scope of the firm), RAV (relative advantage of the firm), CMX (complexity perception of technology), CMB (compatibility of a firm's business with social media), OBV (observability), INT (interactivity), TRT (trust), IMG (image of business), TMS (top management support of social media adoption), INV (innovativeness of the CEO), PIE (prior experience of the firm in the use of technology), PLT (perceived lack of time), CMP (competitive pressure from competitive firms), CSP (customer pressure), and FFI (support of family and friends).

3.2.1. Robustness Check

To validate the results of the Logit Model, the binary dependent variable representing the adoption of social media SM is replaced with a depth of social media usage. The depth of social media usage is calculated using a Multiple Correspondence Analysis (MCA) based on the number of social media platforms on which a firm has an active account.

3.2.2. Depth of Social Media Usage

To estimate the social media depth of usage of firm_i we employ Multiple Correspondence Analysis (MCA) to compute the social media SM index of SMEs in Syria. We adopt MCA instead of Principal Component Analysis (PCA) because the variables used in calculating our index variables are binary and take values of 1 and 0. 1 if a respondent owns the underlying asset, and 0 otherwise (Oppong, Baorong, & Mazonga Mfoutou 2024; Oppong, Yu, & Mazonga Mfoutou, 2024). The social media SM index function is of the form:

$$\text{Social media index}_i = f\left(O_{ij}\right) \quad (3)$$

where $\left(O_{ij}\right)$ It is a function of all binary data of the nine social media SM platforms considered under the study (Facebook, X, Instagram, WhatsApp, LinkedIn, Wechat, TikTok, Telegram, and others).

Correspondence Analysis (MCA) to Create Depth of Social Media Usage Index

MCA is a new version of PCA designed to analyze categorical variables (Oppong, Baorong, & Mazonga Mfoutou, 2024). Its ability to analyze categorical variables, such as Yes-No questions and social media SM platform usage, makes it suitable for this study.

$$\text{Social media index}_i = P_{i1}W_1 + P_{i2}W_2 + P_{i3}W_3 + \cdots + P_{i9}W_9 \quad (4)$$

3.2.3. Tobit Model Specification

We employ a Tobit model to analyze social media adoption factors among SMEs in Syria. A Tobit model considers a latent unobserved variable. γ^* That depends on a treatment variable φ with a binary output of 0 and 1 through a vector of control variables (Oppong, Yu, & Mazonga Mfoutou, 2024). δ_i. The base form of the Tobit model is as follows:

$$\gamma_i = \gamma_i^* \text{ if } \gamma_i^* > 0 \quad (5)$$

$$\text{and } 0 \text{ if } \gamma_i^* \le 0 \quad (6)$$

where γ_i^* is the depth of social media usage by γSME_i in Syria.

The full model is of the form:

$$\begin{aligned} p_{0i} = {} & \beta_0 + \beta_1 \text{IND}_i + \beta_2 \text{Size}_i + \beta_3 \text{Sscope}_i + \beta_4 \text{RAV}_i + \beta_5 \text{CMX}_i + \beta_6 \text{CMB}_i \\ & + \beta_7 \text{TRB}_i + \beta_8 \text{OBV}_i + \beta_9 \text{INT}_i + \beta_{10} \text{TRT}_i + \beta_{11} \text{IMG}_i + \beta_{12} \text{TMS}_i \\ & + \beta_{13} \text{INV}_i + \beta_{14} \text{PIE}_i + \beta_{15} \text{PLT}_i + \beta_{16} \text{CMP}_i + \beta_{17} \text{CSP}_i + \beta_{18} \text{FFI}_i + \varepsilon \end{aligned} \quad (7)$$

where p_{0i} is the index based on the number of social media platforms a firm uses, this represents the depth of the firm's social media presence.

3.2.4. Quantile Regression

To robust the Tobit regression estimates, the study employed the quantile regression method of the moment quantile regression (MMQR) model proposed by (Koenker & Bassett, 1978) to address distributional heterogeneity. This methodology is resistant to the influence of extreme values and distorted data distributions when calculating gradient values at various distribution quantiles. The study identifies asymmetric impacts of the factors affecting SMEs' decision to adopt social media in their operation without depending on consistent attributes throughout the range by examining the connections between social media adoption and influencing factors across different quantiles. The MMQR estimation allows for comparing the effects of the influencing factors on SMEs adopting social media across the entire Distribution, making it more favourable than linear regression techniques such as OLS and Tobit models. According to (Hao & Naiman, 2007), quantile regression expands on linear regression models to provide a more comprehensive understanding of the impact of regressors on response distribution. The conditional quantile γ_{it} given ∂_i Condition is expressed as:

$$Q\gamma_{it}\left(\varphi \middle| \partial_{it}\right) = \partial_{it}^{\varphi}\beta_{\varphi} \quad (8)$$

where φ_i is the quantile (for $0 < \partial_i < 1$) of the conditional Distribution, ∂_{it} Is the vector of the independent variables, and $Q\gamma_{it}\left(\varphi \middle| \partial_{it}\right)$ is the φ^{th} quantile (Daood, Wang, & Oppong, 2024).

4. Analysis and Discussion

This section presents the analysis and discussions of the factors affecting social media adoption among SMEs in Syria. The section first discusses the descriptive

statistics and then the empirical estimates. Finally, the study discusses the components of the TOE framework that support social media adoption in Syria based on the econometric and thematic analysis of the interviews conducted.

4.1. Descriptive Statistics

Table 2 presents the demographic statistics of owner-managers and SMEs, focusing on age, gender, educational attainment, and employment type. The analysis revealed that 68.4% of respondents were male, reflecting cultural norms in Syria where most SMEs are male-owned or managed. However, policy changes have increased female participation, with women primarily running microbusinesses with fewer than five employees (Belwal, Belwal, & Saidi, 2014; McElwee & Al-Riyami, 2003). Age-wise, 62% of respondents were aged 35 - 44, followed by 21.9% aged 25 - 34. Educationally, 64.6% held college degrees and 20% held postgraduate degrees, with over 80% having at least a bachelor's degree. Interestingly, more than 75% of female participants held a college credential, indicating a higher likelihood of women pursuing entrepreneurship post-education. Regarding work status, 86.7% were self-employed, with more in the private sector (4.2%) than the public sector (3.8%). Notably, over 75% of self-employed females owned their businesses, highlighting the supportive cultural context for female entrepreneurs. The SMEs' demographics included age, size, scope, and industry sector (Kakumbi & Phiri, 2022).

