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Original Article

CEO Financial Literacy on Firm Performance among SMEs; The Mediating Role of Firm Technological Innovations and Risk Tolerance and Moderating Role of Firm Size

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Abstract: *This manuscript presents an in-depth exploration of the impact of Chief Executive Officer (CEO) financial literacy on the performance of Small and Medium-sized Enterprises (SMEs), with a particular focus on the context of Zimbabwe. This study is pivotal in addressing a significant gap in the existing literature by examining the mediating roles of firm technological innovations and risk tolerance alongside the moderating role of firm size. The research is grounded in Resource-Based Theory (RBT), which emphasizes the strategic importance of internal resources such as CEO financial literacy in shaping firm competitiveness and success. A comprehensive methodology is employed, utilizing Structural Equation Modeling (SEM) to analyze data from a cross-sectional questionnaire distributed to CEOs of SMEs in Zimbabwe. The study's findings reveal a robust and statistically significant positive relationship between CEO financial literacy — encompassing financial behavior, knowledge, and skills — and firm performance. This relationship is further mediated by technological innovation and risk tolerance. Notably, firm size is found to significantly moderate these relationships, highlighting its crucial role in the dynamics of SME performance. This research contributes to the scholarly discourse by offering new insights into the direct and indirect impacts of financial literacy on firm performance. It emphasizes the need for strategic investments in comprehensive financial education and leadership development, particularly in the dynamic and challenging economic environment of Zimbabwe. The study's findings have broad implications for practitioners and policymakers, suggesting a holistic approach to leadership development that includes fostering risk tolerance and the capacity to embrace technological advancements.*

Keywords: *CEO Financial Literacy, Firm Size, Risk Tolerance, SME Performance, Technological Innovation.*

I. INTRODUCTION

The duties of Chief Executive Officers (CEOs) in Small and Medium-sized Enterprises (SMEs) have changed significantly in today's globalized and technologically advanced corporate environments. These days, CEOs are in the vanguard of complex financial decision-making processes, going beyond their typical leadership duties (Canals, 2020). CEO financial literacy is acknowledged as a critical component that shapes the success of SMEs and their capacity to negotiate the complexities of contemporary financial environments (Atkinson and Messy, 2012). An in-depth investigation of the complex relationship between CEO financial literacy and business success in the SME sector is undertaken in this study.

Although earlier studies have acknowledged the importance of CEO financial literacy in organizational settings, there is a clear research gap concerning Small and Medium-sized Enterprises (SMEs). Small and medium-sized enterprises (SMEs) represent a separate sector of the business environment, distinguished from their bigger counterparts by their specific operating dynamics and intrinsic resource limits (Grimaldi et al., 2013). Most existing literature focuses on big businesses, pushing small and medium-sized enterprises to the margins of academic research. As such, there is a marked lack of thorough studies that explore the complex links between CEO financial literacy, company performance, and the crucial mediating and moderating elements relevant to small and medium-sized enterprises. One remarkable aspect of this research gap is the absence of a study on the mediating effect of SME technical innovation and risk tolerance. Although the literature currently in publication acknowledges these factors as important predictors of organizational success in SMEs (Haleem, 2022; Eniola and Entebang, 2017), little is known about how they relate to the financial literacy of the CEO. This research gap highlights the urgent need for studies that clarify how financial literacy among CEOs of SMEs influences organizational outcomes and reveal the complex mechanisms by which this influence is mediated, especially by illuminating the mediating roles of risk tolerance and technological innovation within the SME context. This study seeks to bridge this conspicuous gap in our understanding of the intricate dynamics governing SMEs and their leadership, forging a path toward a more holistic comprehension of the factors shaping their performance and resilience.

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This study draws upon the resource-based theory as a guiding framework to achieve its objectives. Resource-based theory posits that firms gain competitive advantages and superior performance by acquiring, deploying, and leveraging valuable, rare, and non-substitutable resources (Barney et al., 2001). In the context of this study, CEO financial literacy represents a resource that, when effectively harnessed, has the potential to enhance SMEs' capabilities and competitive positioning. By applying the resource-based theory lens, we aim to unravel the relationships between CEO financial literacy, firm technological innovations, risk tolerance, and firm performance, shedding light on the resource dynamics within SMEs.

This study uses a strong technique that uses structural equation modeling (SEM) analysis to meet these research objectives. SEM is a flexible statistical method used concurrently to capture intricate correlations between several variables. The study's sample of SMEs in Zimbabwe, a country distinguished by a distinct commercial and economic environment, is the subject of the investigation. Zimbabwean small and medium-sized enterprises (SMEs) present a unique environment for examining the correlation between the financial literacy of CEOs, technological advances of their firms, risk appetite, and firm size. By utilizing SEM in this setting, we hope to offer thorough insights into the mediating and moderating factors influencing the link between CEO financial literacy and company performance among SMEs in Zimbabwe.

