

Financial Literacy, Digital Financial Access, and SME Distribution Performance in the UAE: A Mediation Analysis

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Abstract: Purpose: This study aims to examine the relationship between FL and SME distribution performance, and to investigate the mediating role of access to digital finance in strengthening distribution-related business efficiency within the context of the United Arab Emirates. The research seeks to provide empirical evidence on how financial knowledge and digital financial accessibility jointly influence distribution-channel performance, operational efficiency, and SME sustainability.

Design/methodology/approach: The study adopts a quantitative research design, using a structured questionnaire distributed to SME owners and managers. A total of 170 valid responses were collected and analysed using statistical software. Data screening procedures were conducted, including missing data analysis, outlier detection, multicollinearity checks, and normality testing. Regression and mediation analyses were employed to test the proposed hypotheses and examine both direct and indirect relationships among the variables.

Findings: The findings reveal that FL did not have a significant direct effect on SME distribution performance; however, it exerted a significant indirect effect through access to digital finance. Additionally, access to digital finance fully mediates the relationship between FL and SME distribution performance. SMEs with better access to digital financial services demonstrated improved customer reach, payment efficiency, and distribution-channel effectiveness.

Research limitations/implications: The study is limited to SMEs operating within the United Arab Emirates and is based on cross-sectional data, which may limit the generalisability of the findings. Future research is recommended to apply longitudinal designs and expand the study to different geographical contexts to validate and extend the results.

The study should be interpreted in light of several limitations. First, the sample was predominantly composed of female respondents (88.2%), employees (62.4%), service-sector SMEs (80.0%), and relatively young firms operating for 3–5 years (78.2%). Consequently, the findings may not be fully representative of the wider SME population in the UAE. Second, the use of convenience sampling limits the generalisability of the findings. Future studies should employ probability sampling techniques and include SMEs from a wider range of industries, ownership structures, and organisational maturity levels.

The study relied on self-reported data collected from a single source using a cross-sectional survey, which may increase the risk of common method bias. Although procedural measures such as anonymity and voluntary participation were implemented to minimise this risk, future studies are encouraged to employ formal statistical assessments (e.g., Harman's single-factor test or marker-variable techniques) to further evaluate the potential influence of common method bias.

Practical implications: The results highlight the importance of promoting FL programmes and expanding access digital financial infrastructure to support SME distribution activities. Policymakers and financial institutions should focus on strengthening digital payment systems, online transaction capabilities, and fintech accessibility to improve SME distribution efficiency and competitiveness.

Social implications: Enhancing FL and digital financial inclusion can contribute to broader economic development by empowering SMEs, increasing employment opportunities, and fostering innovation within the economy.

Originality/value: This study contributes to the distribution science literature by integrating FL and digital financial access within a distribution-performance framework. It provides empirical evidence from the UAE context on how digital finance supports SME distribution efficiency and operational competitiveness.

Conclusion: The study concludes that financial knowledge and digital financial inclusion are essential drivers of SME growth and sustainability. Strengthening access to digital financial services can significantly improve operational efficiency and strategic decision-making among SMEs in the UAE.

Keywords: FL, Digital Financial Access, SME Distribution Performance, Distribution Efficiency, Digital Payment System, Distribution Channels

1. Introduction

Small and Medium Enterprises (SMEs) play a critical role in distribution systems by facilitating product movement, customer access, retail transactions, and supply-chain activities across modern economies. In the United Arab Emirates (UAE), SMEs contribute significantly to non-oil economic diversification and more heavily involved in retail trade, logistics, digital commerce, and service distribution channels. Their ability to maintain efficient distribution operations, manage customer transactions, and sustain competitive market access is increasingly important in digitally connected economies (Ahmad et al., 2023; Al Malki, 2023).

Despite their importance within distribution networks, many SMEs continue to face structural financial barriers that limit operational efficiency and channel competitiveness. Limited access to financing often restricts SMEs from investing in digital payment systems, inventory management technologies, customer-service platforms, and online-to-offline distribution capabilities. Traditional financial institutions typically impose strict lending conditions, causing many SMEs to rely on informal financing arrangements that may weaken supply-chain responsiveness and distribution performance (Popescu et al., 2020; Hassan, 2022).

The concept of FL has, therefore, become a key skill for SME owners and managers seeking to overcome such financial constraints. It is defined as the knowledge and skills required to learn and apply financial concepts, manage financial resources efficiently, and make sound economic judgments (Lusardi & Messy, 2023). Greater FL helps entrepreneurs to assess the available financing opportunities, use debt productively, and spend resources in a more effective way. Nevertheless, empirical data indicate that a significant portion of SME managers continue to lack adequate financial knowledge, leading to weak transaction management, inefficient distribution operations, and lower SME distribution performance (Zaimovic et al., 2023).

At the same time, the rapid development of technologies has changed the financial environment with the emergence of digital financial services. Digital finance encompasses fintech platforms, mobile banking, digital wallets, peer-to-peer lending, and online payment systems that enable financial transactions and access to capital via digital platforms. These can help increase financial inclusion, lower transaction costs, and improve the operational efficiency of SMEs through faster customer transactions, improved inventory coordination, enhanced online retail integration, and more efficient distribution-channel management. (Falaiye et al., 2024; Lusardi & Messy, 2023).