Table 2. Cross-tabulation - SME owner-managers demographic characteristics.

Demographic	Frequency	%	Adopters	%	Non-adopters	%
Gender						
Female	166	31.6	134	29.6	41	56.1
Male	359	68.4	318	70.4	32	43.8
Respondents' Age						
Less than 25	17	3.2	17	3.8	0	0
25 to 34	115	21.9	96	21.2	19	26.0
35 to 44	327	62.3	286	63.3	41	56.1
45 to 54	54	10.3	45	10.0	9	12.3
55 to 64	9	1.7	8	1.8	1	1.4
65 and over	3	0.6	0	0	3	4.1
Education						
No formal education	25	4.76	15	3.3	10	13.7
Primary education	2	0.4	2	0.4	0	0
Secondary education	32	6.1	27	6.0	5	6.9
College Education	23	4.4	21	4.6	2	2.7

Continued

Degree	339	64.6	304	67.3	35	48.0
Postgraduate	105	20	84	18.6	21	28.8
Employment						
Full-time government worker	22	4.2	18	4.0	4	5.5
Full-time private employee	20	3.8	20	4.4	9	12.3
Self-employed	455	86.7	397	87.8	58	79.5
Students	19	3.6	17	3.8	2	2.7
Enterprise size						
Less than five employees	78	14.9	65	83.33	13	16.67
Between 5 and 9 employees	177	33.7	155	100	0	0
Between 10 and 99 employees	270	51.4	231	85.6	39	14.4
Enterprise age						
0 - 1 year	25	4.8	22	88	3	12
1 - 3 years	34	6.5	26	76.5	8	23.5
3 - 5 years	95	18.1	78	82.1	17	17.9
More than five years	371	70.7	325	87.6	16	12.4
Industry						
Manufacturing	337	64.2	291	86.4	46	13.6
Wholesale & retail	62	11.8	52	83.9	10	16.1
Professional & Technical Services	76	14.5	69	90.7	7	9.3
Construction	50	9.5	40	80	10	20
Market scope						
Local	150	28.6	124	82.7	26	17.3
National	255	48.6	220	51.8	35	48.2
Regional	74	14.1	67	90.1	7	9.9
International	47	9.0	41	87.2	6	12.8

Source: Author.

In **Figure 1**, we present the popular social media platforms used by SMEs in Syria. The most popular choice of social media platforms among SMEs in Syria is Facebook, followed by Instagram. This contradicts studies in the UAE, where Instagram is the most widely used platform among SMEs (Dahleez, Abdel Fattah, & Al Alawi, 2020). However, we find that the difference between using Facebook and Instagram is 3 per cent, indicating that 3 per cent more SMEs use Facebook than Instagram. We discovered that WeChat is the least adopted social media app among SMEs. This is partly due to the strict regulation and tedious verification process people outside China have to go through before getting WeChat to work. This has made the App less popular in Syria.

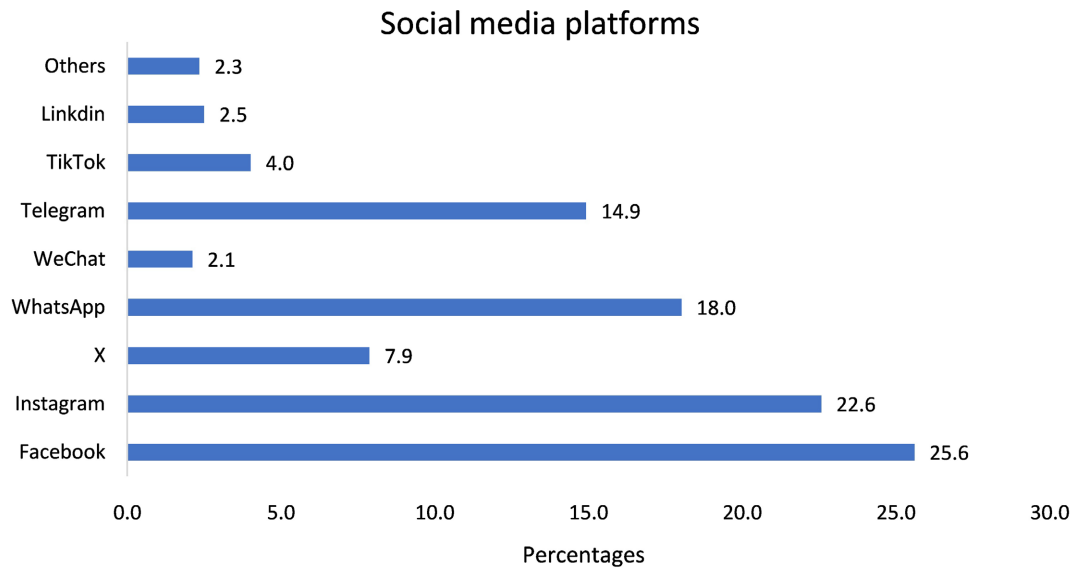

Figure 1. Social Media Platform Use. Source: Author.

4.1.1. Social Media Usage

Figure 2 presents the purpose of social media usage among SMEs in Syria. The figure shows that SMEs tend to view social media (SM) primarily as a tool for advertising and marketing. The results indicate that most SMEs adopt social media for customer service and advertisement and marketing purposes with 94.90% and 82.90%, respectively. Notably, a significant proportion of SMEs (53.6%, 31.30% and 31.30%, respectively) use social media SM for getting referrals, branding and information sharing purposes, indicating a growing recognition of the potential benefits of SM in the Syrian business environment. These findings were confirmed by SME01, SME02, SME07, and SME09, highlighting that social media SM has helped them expand globally and regionally, reaching customers across the globe.

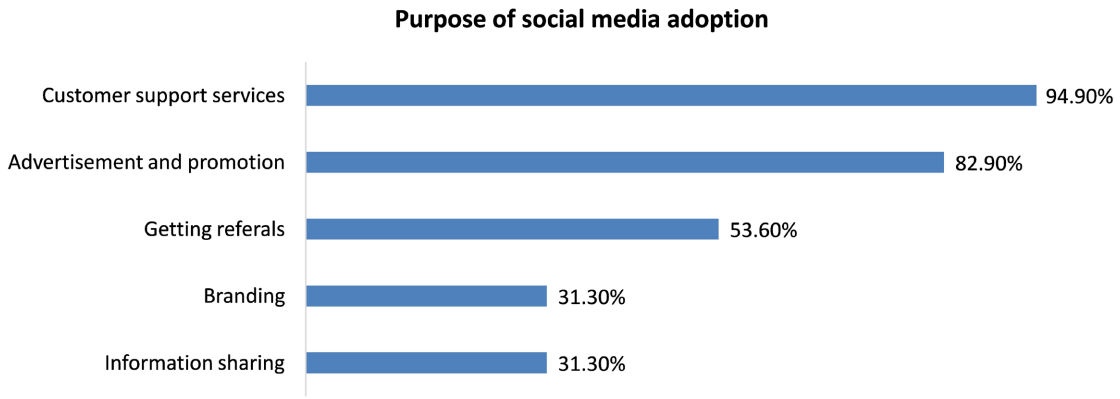

Figure 2. Purposes of Social Media SM Adoption. Source: Author.

4.1.2. Reasons for Non-Adoption of Social Media among SMEs in Syria

Figure 3 presents the reason for the non-adoption of social media. Most (nearly

50%) cited a lack of resources and perceived advantage as the primary obstacle to adoption. Other notable impediments included the belief that the enterprise could operate without social media and insufficient skills to utilize it. A small percentage (11.2%) expressed concerns over potential negative customer feedback.

Of the reasons for the non-adoption, 31.75 per cent of the SMEs cited inadequate financial resources for their non-adoption. This is consistent with the findings of (Amoah et al., 2023) and (Marete, Kituyi, & Kirabo, 2021), who argue that financial availability impacts social media adoption positively. Similarly, 29.63 per cent cite the lack of relative advantage of social media for their non-adoption. These companies argue that using social media for business does not offer companies advantages over firms that do not. SMEs 15 and 17 stated that they do not think using social media will directly impact the operation and performance of their businesses. Also, according to SME 18, customers prefer to transact offline than to transact online. However, SME 13 argues that the time spent on social media could be used to improve the firm's production. The impact of the perceived advantage of social media has been established as a major influencing factor in SMEs' decision to adopt social media (Richard, Osunsan, & Wampande, 2023; Amoah et al., 2023).

Furthermore, the lack of time and skills on social media usage accounts for 10.58 and 8.4 per cent of why businesses choose not to use social media. Also, 7.41 per cent of the SMEs cited the perceived risk in data privacy, cyber-attacks, and copyright infringements as their reasons for the non-adoption of social media in their business.

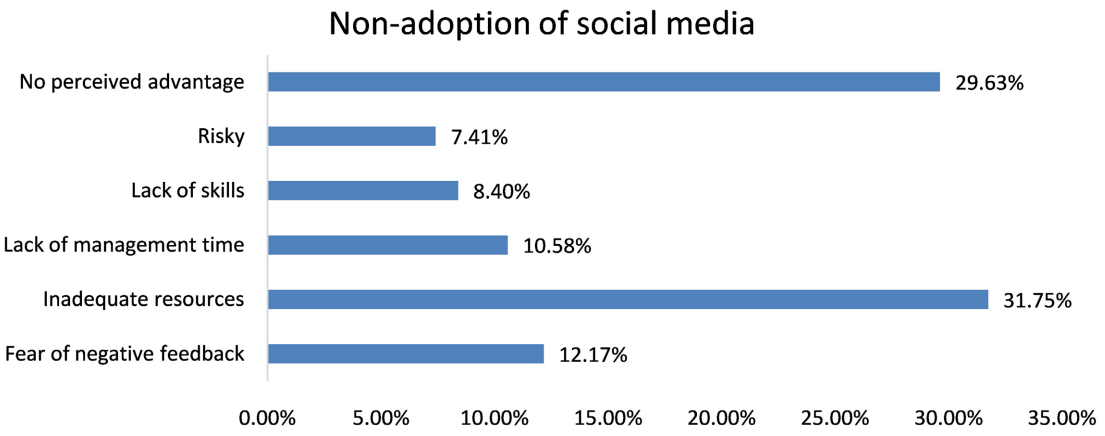

Figure 3. Reasons for Non-adoption of Social Media Usage. Source: Author.

4.1.3. Collinearity between Variables (Multilinearity)

The degree of multi-collinearity among the predictors was investigated using the Variance Inflation Factor (VIF) and Tolerance (TOL). These diagnostic statistical techniques are designed to show whether there is a strong correlation between two or more model-included factors. It is important to note that there is no for-

mal standard for determining what VIF and TOL scores are acceptable for determining whether multi-collinearity exists (O'Brien, 2007). There are various viewpoints in the literature regarding appropriate VIF levels. A criterion suggested by (Hair Jr. et al., 2010; Myers, 1990) was used for this study. Both proposed a VIF > 10 cutoff as a sign of detrimental multi-collinearity and a call for additional statistical analysis. The regression model's stability is unaffected by collinearity; conversely, if the VIF score is less than 10, it denotes a weak interdependence among the model's predictors. The most frequently recommended tolerance number is that a TOL value of less than 0.1 indicates a threat of multi-collinearity, but a value above 0.1 indicates no problem with multi-collinearity (Myers, 1990; Scott, 2002). The model results from this investigation are summarized and contrasted with acceptable scores in **Table 3**.

Table 3. Vector inflation factor.