Nonetheless, the uptake of digital financial services by SMEs is uneven. Although the UAE has high-quality digital infrastructure and an ever-expanding fintech sector, many SMEs continue to face problems related to the effective use of digital financial tools. Inadequate digital literacy, cybersecurity issues, regulatory uncertainty, and technical incompetence often prevent SMEs from fully utilising these technologies (Evanita & Fahmi, 2023).

The relationship between FL and SME performance has been widely explored in existing literature. However, comparatively few studies have examined the processes through which FL affects firm performance, especially in highly digitalised financial settings. Access to digital finance is one such mechanism, potentially bridging the digital gap between financial knowledge and better SME distribution performance (Utomo et al., 2023).

Awareness of this mechanism is especially pertinent in the UAE, where financial technologies are growing fast, and government policies actively promote digitalisation and financial inclusion. Therefore, exploring the role of FL in determining SME performance through access to digital finance may give meaningful insights to policymakers, financial institutions, and SME managers (Yakob et al., 2021).

This study investigates the mediating role of access to digital finance in the relationship between FL and SME distribution performance in the UAE using PROCESS Macro Model 4. Specifically, the study examines how FL and digital financial access contribute to distribution-related business efficacy, including transaction management, customer reach, operational effectiveness, and distribution-channel performance among SMEs.

The study contributes to the journal of Distribution Science by extending the discussion of SME performance into a distribution-science context. It highlights how digital financial systems, fintech accessibility, and financial capability support retail operations, digital transactions, supply-chain responsiveness, and SME competitiveness within modern distribution environments.

2. Literature Review, Model, and Hypothesis Development

2.1 SME Distribution Performance

SMEs play a critical role in distribution systems by supporting product movement, customer accessibility, retail operations, and supply-chain continuity across modern economies. In the UAE, SMEs are heavily involved in trade, logistics, e-commerce, and service distribution activities, marking their distribution performance essential for economic diversification and market competitiveness. Distribution performance in SMEs reflects the efficiency of transaction processing, customer reach, operational coordination, delivery responsiveness, and channel effectiveness within increasingly digital business environments. (European Commission, 2022).

The distribution performance of the SMEs can be evaluated using both financial and operational indicators. Financial indicators include revenue growth, profitability, and cost efficiency, while operational distribution indicators include customer reach, transaction efficiency, inventory coordination, service responsiveness, channel effectiveness, and distribution-network performance. Effective financial management and digital operational capability are increasingly recognised as critical drivers of SME competitiveness within distribution-oriented markets. (Barakat, 2021).

Recent studies emphasise that the managerial capability, technology use, and access to finance are the most significant factors influencing SME performance (Ipinnaie et al., 2017; Forth & Bryson, 2019). Thus, better financial decision-making and digital performance can make SMEs highly competitive in the rapidly changing markets (Forth & Bryson, 2019).

Unlike overall SME performance, SME distribution performance focuses specifically on operational outcomes associated with distribution activities, including transaction efficiency, customer accessibility, distribution-channel effectiveness, service responsiveness, inventory coordination, and supply-chain responsiveness. Therefore, this construct captures the distribution-specific dimensions of organisational performance that are particularly relevant to the scope of Distribution Science.

2.2 FL

FL is a key management skill that empowers SME owners to interpret financial data, evaluate investment prospects, and manage financial risks effectively. As Hung et al. (2009) argued, FL encompasses knowledge, financial behaviour, and attitudes related to budgeting, investment decisions, debt management, and risk assessment. Within distribution-oriented SMEs, FL also supports efficient transaction handling, inventory planning, customer-payment management, and investment in digital distribution technologies, financially literate SME managers are more capable of coordinating operational resources and adapting to digitally connected distribution environments.

Evidence consistently shows that higher levels of FL are associated with better SME distribution performance. For example, Tuffour et al. (2020) observed that financial knowledge can effectively increase the ability of SME owners to make decisions, which improves the financial management of these companies and increases their profitability. On the same note, Moreso et al. (2017) found that financially literate entrepreneurs are better at planning and allocating resources.

These findings are also supported by Kulathunga et al. (2020), who reported that FL positively influences the performance of SMEs.

Nonetheless, FL and firm performance are not always directly related. Some research suggests that financial knowledge needs to be backed with proper financial infrastructure or institutional support so that it can be transformed into measurable performance returns particularly in distribution-related operations such as digital transactions, customer servicing, online retail integration, and supply-chain coordination. (Adomako & Danso, 2014). This implies that FL may have an indirect effect on firm performance in a way that allows entrepreneurs to exercise their financial knowledge effectively (Molina-Garcia et al., 2023).

These findings are consistent with Lusardi and Mitchell (2014), who emphasized that FL improves financial decision-making and business performance.

2.3 Access to Digital Finance

Digital financial services have become a transformative force in the modern financial system. Access to digital finance can be defined as the possibility for individuals and companies to use digital platforms to carry out financial transactions, obtain funding, make payments, and manage finances. Within SME distribution environments, access to digital finance enables firms to improve transaction coordination, digital payment integration, online customer servicing, and supply-chain financial management. Digital financial accessibility also supports distribution-channel efficiency and operational responsiveness in increasing digitalised markets. (Morgan et al., 2019).

Technological developments such as mobile banking, online lending, online payment systems, and fintech applications have made finance more accessible to SMEs. These technologies allow companies to make transactions more efficiently, get alternative sources of funding, and enhance financial record-keeping (Ozili, 2018; Lyons & Kass-Hanna, 2021).