No	Independent variable	Multi-collinearity Test	
		Variance Inflation Factor VIF (1/TOL)	Tolerance (TOL)
1	(IND) Industry	1.185	0.844
2	(SZE) Size	1.571	0.637
3	(SCP) Scope	1.202	0.832
4	(RAV) Relative advantage	2.167	0.461
5	(CMX) Complexity	2.203	0.454
6	(CMB) Compatibility	2.412	0.415
7	(TRB) Trialability	2.810	0.356
8	(OBV) Observability	2.636	0.379
9	(INT) Interactivity	1.831	0.546
10	(TRT) Trust	2.302	0.434
11	(IMG) Image	1.973	0.507
12	(TMS) Top Management Support	2.284	0.438
13	(INV) Innovativeness	2.488	0.402
14	(PIE) Prior IS Experiences	2.812	0.356
15	(PLT) Perceived Lack of Time	1.133	0.882
16	(CMP) Competitive Pressure	2.579	0.388
17	(CSP) Customer Pressure	3.609	0.277
18	(FFI) Family and Friends Support	2.872	0.348

Source: Author.

Table 3 indicates that all of the predictors in this study have VIF scores ranging from 1.133 to 3.609, suggesting no multi-collinearity issue with the dataset. The TOL scores are also acceptable, with all values exceeding 0.1. These results

demonstrate a noticeable difference in multi-collinearity across all cases. However, it is not believed that this level of collinearity would significantly affect the model's ability to forecast the adoption of social media among Syrian SMEs.

4.1.4. Reliability Testing of Constructs

Table 4 presents the reliability constructs of our variables under study following the works of (Heale & Twycross, 2015; Tavakol & Dennick, 2011; Scott et al., 2008). According to (Pallant, 2013, Drost Ellen, 2011, Cortina, 1993; Nunnally, 1978), a coefficient of 0.7 is the recommended cut-off point to show an acceptable level of reliability. Our reliability construct presented in Table 4 shows a minimum of 0.796 and a maximum of 0.951 exceeding the minimum Cronbach's Alpha requirement of 0.7 as suggested by (Pallant, 2013, Drost, 2011) indicating that our contracts are valid for measuring the TOE framework.

Table 4. Reliability construct.

Number	Corresponding questions in the survey	Constructs	Reliability Cronbach's Alpha
		Technology	
1	15 - 18	Relative Advantage (RAV)	0.800
2	19 & 20	Complexity (CMX)	0.840
3	21 - 23	Compatibility (CMB)	0.804
4	24 & 25	Trialability (TRA)	0.823
5	26 - 28	Observability (OBS)	0.796
6	29 - 31	Interactivity (INT)	0.830
7	32 - 35	Trust (TRT)	0.807
8	36 & 37	Image (IMG)	0.881
		Organization	
9	38 & 39	Top Management Support (TMS)	0.873
10	40 - 42	CEO Innovativeness (INV)	0.901
11	43 & 44	Prior IS experience (PIE)	0.800
12	45 - 46	Perceived Lack of Time (PLT)	0.845
		Environment	
13	47 & 48	Competitive Pressure (CMP)	0.866
14	49 & 50	Customer Pressure (CSP)	0.951
15	51 & 52	Family & Friends Support (FFI)	0.897

Source: Author.

4.1.5. KMO & BTS Values within TOE Contexts

To measure the sampling adequacy and the suitability of using Factor Analysis (FA) for our constructs, we adopt Bartlett's Test of Sphericity (BTS) and the Kaiser-Meyer-Olkin (KMO) which are both statistical tests used to assess the

suitability of data for FA. The KMO values presented in Table 5. Factor The KMO values exceeded the recommended minimum of 0.6, and the BTS significance levels were below 0.05, justifying the application of FA to the study data (Sheahan & Barrett 2014; Field, 2013).

Table 5. KMO& BTS values within TOE contexts.

Context	Bartlett's Test of Sphericity (BTS)	Kaiser-Meyer-Olkin (KMO) measure of Sampling Adequacy
Technology	2471.462 (p = 0.000, <0.005)	0.873
Organization	932.847 (p = 0.000, <0.005)	0.800
Environment	784.014 (p = 0.000, <0.005)	0.819

Source: Author.

4.2. Findings and Statistical Tests of the Hypotheses

Table 6 presents the logistics regression output of the factors affecting the adoption of social media by SMEs in Syria. The results are categorized into three broad categories. Those are technological, organizational, and environmental factors. Nine of the 18 factors under our TOE framework are statistically significant. Of these nine factors, five are Technological (compatibility, observability, Triability, Trust and Image) factors; one is organizational (Perceived lack of managerial time) and finally, three are environmental (Market scope, Customer pressure and Family and friend support) factors.

4.2.1. Technological Factors

Our research indicates that SMEs' adoption of social media in Syria is significantly impacted by compatibility with a coefficient of 1.206. This finding is consistent with previous studies on adopting new technologies in SMEs, including cloud computing and e-commerce (Ashraf et al., 2021; Honinah & Alhakimi, 2021; Nuseir & Elrefae, 2022). Similarly, the significant effect of compatibility on social media adoption is consistent with the compatibility of innovation under the diffusion theory of (Rogers et al., 2019) reconceptualised by (Karahanna, Agarwal, & Angst, 2006) which states that businesses adopt new innovations and technologies which aligns and integrates with their current practices and systems, However, this contradicts the findings of (Amoah et al., 2023), who found a negative relationship between compatibility and social media adoption.

Syrian SMEs rely on basic applications, which raises concerns about compatibility issues with social media and other tools. Many Syrian SMEs streamline their business processes using various technologies such as enterprise resource planning (ERP), inventory management software (IMS), and customer relationship management (CRM). They also use informational websites to provide details about their operations. The findings imply that technology will be easily accepted in the organization if it is tuned in with the principal value of that organization, can satisfy the desires of the organization, and is in line with the culture.

Further, by integrating social media activities in firm operations in line with the firm objectives, policies, and values, organizations can instantly reach their target audiences efficiently and effectively by sharing information about the firms' offerings (Alsharji, Jabeen, & Ahmad, 2019).

During the interview, SMEs 02 and 09 confirmed that low and weak network signals caused by the war in Syria did not deter them from adopting social media SM platforms. This was because these platforms could be accessed and managed on mobile phones without special software. According to SME 06 and 10, social media helps them connect with other businesses and their customers. They adopt social media because it meaninglessly integrates with other advanced tools that aid their marketing campaigns. On the other hand, SMEs 13 and 14 stated that they chose not to adopt social media as it was incompatible with their business. According to these SMEs, their business relied heavily on physical tasks that could not be completed using social media.

This study reveals that the trialability of social media is a statistically significant factor that positively influences the adoption of social media among Syrian SMEs, with a coefficient of 1.565. This finding is consistent with earlier research conducted by (Azam, Quaddus, & Rahim, 2010; Ramdani, Kawalek, & Lorenzo, 2009; Seyal & Rahman, 2003). Again, this is a constituent of the testing component of technological innovations of the diffusion theory by (Rogers et al., 2019), which is emphasised by (Dearing, 2021). Trialability is the degree to which an innovation may be experimented with on a limited basis. Because new innovations require investing time, energy and resources, innovations that can be tried before being fully implemented are more readily adopted (Scott et al., 2008). However, it contradicts the outcomes of studies by (Alshamaila, Papagiannidis, & Li, 2013), which indicated that innovation trialability had little impact on SMEs' adoption of new technologies. The present study highlights the significance of trialability and suggests that SMEs with more opportunities or a greater need to try out social media are more likely to adopt it. Given the study context, Syrian SMEs may need to evaluate the suitability of social media applications by using them before deciding to adopt them due to a lack of knowledge about pertinent and practical ICT solutions (Ashrafi & Murtaza, 2008).

Moreover, Syrian SMEs are known to lack internal IT expertise (Al-Gharbi & Ashrafi, 2010). The lack of expertise discourages SMEs from adopting social media platforms unless they have tested it out. Additionally, owner-managers of SMEs may be hesitant about using new technologies unless they are convinced of their suitability for their businesses.

The results from the empirical study are confirmed by SMEs 03, 06 and 12, who spearheaded the adoption of social media for their companies after using them. According to SME 06, he convinced his company to adopt social media using his experience on Facebook and Instagram. In the same vein, SME 03 said he did not hesitate to create a social media page for his company since he had already used social media and other networking sites. Finally, SME 12 confirmed

adopting social media for his business and the company after comparing it with other technologies he tried.

Similarly, the empirical results show that observability has a significant positive impact on the adoption of social media, with a coefficient of 1.124. This finding confirms earlier studies by (Alsharji, Jabeen, & Ahmad, 2019). This conclusion is also consistent with the diffusion theory of (Rogers, Singhal, & Quinlan, 2019), as highlighted by (Dearing, 2021). The theory posits that the adoption of technology follows a predictable pattern, starting with innovators and early adopters before reaching the majority of users. SMEs are more likely to adopt technology if they see other similar businesses benefiting from it. Similarly, it is consistent with the Technology Acceptance model that states that technologies are adopted when they are perceived to be useful to the adopters (Davis, 1989; Ma & Liu, 2011). The empirical results also align with the thematic output from our interview with managers of SMEs in Syria.

Observability is the ability to see the benefits of using social media and how it fosters engagement and adoption. Many companies use social media to observe other businesses in their industries, which becomes a critical factor in choosing a platform. The younger generation tends to spend significant time on social media. SME01, SME08, and SME12 shared how global companies' experiences with social media influence their decisions.

According to SME 08, his company adopted social media after seeing how international companies like Shein, Adidas, and Nescafe use social media. Similarly, SME 01 confirmed that Successful entrepreneurs using social media influenced their decision to adopt social media as they tried to imitate them.

In addition to observability, trust is a significant factor affecting the adoption of social media by Syrian SMEs, with a coefficient of 0.440. This aligns with Lee and Chan's (2003) assertion that trust is necessary for SMEs to adopt ICT. Due to a high-context culture, Syrian SMEs tend to be cautious of the uncertainty and risk associated with ICT adoption. Awareness of laws governing information technology and legal and regulatory matters is lacking, a significant obstacle for Syrian SMEs to adopt ICT (Ashrafi & Murtaza, 2008).

From the perspective of the participating adopting companies based on the thematic analysis from our interview with managers of SMEs in Syria, [SME02, SME06, and SME10] considered that trust significantly influences their organizations' decisions on adopting SM to do business. The SMEs adopt social media for their business because they are security systems of these platforms, such as end-end encryption and other data privacy protocols of these social media firms. On the contrary, SME 14 pointed out social media platforms are not secure enough, hence their decision not to use them. To them, emails are more secure, hence their decision to use emails for all internal communications instead of social media.

Our research has shown that image plays a vital role in SMEs' adoption of social media in Syria, with a coefficient of 1.138. This finding aligns with a study

published by (Al-Qirim, 2006), which also highlighted the significance of image in the adoption of websites by SMEs in New Zealand. These outcomes suggest that the impact of image on the adoption of IS technologies, such as social media, is significant in the context of SMEs. This implies that SMEs perceive social media as a means to enhance their social standing, which may influence their decision to adopt it. This result aligns with the thematic analysis from the interview, as pointed out by SME03, SME10, and SME11.

"I aspire to be a successful businesswoman with a prominent social status in the Syrian business community. Linking my photos to my work can enhance my sense of accomplishment, success, and pride." [SME03].

The owners of SME12 and SME11 applied rationales similar to the view of the owner of [SME03] in that they appreciated the importance of the advantage and status that SM provided them with when their companies adopted it.

"Our presence on SM platforms has positively impacted the company and its projects. When my photo spread on SM pages because I won the Entrepreneur Award, I felt important and became known to many SM users who followed me and the company's accounts. As a successful businessman, I also became the focus of their attention and inspiration. We emphasize using SM platforms to enhance the professionalism and image of our company in Syrian and Arab society in general" [SME11].

"The use of social media has helped us present our organization professionally. Facebook, Instagram, and WhatsApp have increased the chances of our company brand being seen as successful and reliable" [SME12].

4.2.2. Organizational Factors

SMEs in Syria face challenges in adopting social media due to a perceived lack of time management, with a coefficient of −1.077. This finding is consistent with Penrose's resource-based theory (Jones et al., 2012) argues that time is a resource constraint faced by small businesses. This theory posits that SMEs will not adopt technology when they are not sure if leveraging time to use social media will not earn them a competitive advantage. This is supported by (Gligorijevic & Leong, 2021) research. SME owners and managers have demanding roles in the Syrian government, making engaging with customers on social media difficult. Cultural and familial obligations could also contribute to the issue the lack of time for social media adaptation among businesses.