Several studies highlight the positive impact of digital finance on SME distribution performance. To illustrate this point, Kulathunga et al. (2020) established that online financial services contribute to the SME operational efficiency and minimise transaction costs. On the same note, Ratnawati et al. (2022) found that access to digital finance enhances financial transparency and facilitates investment decisions.

Despite these benefits, adoption barriers still exist. SMEs are still exposed to cybersecurity threats, regulatory logistics, and limited digital literacy, which challenge their use of digital financial technologies (Mu et al., 2023).

Yakob et al. (2021) also emphasized that digital financial inclusion contributes significantly to SME operational sustainability and distribution performance.

2.4 Relationship Between FL and Access to Digital Finance

FL is a key factor that will ease the adoption of digital financial services. Managers with strong FL can better assess digital financial products, understand related risks, and choose appropriate financial solutions.

This relationship is supported empirically. Buchdadi et al. (2020) discovered that financially literate entrepreneurs will be more inclined to use fintech applications and digital banking platforms. Likewise, the World Bank (2023) revealed that FL is a major factor in people's willingness to use digital financial tools.

These findings imply that FL allows SME managers to navigate the uncertainties related to digital finance and to use digital financial platforms in a more effective way. In line with this, the following hypothesis is proposed:

H1: FL has a positive impact on access to digital finance.

2.5 SME Distribution Performance and FL

FL has been recognised as an important determinant of SME distribution performance. Strong financial knowledge enable SME manage to coordinate operational budgets, manage transaction activities, evaluate digital investments, and improve distribution-related decision-making (Lusardi & Mitchell, 2014).

Several empirical studies have reported a positive correlation between FL and SME performance. For example, Rahadjeng et al. (2023) discovered that financial knowledge enhances financial planning and profitability in SMEs. On the same note, Menike (2018) documented that FL has a great impact on business sustainability.

Nevertheless, other researchers have hypothesised that FL might not be enough to enhance performance in the absence of access to financial facilities and financial infrastructure. This means that the impact of FL might be affected by contextual factors like financial access and technological ability.

Thus, the following hypothesis is proposed:

H2: FL has a positive relationship with SME distribution performance.

2.6 Access to Digital Finance and SME Distribution Performance

Digital finance can improve SME distribution performance by enhancing transaction efficiency, digital payment integration, customer accessibility, and operational coordination across distribution channels.

The literature highlights the significant impact of digital financial services on improving SME performance. Ratnawati and Soelton (2022) discovered that the use of fintech enhances SME productivity and financial management. On the same note, Frimpong (2022) indicated that digital financial inclusion enhances SME competitiveness and growth.

Therefore, the availability of digital finance can be a significant contribution towards SME performance in contemporary digital economies. Thus, the following hypothesis is proposed:

H3: Access to digital finance has a positive impact on SME distribution performance.

2.7 Mediating Role of ADF and SME Performance

Although FL is known to enhance decision-making, its influence on SME distribution performance may be indirect, operating through mechanisms that enable financial access and resource utilisation. One such mechanism is digital financial services. In distribution-oriented SMEs, access to digital finance may improve customer-payment systems, online transaction processing, distribution coordination, and supply-chain responsiveness, thereby strengthening overall distribution performance

According to past research, FL is a factor that enables the entrepreneurial adoption of digital financial technologies and improves business performance (Agyapong & Attram, 2019). In this respect, access to digital finance can serve as an intermediate variable that can transform FL into stronger firm performance.

Thus, the following hypothesis is proposed:

H4: Access to digital finance mediates the relationship between FL and SME distribution performance.

2.8 Research Gap

Despite the growing body of literature on FL, digital finance, and SME performance, several important gaps remain unaddressed. These can be classified into three main categories: theoretical, empirical, and contextual gaps.

Theoretical gap:

Previous studies have largely examined FL and SME performance through direct relationships, with limited attention given to the underlying mechanisms that explain how FL translates into improved firm outcomes. In particular, the mediating role of access to digital finance has not been sufficiently integrated into existing theoretical

models, leaving a gap in understanding the transmission process between financial knowledge and performance outcomes.

Empirical gap:

Empirical findings on the relationship between FL and SME performance remain inconsistent. While some studies report a strong positive relationship, others suggest that the impact is indirect or dependent on additional enabling factors such as financial access or technological capability. Moreover, few empirical studies have simultaneously examined FL, access to digital finance, and SME performance within a unified analytical framework.

Contextual gap:

Most existing studies have been conducted in developed or emerging economies outside the Gulf region, with relatively limited focus on the UAE context. Given the UAE's rapid digital transformation and strong emphasis on fintech adoption, the dynamics between FL, ADF, and SME performance may differ significantly. Therefore, there is a need to investigate these relationships within the UAE environment to provide context-specific insights.

Based on the above discussion, previous studies have largely focused on the direct relationship between FL and SME performance without sufficiently examining the operational mechanisms through which digital finance influences distribution-related outcomes. Existing literature has also given limited attention to SME distribution performance within digitally integrated business environments, particularly in the UAE context. Furthermore, few studies have simultaneously examined FL, access to digital finance, and SME performance within a unified mediation framework. Therefore, this study addresses these gaps by deepening an integrated model that investigates how FL infuses SME distribution performance directly and indirectly through access to digital finance within the UAE sector.