During our interview, SMEs 13 and 14 noted that their lack of time was the primary reason they hadn't adopted social media for their businesses. This sentiment was echoed by SMEs 02, 03, and 06, who also acknowledged that a lack of time was preventing them from fully utilizing social media despite having accounts set up. However, SMEs 09, 10, and 12 provided some solutions to overcome the time constraints that had previously impacted their adoption decisions. Time can be a significant challenge when implementing social media SM technologies, but there are ways to work around it. These companies outsource

the management of their social media accounts. SME 12 confirmed having a social media account manager responsible for managing their social media accounts as a full-time job.

As a result, this study finds that organizational context factors are a vital area that must be carefully examined to understand SMEs' decisions to adopt social media SM. Details of the corporate context results will be discussed later, as the influential factors were (Top Management Support - The Size Of The Organization - The Innovation Of The CEO - And Previous Experience In Information Systems). The factor related to (Lack of Time) was added as an influential sub-factor.

4.2.3. Environmental Factors

The study found that three environmental factors—market scope, customer pressure, and support from family and friends—significantly influence SMEs' use of social media. Other factors, such as industry type and competitive pressure, were unnecessary.

The study found that the market scope of SMEs has a statistically significant positive effect on social media adoption among SMEs in Syria, with a coefficient of 1.38. This finding is consistent with the institutional theory (Osakwe & Ikhide, 2022), which states that organisations face external pressures when adopting social media. Similarly, it is consistent with the relative and perceived advantage of the diffusion theory and technological acceptance model, respectively (Ma & Liu, 2011; Rogers, Singhal, & Quinlan, 2019). This highlights the influence of potential advantages of social media usage on its adoption. This finding is also in line with studies by (Alshamaila, Papagiannidis, & Li, 2013; Ramdani, Kawalek, & Lorenzo, 2009) and contradicts the results of (Alshamaila, Papagiannidis, & Li, 2013; Yeboah-Boateng & Essandoh, 2014). SMEs operating in broad market areas are likelier to adopt social media than firms in narrow or monopolized markets. With broad markets, SMEs must increase their visibility to attract customers.

During the interview, it came to light that small and medium-sized enterprises (SMEs) with customers in close proximity tend to shy away from utilizing social media in their operations. This assertion was corroborated by SME 16. However, SMEs with a broader target market have found social media to be a valuable tool. For instance, SME 03 attested to using social media to reach customers beyond Syria after deciding to expand its market scope. Similarly, SMEs 16 and 17 expressed their intention to adopt social media as part of their strategy to expand their market reach.

Similarly, we find that customer pressure and the support of friends and family have statistically significant positive effects on social media adoption among Syrian SMEs, with coefficients of 1.603 and 1.170, respectively. These findings are consistent with the institution theory (Osakwe & Ikhide, 2022), which posits that SMEs will adopt social media to meet the expectations of their customers

and to be able to serve them. Similarly, the findings are consistent with the social network theory, which highlights the importance of social networks and relationships in facilitating technology adoption. SMEs may be more likely to adopt technology if they receive support and advice from peers, suppliers, or other stakeholders in their network (Ngai, Tao, & Moon, 2015). This also aligns with previous research studies, including those conducted by Wamba & Carter (2014), and Harindranath et al. (2008). Additionally, it supports the findings of Simpson and Doherty (2004), who discovered that SMEs are more likely to adopt IT when they receive informed information from friends and family. This also validates the assertion by (Ashrafi & Murtaza, 2008) that SME owner-managers in developing nations require a more robust IT foundation to evaluate the impact of ICT on their businesses. Consequently, SME owners may turn to their friends for advice and support on ICT-related matters. A study by (Harindranath, Dyerson, & Barnes, 2008) revealed that 64% of SME owners in developing countries rely on family, friends, and relatives as their primary sources of assistance.

Support from friends and family plays a crucial role in SMEs' adoption of social media technologies. SME02, SME04, SME06, SME07, and SME08 shared that they were influenced by the backing they received from their loved ones in embracing social media SM technologies. SME 07 and 12 highlighted the assistance their businesses got from their family and friends in establishing their presence on Facebook and Instagram. According to SMEss 06 and 12, their families motivated them to adopt social media. Similarly, SME 04's children, who were more tech-savvy, helped him set up his business account. SME 04 mentioned that he was grateful for the support he received from his friends, especially since he had no prior knowledge of social media and its potential benefits. His sister even took the initiative to create a business page for his company.

Finally, we find that customer pressure has a statistically significant positive effect on social media adoption among SMEs in Syria. The findings of this study are consistent with studies conducted by (Amoah et al., 2023; Richard, Osunsan, & Wampande 2023; Solomon, Allen, & Wangombe, 2023). The findings are also consistent with what the SMEs interviewed pointed out. SME 01 to 12 pointed out that customer pressure influenced their decision to utilize social media in their business. According to SME 01 and 02, they adopted social media because their current and potential customers are actively on social media, specifically Facebook and Instagram. According to SME 02, their customers are tertiary students who actively use social media. They adopted social media to engage with their customers in real-time.

Similarly, SMEs 07 and 08 stated they adopted social media because those are their customer's preferred means of communication. Their customers prefer to contact them using social media rather than their official website. However, SMEs 17 and 18 stated that their customers prefer physical interaction to social media interaction, hence their decision not to adopt social media in their busi-

ness. "We don't need to invest in social media platforms as our customers prefer direct communication and are not ready to switch to new technologies." [SME 18].

Table 6. Results of LR analysis.

Variable	Coefficient
Technology	
Relative advantage	−0.861 (0.542)
Complexity	−0.860 (0.521)
Compatibility	1.206 (0.595) **
Trialability	1.565 (0.715) **
Observability	1.124 (0.511)**
Interactivity	0.644 (0.558)
Trust	0.949 (0.440) **
Image	1.138 (0.545) **
Organization	
Size	0.481 (0.786)
Top management support	0.254 (0.559)
Innovativeness	−0.891 (0.492)
Prior IS experience	−0.602 (0.423)
Perceived Lack of Management Time	−1.077 (0.350) ***
Environment	
Industry	0.568 (0.515)
Market scope	1.380 (0.496) **

Continued

Competitive Pressure	−0.616
	(0.423)
Customer Pressure	1.603
	(0.702) **
Family and Friends Support	1.170
	(0.592) **
Constant	−5.230
	(2.653)

Robust standard error in parenthesis. Significance: ***p < 0.01, **p < 0.05 and *p < 0.10. Source: Author. Hosmer & Lemeshow = 0.810, Cox & Snell = 0.537, Nagelkerke = 0.743.

4.3. Robust Check

To ensure a more robust analysis of the factors affecting the adoption of social media by SMEs in Syria, the study carried out two extra analyses as a robust check. These analyses are a Tobit and Quantile regression of the independent variables on the depth of social media adoption calculated using MCA.

4.3.1. Tobit Analysis of Depth of Social Media Adoption

To ensure a more robust conclusion, we employed the Tobit model to assess the factors affecting the depth of social media usage among SMEs in Syria. The depth of social media usage is an index of the number of social media platforms a firm adopts. From Table 7, we find that Trialability, compatibility, observability, trust, image, consumer pressure, market scope, managerial lack of time and family and friends' support significantly affect the depth of social media usage among SMEs in Syria. This finding is consistent with the logistics results discussed in section 4.2. These findings indicate that these factors deepen the depth of the social media presence of SMEs in Syria positively. On the contrary, relative advantage significantly negatively affects the depth of social media adoption among SMEs operating in Syria.

Table 7. Factors affecting the depth of social media adopt in Syria.

Variable	Coefficient
Technology	
Relative advantage	−0.209
	(0.280)
Complexity	−0.330
	(0.260)
Compatibility	1.730
	(0.307)**

Continued

Trialability	1.239 (0.351)*
Observability	0.402 (0.357)**
Interactivity	0.401 (0.279)
Trust	0.580 (0.220)***
Image	0.602 (0.272)**
Organization	
Size	0.365 (0.393)
Top management	0.325 (0.279)
Innovativeness	−0.640 (0.246)
Prior IS experience	−0.406 (0.211)
Perceived Lack of Management Time	−0.848 (0.175) *
Environment	
Industry	0.952 (0.257)
Market scope	1.205 (0.248)**
Competitive Pressure	−0.397 (0.2115)
Customer Pressure	1.492 (0.351)**
Family and Friends Support	1.029 (0.296)***
Constant	−3.634 (1.356)

Source: Author. Robust standard error in parenthesis. Significance: ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$.

4.3.2. Quantile Regression

In Table 8, we present the quantile analysis of the factors affecting the depth of social media usage among SMEs in Syria under 10, 25, 50, 75 and 90 per cent quantiles. The estimates from the quantile regression confirm the Tobit model

estimations of the factors affecting the depth of social media usage by SMEs in Syria. We find that compatibility, observability, Trailbility, trust, a firm's image, consumers' pressure, market scope, managerial lack of time and family and friends' support have a significant positive effect on the depth of social media usage among SMEs in Syria under all quantiles. We also find that the coefficients increase as the quantiles increase. This implies that the magnitude of these factors on the depth of social media usage is under 10 per cent quantile, which is less than 90 per cent quantile.

Table 8. Quantile regression of the factors affecting the depth of social media usage among SMEs in Syria.

Variables	10%	25%	50%	75%	90%
			Technology		
Relative advantage	−0.115	−0.111	−0.0989	−0.0663	−0.0559
	(0.0308)	(0.0319)	(0.0380)	(0.0642)	(0.0739)
Complexity	−0.797	−0.861	−1.091	−1.702	−1.897
	(0.0384)	(0.0416)	(0.0669)	(0.101)	(0.104)
Compatibility	0.0137***	0.0141***	0.0155***	0.0190**	0.0202*
	(0.00423)	(0.00437)	(0.00527)	(0.00909)	(0.0105)
Trailbility	0.000185	0.000322	0.000816	0.00213	0.00254
	(0.00125)**	(0.00129)**	(0.00153)**	(0.00251)**	(0.00288)**
Observability	0.814***	0.859***	1.023***	1.457***	1.597***
	(0.0373)	(0.0398)	(0.0590)	(0.0948)	(0.101)
Interactivity	0.0187	0.0137	0.00408	0.0513	0.0664
	(0.0361)	(0.0373)	(0.0442)	(0.0737)	(0.0845)
Trust	0.5804**	0.3227**	0.8116**	0.3512**	0.7197**
	(0.5741)	(0.0255)	(0.4577)	(0.1487)	(0.0528)
Image	0.3978**	0.8299**	0.7378***	0.8165**	0.3964**
	(0.7799)	(0.3674)	(0.0235)	(0.0555)	(0.4566)
			Organization		
Size	0.5398	0.2994	0.8701	0.4762	0.0529
	(0.3458)	(0.7467)	(0.6821)	(0.1787)	(0.5868)
Top Management	0.7254	0.3347	0.5239	0.8742	0.1324
	(0.1519)	(0.8963)	(0.3475)	(0.2776)	(0.2898)
Innovativeness	−0.8793	−0.9557	−0.7097	−0.9732	−0.2985
	(0.4520)	(0.5457)	(0.9991)	(0.2836)	(0.3260)
Prior IS experience	−0.7533	−0.0308	−0.7427	−0.6327	−0.5646
	0.8127	0.6519	0.3852	0.3463	0.6275
Perceived lack of time	−0.3947**	−0.3735**	−0.4116**	−0.5695**	−0.2277**
	(0.8099)	(0.2083)	(0.4029)	(0.0030)	(0.2556)

Continued

			Environment		
Industry	0.3652	0.1206	0.5998	0.3128	0.2182
	(0.0052)	(0.7642)	(0.4897)	(0.1405)	(0.7017)
Market scope	0.9394**	0.1298**	0.5361**	0.0495**	0.9141**
	(0.1792)	(0.7346)	(0.4387)	(0.9495)	(0.4489)
Competitive pressure	−0.7344	−0.9434	−0.9402	−0.7815	0. 9154
	(0.5599)	(0.7264)	(0.9719)	(0.1143)	(0.6406)
Customer pressure	0.6906**	0.9635**	0.5189**	0.6534**	0.2999**
	(0.5698)	(0.1288)	(0.2551)	(0.5253)	(0.1105)
Family and friends support	0.0524***	0.2531***	0.5049***	0.7267***	0.4133***
	(0.5687)	(0.5776)	(0.7831)	(0.3190)	(0.9282)
Constant	−2.210***	−2.133***	−1.855***	−1.117***	−0.881**
	(0.182)	(0.189)	(0.228)	(0.383)	(0.445)

Robust standard error in parenthesis. Significance: ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$. Source: Author.