3. Research Methodology

3.1 Research Design

The research will follow a quantitative research design to determine the type of relationships between FL, access to digital finance, and SME distribution performance in the United Arab Emirates (UAE).

This study specifically examines how digital financial accessibility supports operational efficiency, transaction coordination, and distribution-related performance among SMEs in the UAE.

The popularity of quantitative methods in business research is that it provides the opportunity to measure variables systematically and test the hypothetical relationships using statistical methods (Sileyew, 2020). The survey instruments are structured, which allows the study to support the consistent collection of data and reduces the level of researcher bias. Quantitative approach is especially appropriate in this research since it will be easy to test hypotheses and employ regression and mediation analysis to test the given conceptual framework (Bloomfield & Fisher, 2019).

3.2. Research Context and Participants

The study focuses on small and medium enterprises in the UAE service and trade industries. The UAE was selected as the research setting because it represents one of the fastest-growing digital economies in the Middle East, supported by national initiatives promoting digital transformation and financial inclusion. SMEs constitute more than 90% of registered businesses in the UAE and play a vital role in economic growth, making them an appropriate context for examining the relationship between FL, access to digital finance, and SME performance. These industries contribute greatly to the national economy and are increasingly dependent on online financial technologies. The selected SMEs are also increasingly reliant on digital payment systems, online customer transaction, and distribution-channel coordination to sustain operational competitiveness. The sample comprised SME owners, managers, and employees who engage in financial decision-making or the use of digital financial tools. These respondents were selected because they are directly involved in financial decision-making, digital financial activities, and business operations, enabling them to provide informed responses regarding the study variables. As no complete SME database was available and firm access was limited, a non-probability convenience sampling method was employed. This

allowed the researcher to obtain data in an effective manner from respondents who were available and willing to take part in the research.

3.3 Sample Size

A total of 170 valid responses were gathered and included in the final analysis. The sample size is adequate in terms of regression and mediation analysis. The final sample exceeded the minimum sample size of 97 respondents recommended by Cohen's (1988) statistical power analysis for regression models with two predictors, thereby providing sufficient statistical power for testing both direct and mediation effects. Cohen (1988) outlined statistical power guidelines, which indicate that 97 respondents are required to detect medium effect sizes in regression models. As such, the obtained sample provides adequate statistical power to test the study hypotheses (Althubaiti, 2023).

3.4 Measurement Instrument

A structured questionnaire was developed based on an extensive review of previous literature and adapted from validated measurement scales to ensure content validity and construct reliability. The questionnaire was designed to measure FL, access to digital finance, and SME performance among SMEs operating in the UAE. The instrument comprised three key constructs:

- FL (FL): measured by items corresponding to financial knowledge, budgeting ability, financial planning, and decision-making capacity.
- Access to Digital Finance (ADF): measured by the use of mobile banking, online payments, fintech services, and online financial platforms.
- SME Distribution Performance (SMDP): measured using indicators related to operational efficiency, transaction processing effectiveness, customer accessibility, distribution-channel performance, service responsiveness, and competitive distribution capability.

All items employed a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The questionnaire was translated into the Arabic language using a back-translation process to ensure linguistic accuracy. Prior to the main survey, the questionnaire was pilot-tested to evaluate the clarity, relevance, and comprehensibility of the items. Feedback obtained during the pilot phase was incorporated into the final version of the instrument.

3.5 Validity and Reliability

The questionnaire was reviewed by a panel of five academic experts in finance, SME management, and digital finance to assess its content validity. Their comments and suggestions were incorporated into the final version of the instrument to improve the clarity and relevance of the questionnaire items. Their feedback was used to refine the questionnaire items and ensure relevance to the research constructs. Pearson correlation analysis was used to evaluate construct validity, with correlations ranging from 0.699 to 0.867 ($p < 0.01$), indicating strong associations between items and constructs. The obtained correlation coefficients ranged between 0.699 and 0.867 ($p < 0.01$), confirming satisfactory construct validity. Cronbach's alpha reliability analysis produced a coefficient of 0.957, above the recommended level of 0.70 for internal consistency among the study constructs.

3.6 Data Collection Procedure

Data were gathered through electronically distributed questionnaires sent to SME players in the UAE. Participation was anonymous and voluntary to ensure confidentiality and encourage honest answers. The questionnaires were distributed electronically using Google Forms to facilitate participation from SME owners and managers across different emirates of the UAE. Following data collection, screenings were done to identify data gaps, inconsistencies, and outliers, after which statistical analysis was performed.

3.7 Data Analysis Techniques

The obtained data were analysed using SPSS Version 29, following several steps. First, descriptive statistics were employed to describe demographic factors and important variables in the study. Second, diagnostic tests were undertaken to confirm the assumptions required for regression analysis, such as normality, multicollinearity, and independence of errors. Lastly, Hayes's (2018) PROCESS Macro Model 4 was applied to verify whether access to digital finance mediates the relationship between FL and SME Performance. The mediation analysis estimated the direct, indirect, and total effects of FL on SME performance through access to digital finance. Statistical significance of the indirect effect was evaluated using bias-corrected bootstrap confidence intervals based on 5,000 bootstrap samples.

Under the mediation model, the following directions were considered:

- Path a: the influence of FL on ADF.
- Path b: the impact to access to digital finance on SME distribution performance.
- Path c: the direct impact of FL on SME distribution performance.