In summary, our analyses demonstrate that nine factors from the TOE framework—Compatibility, Observability, Trialability, Trust, and Image from the technology context; Perceived Lack of Managerial Time from the organization context; and Market Scope, Customer Pressure and Family and Friends' Support from the environment context have a statistically significant relationship with social media SM adoption by SMEs in Syria. Among these factors, the perceived lack of managerial time was the most critical factor, negatively affecting SMEs' adoption of social media social media SM in Syria. Table 9 provides an overview of the acceptance or rejection of the hypotheses resulting from the LR analysis.

Table 9. Summary of hypotheses.

H NO	Corresponding variable	Decision	Model
	Technology (T)		
H1	Relative advantage	Not supported	Insignificant
H2	Complexity	Not supported	Insignificant
H3	Compatibility	Supported	Significant
H4	Trialability	Supported	Significant
H5	Observability	Supported	Significant
H6	Interactivity	Not supported	Insignificant
H7	Trust	Supported	Significant
H8	Image	Supported	Significant
	Organization (O)		
H9	Size	Not Supported	Insignificant
H10	Top Management Support	Not supported	Insignificant

Continued

H11	Innovativeness	Not supported	Insignificant
H12	Prior IS Experience	Not supported	Insignificant
H13	Perceived lack of Management Time	Supported	Significant
	Environment (E)		
H14	Industry	Not supported	Insignificant
H15	Market scope	Supported	Significant
H16	Competitive Pressure	Not supported	Insignificant
H17	Customer Pressure	Supported	Significant
H18	Family and Friends Support	Supported	Significant

Source: Author.

5. Summary

This study assesses the current status of social media adoption and the various factors that impact its adoption among SMEs in Syria through the Technology, Organization and Environment framework. The study adopted a mixed approach to estimate the factors affecting social media adoption among SMEs in Syria. We surveyed a list of 525 SMES and interviewed 18 SMEs using Semi-structured interviews. To estimate the TOE framework for social media adoption among SMEs, we employed a logistic regression (LR). In addition, we substituted the binary variable for social media usage with the depth of social media presence, which is a calculated index based on the number of social media platforms an SME uses through Multiple Correspondence Analysis. We utilised Tobit and the Method of Moment Quantile Regression (MMQR) to estimate the impact of the TOE framework on the depth of social media presence. The MMQR approach enables a more comprehensive analysis of the influencing factors on SMEs' adoption of social media across the entire distribution, which is superior to linear regression techniques like OLS and Tobit models. The MMQR model also controls distributional asymmetry effects (Pickson et al., 2022). The Semi-structured interview's thematic analysis outcome supported the empirical study's findings.

Our findings indicate that compatibility, observability, trialability, trust, a firm's image, consumer pressure, market scope, and support from family and friends all significantly positively affect the depth of social media usage among SMEs in Syria at all quantiles. Additionally, we noted that the coefficients increased as the quantiles increased. This suggests that the impact of these factors on the depth of social media usage is less pronounced under the 10th percentile than the 90th percentile.

For SME managers in Syria, we recommended prioritizing investment in technological infrastructure that enhances social media compatibility, observability, and interactivity. This includes ensuring that digital platforms align with the unique needs and preferences of their target market. Additionally, fostering a

culture of innovation and providing adequate training and resources for employees can boost social media adoption and utilization. Addressing the perceived lack of managerial time by delegating responsibilities effectively and utilizing automation tools where possible can also facilitate smoother adoption processes. Collaboration with other SMEs and industry stakeholders to share best practices and insights can further accelerate social media integration and improve competitiveness.

For the government of Syria, creating a conducive regulatory environment that supports digital transformation and innovation within SMEs is crucial. This includes streamlining administrative processes, reducing bureaucratic hurdles, and providing incentives for SMEs to invest in digital technologies. Access to affordable and reliable internet infrastructure is fundamental for widespread social media adoption, so efforts to improve digital connectivity across the country should be a priority. Supporting capacity-building initiatives and educational programs focused on digital literacy and e-commerce skills can empower SMEs to leverage social media effectively for business growth. Additionally, fostering public-private partnerships and engaging with international organizations and tech companies can bring valuable expertise and resources to the Syrian SME ecosystem, driving economic resilience and development.

Conflicts of Interest

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

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Appendix 1. Thematic Presentation of the 18 SMEs Interviewed

Categories	Themes	SME 01	SME 02	SME 03	SME 04	SME 05	SME 06	SME 07	SME 08	SME 09	SME 10	SME 11	SME 12	SME 13	SME14	SME 15	SME 16	SME 17	SME 18
Technology (T)	RAV	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	CMX	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	CMP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	TRB	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓						
	OBS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	IMG			✓									✓	✓					
	INT				✓			✓		✓	✓								
	TRT		✓						✓				✓			✓			
Organization (o)	SIZE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
	TMS	✓	✓									✓							
	INV	✓	✓	✓			✓				✓	✓	✓						
	PIE	✓	✓							✓	✓	✓	✓						
	PLT		✓			✓								✓	✓	✓	✓	✓	✓
Environment (E)	IND	✓	✓							✓				✓	✓	✓	✓	✓	✓
	MKS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CMB	✓	✓											✓	✓	✓	✓	✓	✓
	CSP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	FFI		✓		✓									✓	✓	✓	✓	✓	✓