To establish mediation between FL and SME distribution performance, the indirect effect was measured to evaluate the role of access to digital finance.

4. Results

4.1 Demographic Analysis

The demographic statistics of the study participants are presented in Table 1. The table shows that all demographic variables have 170 valid responses with no missing data, indicating complete and valid demographic data for the entire sample.

For gender, a mean of 1.88 and a median of 2.00 indicate that the sample was mainly female, as reflected in the frequency distribution. The low standard deviation (0.323) indicates minimal variation in gender responses, implying a relatively homogeneous distribution.

For age, the mean and median values of 1.99 and 2.00, respectively, show that most respondents were within the 25–35 years age group. The standard deviation of 0.560 indicates moderate variability, with older age groups underrepresented.

Regarding education level, the mean and median values of 1.99 and 2.00, respectively, show that most respondents held a bachelor's degree. The standard deviation of 0.662 indicates some diversity in educational attainment, though higher academic qualifications were less common in the sample.

For the current position in the business, the mean value of 3.15 and the median of 4.00 imply that most respondents were employees as opposed to managers and supervisors. The relatively high standard deviation (1.207) indicates a wide variety of job positions, reflecting an amalgamation of organisational positions.

With respect to business activity, the mean of 1.87 and the median of 2.00 imply that most businesses operated in the service industry. The relatively low standard deviation of 0.429 indicates that the sample was dominated by service-oriented enterprises.

Lastly, for years of business operation, the mean of 2.41 and the median of 2.00 imply that most businesses were 3–5 years old. The standard deviation of 0.874 implies limited variation, with relatively few firms having longer operational histories.

Overall, the demographic analysis shows that the sample population is composed mainly of female employees aged 25–35 years, with bachelor's degrees, working in service-based SMEs of relatively short to medium period of work. These attributes give a significant background for understanding the subsequent research outcomes.

Table 1: Statistics of Demographic Characteristics

Statistics							
		Gender	Age	Highest Level of Education	Current Position in the Business	Business Activity	Business Operating Duration
N	Valid	170	170	170	170	170	170
	Missing	0	0	0	0	0	0
Mean		1.88	1.99	1.99	3.15	1.87	2.41
Median		2.00	2.00	2.00	4.00	2.00	2.00
Std. Deviation		.323	.560	.662	1.207	.429	.874

Demographic Characteristics of the Respondents

The demographic profile of the respondents is presented in Table 2 and provides an overview of the key characteristics of the study sample. A total of 170 valid responses were analysed, with no missing data reported across all demographic variables, ensuring completeness and reliability of the descriptive analysis.

In terms of gender, most respondents were female, accounting for 88.2% of the sample, while males represented only 11.8%. This distribution indicates a strong female representation within the sample. This may be attributed to the higher response rate obtained from female participants, particularly within service-oriented SMEs where female participation in administrative and operational roles is relatively common. Therefore, the gender distribution may reflect the accessibility and willingness of female respondents to participate in the survey rather than the exact gender composition of all SMEs in the UAE.

Regarding age, most respondents fell within the 25–35 years age group, representing 72.4% of the sample. Participants aged less than 25 years accounted for 14.7%, while those aged 36–45 years represented 11.8%. Only a very small proportion of respondents (1.2%) were above 45 years of age. This suggests the sample is largely composed of young, early-career individuals, which may influence perspectives on FL and digital finance adoption.

With respect to educational attainment, most respondents held a bachelor's degree (63.5%). This was followed by diploma holders (20.0%) and those with a master's degree (14.1%). A very small percentage of respondents (2.4%) possessed a PhD. These results suggest a relatively well-educated sample, which is relevant when interpreting variables related to knowledge and financial decision-making.

In terms of current position in the business, most respondents were employees, accounting for 62.4% of the sample. Owners or managers represented 18.8%, while supervisors and department managers each accounted for 9.4%. This distribution indicates that the perspectives captured in the study are primarily those of operational-level employees rather than top management, which may affect perceptions of business performance and access to financial resources.

Regarding business activity, most firms operated in the service sector, representing 80.0% of the sample. Manufacturing businesses accounted for 16.5%, while other types of activities represented only 3.5%. This dominance of service-oriented enterprises reflects the structure of many SME sectors and provides important context for interpreting the study findings.

Finally, concerning business age, most businesses had been operating for 3–5 years, accounting for 78.2% of the sample. Firms operating for 5–10 years represented 10.0%, while those operating for 10–15 years and more than 15 years accounted for 4.7% and 7.1%, respectively. These results suggest that most SMEs in the sample are relatively young, which may influence performance dynamics and reliance on digital financial services.

Overall, the demographic analysis indicates that the study sample largely comprised young, well-educated female respondents working primarily as employees in service-based SMEs with a relatively short operating period. These characteristics provide important contextual insight for interpreting the study's empirical results.

Table 2: Demographic Characteristics of the Respondents

Variable	Category	Frequency (n)	Percentage (%)	Valid Percentage (%)	Cumulative Percentage (%)
Gender	Male	20	11.8	11.8	11.8
	Female	150	88.2	88.2	100.0
	Total	170	100.0	100.0	—
Age	Less than 25 years	25	14.7	14.7	14.7
	25–35 years	123	72.4	72.4	87.1
	36–45 years	20	11.8	11.8	98.8
	Above 45 years	2	1.2	1.2	100.0
	Total	170	100.0	100.0	—
Highest Level of Education	Diploma	34	20.0	20.0	20.0
	Bachelor's Degree	108	63.5	63.5	83.5
	Master's Degree	24	14.1	14.1	97.6
	PhD	4	2.4	2.4	100.0
	Total	170	100.0	100.0	—
Current Position in the Business	Owner / Manager	32	18.8	18.8	18.8
	Supervisor	16	9.4	9.4	28.2
	Department Manager	16	9.4	9.4	37.6
	Employee	106	62.4	62.4	100.0
	Total	170	100.0	100.0	—
Business Activity	Manufacturing	28	16.5	16.5	16.5
	Service	136	80.0	80.0	96.5
	Others	6	3.5	3.5	100.0
	Total	170	100.0	100.0	—
Business Operating Duration	3–5 years	133	78.2	78.2	78.2
	5–10 years	17	10.0	10.0	88.2

	10–15 years	8	4.7	4.7	92.9
	More than 15 years	12	7.1	7.1	100.0
	Total	170	100.0	100.0	—

The examination of extreme values (outliers) was conducted using two statistical procedures: standardised z-scores to detect univariate outliers and Mahalanobis D² to identify multivariate outliers. The results showed that no standardised z-score exceeded ± 4 , indicating the absence of significant univariate outliers. Furthermore, the maximum Mahalanobis D² value was 7.821, which was below the critical chi-square value ($\chi^2 = 13.816$, $p < .001$). Therefore, no multivariate outliers were identified, confirming that the dataset is free from extreme observations and suitable for further statistical analysis.

Table 4 presents the regression coefficients for predicting SME performance (SMDPer) based on two independent variables: Assessed Digital Literacy (ADF) and FL (FanLit). The analysis includes both unstandardised and standardised coefficients, t-values, significance levels, and collinearity diagnostics.

Table 3: Mahalanobis Maximum Value Results D2:

	Minimum	Maximum	Mean	Std. Deviation	N
D ² (df = 1, p1 < 0.001)	0.046	7.821	1.988	1.721	170

Regression Coefficients:

The constant (intercept) of the model was -0.311, and statistically significant ($t = -3.950$, $p < 0.001$), indicating that when the independent variables are held constant, zero, SME performance slightly decreases. The unstandardised coefficient for access to digital finance (ADF) was 1.123, with a t-value of 30.180 and $p < 0.001$, indicating a strong and statistically significant positive effect on SME performance. This suggests that greater access to digital finance is associated with higher SME performance. In contrast, FL (FanLit) showed a coefficient of -0.053 with a t-value of -1.421 and $p = 0.157$, indicating that FL did not have a statistically significant direct effect on SME performance in this model.

Standardised Coefficients:

The standardised beta coefficient for access to digital finance was 1.014, reflecting a strong contribution of SME performance, whereas the beta coefficient for FL was -0.048, indicating a very limited effect.

Multicollinearity Diagnostics:

Multicollinearity diagnostics showed acceptable values, with tolerance levels above 0.20 and VIF values below 10, confirming the absence of assessed multicollinearity issues in the regression estimates.

Overall, the regression results indicate that access to digital finance is a significant positive predictor of SME performance, whereas FL does not show a statistically significant effect. Additionally, the absence of multicollinearity confirms the stability and reliability of the regression coefficients.

Table 4: Coefficients

Coefficients							
Model		Unstandardised Coefficients		Standardised Coefficients	T	Sig.	Collinearity Statistics
		B	Std. Error	Beta			Tolerance VIF
1	(Constant)	-.311	.079		-3.950	.000	

	ADF	1.123	.037	1.014	30.180	.000	.276	3.618
	FanLit	-.053	.037	-.048	-1.421	.157	.276	3.618
a. Dependent Variable: SMDPer								

5. 3 PROCESS Macro Model 4 Results

H1 was significant and positive (FL to Access to Digital Finance) $p < 0.001$

Table 5: Effect of FL on Access to Digital Finance

Predictor	B	SE	T	p	LLCI	ULCI
Constant	0.5196	0.1585	3.2777	.001	0.2067	0.8326
FL (FL)	0.8471	0.0404	20.9730	< .001	0.7674	0.9268

H2 was negative and not statistically significant (FL to SME Performance) $p > 0.05$.

Table 6: Direct Effect of FL on SME Performance

Predictor	B	SE	t	p	LLCI	ULCI
Constant	-0.3114	0.0788	-3.9498	< .001	-0.4671	-0.1558
FL (FL)	-0.0526	0.0370	-1.4211	.157	-0.1258	0.0205

Model Summary:

$R = .9736$, $R^2 = .9479$, $F(2,167) = 1519.4959$, $p < .001$

H3 was significant and positive (Access to Digital Finance to SME Performance) $p < 0.001$.

Table 7: Effect of Access to Digital Finance on SME Performance

Predictor	B	SE	T	p	LLCI	ULCI
Access to Digital Finance (ADF)	1.1226	0.0372	30.1805	< .001	1.0492	1.1961

H4 significant and positive (Access to Digital Finance as a Mediating Variable on the Relationship Between FL and SME Performance) with a bootstrap indirect effect of 0.0468 and a significance level of $p < 0.05$.

Table 8: Access to Digital Finance as a Mediating Variable on the Relationship Between FL and SME Performance

Effect Type	Effect	SE / BootSE	t	p	LLCI	ULCI
Total Effect	0.8984	0.0493	18.2126	< .001	0.8010	0.9957
Direct Effect	-0.0526	0.0370	-1.4211	.157	-0.1258	0.0205
Indirect Effect (via ADF)	0.9510	0.0468	—	< .05	0.8597	1.0438

Note.

Results were generated using PROCESS Macro Model 4 with 5,000 bootstrap samples and a 95% confidence interval.

FL = FL; ADF = Access to Digital Finance; SMDP = SME Performance.

Source: PROCESS Macro Output (Hayes, 2018).

The relationships between FL (FL) and SME Performance (SMDP) and Access to Digital Finance (ADF) as a possible mediator were tested using mediation analysis based on PROCESS Macro Model 4 (Hayes, 2018). The sample size of 170 SMEs was sufficient to test the hypothetical relationships. The researchers experimented with four hypotheses (H1 –H4) to identify both direct and indirect effects.

Hypothesis 1 (H1): FL Impact on Access to Digital Finance.

The first hypothesis proposed that FL positively influences SMEs' access to digital finance. Regression results indicated a statistically significant and strong positive relationship, with a coefficient of 0.8471 ($t = 20.973$, $p < 0.001$). The model summary showed high explanatory power ($R = 0.8507$ and $R^2 = 0.7236$), which implies that around 72 percent of the variance in access to digital finance can be attributed to FL. Although the model demonstrates a very high explanatory power, the high R^2 value may also indicate the possibility of common method bias, as the data were collected using a self-reported questionnaire from respondents within the same organisational context. The finding implies that financially literate SMEs can better grasp and utilise digital financial instruments, including online banking, online payment systems, and financial management programmes. Thus, H1 is completely substantiated.

Hypothesis 2 (H2): FL Impact on SME Performance.

The second hypothesis examined the direct effect of FL on SME performance. The findings showed a coefficient equal to -0.0526 ($t = -1.421$, $p = 0.157$), which implies that the relationship is negative and statistically non-significant. This suggests that FL alone does not have a direct positive impact on SME performance. The model emphasises that financial knowledge by itself cannot lead to better performance outcomes unless it is translated into practical abilities, such as gaining access to and having the ability to utilise digital finance. This means that H2 is not upheld.

Hypothesis 3 (H3): ADF Impact on SME Performance.

The third hypothesis proposed that access to digital finance would have a positive impact on SME performance. The results strongly supported this, with a coefficient of 1.1226 ($t = 30.180$, $p < 0.001$). These findings show that SMEs with greater access to digital financial services are more likely to achieve higher levels of performance. This is reflected in improved financial organisation, increased operational efficiency, and more investment opportunities. H3 is thus upheld, highlighting how important digital finance is in enhancing SME performance. The high R^2 values should be interpreted with caution, as they may be influenced by the use of self-reported data collected from a single source, which may inflate the observed relationships.

Hypothesis 4 (H4): Mediating Role of Access to Digital Finance on SME Performance.

The mediation examined the effect of access to digital finance as a mediator between FL and SME performance. These findings showed a strong indirect impact of FL on SME performance through access to digital finance, with a bootstrapped indirect effect of 0.9510 and a confidence interval between 0.8597 and 1.0438. This shows that digital finance has complete mediating power, i.e. FL has a role to play in SME performance; it helps SMEs to use and exploit digital financial resources. The direct effect was not statistically significant (-0.0526, $p = 0.157$), which once again supported the mediating role of ADF. This conclusion confirms H4 and emphasises the significance of digital finance as the primary process that can connect FL and business performance.

Overall Model Insights

The total effect model indicated a substantial overall effect of FL on SME performance (0.8984, $t = 18.213$, $p < 0.001$). However, as soon as access to digital finance is added to the model as a mediator, the direct effect turns insignificant. These findings indicate a full mediation effect. Although the total effect of FL on SME distribution performance was significant, the direct effect became statistically non-significant after access to digital finance was introduced into the model, while the indirect effect remained significant. This indicates that FL influences SME distribution performance entirely through access to digital finance. Therefore, H4 is supported and access to digital finance serves as a full mediator in the proposed relationship³⁴. Therefore, H4 is supported. The findings highlight

the significance of FL coupled with practical access to digital financial tools to attain practical improvements in SME performance.

Consequently, policies and interventions aimed at enhancing SME performance must not only target FL but also provide SMEs with easy access to digital finance.

4.4 Summary of Results of Hypotheses Testing

H1: FL → Access to Digital Finance.

The findings suggest a strong, statistically significant positive impact of FL on access to digital finance. The greater FL among SMEs allows them to comprehend, adopt, and successfully utilise digital financial solutions, including online banking platforms, online payment systems, and financial management software. This supports H1 and stresses the nature of FL as a prerequisite for the use of digital finance.

H2: FL → SME Performance.

FL was found to have a direct negative but statistically non-significant impact on SME performance. This implies that SMEs can be financially knowledgeable, but this does not necessarily translate into better performance. In the absence of practical tools to implement financial education, such as digital finance. Accordingly, H2 is not supported.

H3: Access to Digital Finance → SME Performance.

The availability of digital finance was found to have a significant positive influence on SME performance. SMEs with access to and the ability to utilise digital financial services can enhance their operational efficiency, manage cash flows effectively, and invest in growth opportunities. This result confirms H3 and underlines the fact that digital finance is a major success factor in businesses.

H4: FL → SME Performance (Mediated by Access to Digital Finance).

The mediation analysis revealed a fully mediating relationship between FL and SME distribution performance through access to digital finance. This indicates that FL influences SME performance both directly and indirectly through access to digital finance. Accordingly, H4 is supported.

The results all point to the idea that FL matters, but its influence on SME performance is large, indirect, and dependent on the availability of digital finance. Policies and programmes aimed at improving SME performance should not only focus on increasing FL but also ensure a practical avenue to digital finance solutions.

Table 9: Summary of Hypotheses Testing Results

Hypothesis	Relationship	Result
H1	FL → Access to Digital Finance	Supported
H2	FL → SME Performance	Not Supported
H3	Access to Digital Finance → SME Performance	Supported
H4	FL → SME Performance (Mediated by Access to Digital Finance)	Supported

5. Discussion

The research analysed the relationship between FL, access to digital finance, and SME performance in the United Arab Emirates context. Specifically, the research examined whether FL has an indirect relationship with SME performance through access to digital finance.

Some valuable insights emerged from the empirical findings. First, the findings demonstrated a statistically significant and strong correlation between FL and exposure to digital finance. SME owners and managers with higher levels of FL were better able to learn and embrace digital financial services, including online banking, fintech services, and electronic payment systems. The result confirms earlier investigations showing that entrepreneurs with FL are more likely to use financial technologies and online financial tools.

Second, the analysis results established that the direct impact of FL on SME performance was not statistically significant. Even though FL increases the awareness level and financial decision-making capability, its effectiveness on performance may be minimal unless complemented by practical and technical infrastructures that enable SMEs to put financial knowledge into practice.

Third, the results suggested that access to digital finance positively and strongly impacts SME performance. SMEs that proactively use digital financial services are more likely to achieve high operational efficiency, better cash flow management, and increased financial access. These benefits allow the SMEs to enhance productivity and increase business operations in the increasingly digitalised markets.

Most significantly, the mediation analysis confirmed that the full effect of FL on SME performance is mediated by access to digital finance. This implies that FL contributes to better SME distribution performance, mainly by providing SMEs with the opportunity to use and access digital financial tools. In other words, financial knowledge can be turned into financial practice through digital financial systems to make it economically beneficial.

These findings accentuate the role of digital financial inclusion in restructuring FL into actual business performance. FL can only increase SME performance in digitally advanced economies, such as in the UAE, when relevant digital financial infrastructure is established and well-used.

5.1 Theoretical Implications

This paper contributes to the current body of research on FL, digital finance, and SME performance in several ways. First, the results extend past studies by proving that FL does not directly impact SME performance but rather through access to digital finance. This shows the need to incorporate mediating mechanisms when studying the effect of financial capabilities on firm results.

Second, the research empirically validates the resource-based theory (RBT), which theorises that competitive advantage arises from the successful utilisation of internal and external resources. FL is a significant internal strength, but its ability to create value depends on the presence of other resources like digital financial infrastructure.

Third, the paper adds to the existing digital financial inclusion literature by showing its important role in helping SMEs to transform financial knowledge into improved performance results. The study also broadens the geographical scope of research in this area by focusing on SMEs in the UAE, which is a rapidly digitising economy offering valuable empirical evidence.

5.2 Practical Implications

The research findings have several practical implications for policymakers, financial institutions, and SME managers.

First, policymakers and SME development agencies should recognise that FL alone may not be enough to improve SME performance. Financial education programmes must be complemented by access to digital financial services and technologies.

Second, financial service providers and fintech companies should prioritise increasing access and availability of digital financial platforms to SMEs. Simplified financial services, personalised financial products, and sufficient technical support can motivate SMEs to use digital finance more effectively.

Third, SME managers and owners should also incorporate digital financial tools into their business activities. These digital financial services could improve financial management, lower transaction costs, and increase overall efficiency.

In summary, a strategy that integrates the development of FL with the expansion of access to digital financial infrastructure can greatly enhance the competitiveness and sustainability of SMEs.

6. Conclusion

This paper has investigated the relationship between FL, access to digital finance, and SME performance among small and medium-sized businesses in the United Arab Emirates. The findings show that FL strongly affects the accessibility of digital finance, and that access to digital finance, in turn, has a significant positive effect on SME performance.

Nevertheless, FL was not found to have a direct impact on SME performance. Instead, the analysis demonstrated that the effect of FL on SME performance is fully mediated by access to digital finance. These results imply that FL contributes to SME performance only through access to digital finance, which enables SMEs to transform financial knowledge into practical business outcomes.

Overall, the research work highlights the importance of digital financial inclusion as an essential factor in facilitating the process of converting financial capabilities into better SME business performance. Enhancing FL while simultaneously increasing access to digital financial services should therefore be considered a critical responsibility in facilitating the growth and development of SMEs.

Ethical Considerations

Participation in this study was voluntary, and informed consent was obtained from all participants before data collection. The confidentiality and anonymity of respondents were fully protected throughout the research process. The study was conducted in accordance with academic research ethics and the principles of the Declaration of Helsinki.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this study.

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Use of Artificial Intelligence

Artificial intelligence tools were used only for language improvement and grammar checking. All research analysis, interpretations, and conclusions were conducted solely by the authors.

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