In conclusion, this study embarks on a crucial exploration of the impact of CEO financial literacy on the performance of SMEs, with a distinct focus on the mediating role of firm technological innovations and risk tolerance and the moderating influence of firm size. By addressing this research gap within the context of Zimbabwean SMEs and employing the resource-based theory framework, we aim to advance the understanding of how financial literacy among CEOs shapes SMEs' competitive landscape and success. This investigation holds the potential to offer practical insights that can inform strategic decision-making and policy development, fostering the growth and resilience of SMEs in evolving business environments.

II. LITERATURE REVIEW

A) Resource-Based Theory

Resource-Based Theory (RBT) represents an evolution of the Resource-Based View (RBV), providing a comprehensive framework that underscores how the internal resources of a firm shape its competitive advantage and performance. This theory extends the RBV principles, adopting a more predictive and prescriptive standpoint that focuses on developing and strategically utilizing unique firm resources for long-term success. The roots of RBT are traced back to the foundational works of Wernerfelt (1984), Barney (1991), and Peteraf (1993), who highlighted the critical role of valuable, rare, inimitable, and non-substitutable resources in fostering a firm's competitive edge. Emphasizing strategic resource management, RBT highlights the importance of possessing and effectively managing and deploying these unique resources, as elucidated in Barney's later work (Barney et al., 2001).

In the framework of RBT, CEO financial literacy, encompassing behavior, knowledge, and skills, is regarded as a pivotal strategic resource, particularly within the context of SMEs. This form of literacy plays a significant role in influencing a firm's strategic decisions, financial management practices, and overall performance. CEOs with robust financial acumen are better positioned to identify opportunities, manage risks efficiently, and allocate resources effectively, contributing to the firm's success (Brigham and Daves, 2019). Additionally, these financially literate CEOs are adept at fostering innovation within their organizations. They can make informed decisions regarding investments in new technologies and manage the risks associated with innovation-related ventures (Hitt et al., 2014).

B) Hypothesis Development

a. CEO financial literacy and SME performance

The importance of CEO financial literacy as a factor influencing company success has become more apparent in the dynamic and often challenging environment of Small and Medium Enterprises (SMEs) in Zimbabwe. Financial literacy is acquiring skills, knowledge, and behaviors necessary to make well-informed financial decisions (Dewi et al., 2020). It enables one to confidently traverse the intricate realm of personal finance and make decisions that result in financial prosperity (Holzmann et al., 2013). Literacy, including financial behavior, knowledge, and skills, goes beyond fundamental requirements and becomes a strategic advantage based on Resource-Based Theory (RBT). The Resource-Based Theory (RBT) asserts that a company's internal resources, specifically the financial knowledge and skills possessed by its Chief Executive Officers (CEOs), play a crucial role in obtaining and maintaining a competitive edge (Barney, 1991). Amid the tumultuous economic conditions in Zimbabwe, characterized by hyperinflation, currency volatility, and intricate regulations, the importance of a CEO's financial expertise is greatly amplified. It goes beyond being skilled at handling regular financial activities to include more considerable qualities such as strategic decision-making, shrewd risk management, and prudent resource allocation (Ngo and Nguyen, 2022). These qualities are particularly vital in maneuvering through the complexities of Zimbabwe's economic landscape, where strategic financial choices can determine whether a corporation thrives or fails. In this context, a CEO's financial literacy is not merely a set of skills but a crucial strategic tool that influences the path of SMEs (Manhiwa et al., 2016; Mashizha et al., 2019). The intricate relationship

between economic circumstances and leadership abilities highlights the need to comprehend and value the subtle impact that CEO financial literacy has on the outcomes of SMEs in Zimbabwe.

The empirical research strongly emphasizes the importance of CEO financial literacy in influencing the success of SMEs, particularly in a challenging economic environment such as Zimbabwe (Manhiwa et al., 2016). This discovery aligns with broader global and regional study patterns that emphasize financial literacy's complex and diverse aspects. Research suggests that a CEO's financial behavior, including their attitudes, habits, and ethical considerations in managing finances, is crucial in guiding companies through economic uncertainties and taking advantage of new opportunities for growth and expansion (Mutengezanwa, 2018). Financial literacy encompasses more than just knowledge; it entails the utilization of ethical concepts and proactive behaviors while making financial decisions, which is crucial for navigating intricate and frequently unstable business environments (Manhiwa et al., 2016).

Moreover, acquiring financial knowledge, which encompasses a thorough grasp of financial concepts, market dynamics, and the consequences of financial choices, is fundamental for successful leadership in SMEs (Eniola and Entebang, 2017). Such understanding enables CEOs to navigate complex financial landscapes, guaranteeing their organizations' survival, sustainable expansion, and stability. In Zimbabwe's volatile economic climate, a deep understanding of financial markets and economic indicators is crucial for success. This component of financial literacy is especially pertinent since it can determine whether one thrives or fails (Brigham and Daves, 2019). Also, the importance of actual financial skills cannot be exaggerated. This feature encompasses the proficiency to examine financial statements thoroughly, comprehend market trends, and create and execute efficient financial strategies. These skills are essential for converting theoretical financial knowledge into practical, executable strategies that produce concrete enhancements in corporate performance. Applying financial insights in practical situations is the key to gaining a competitive edge and achieving long-term corporate success (Hitt et al., 2014). These considerations lead to the formulation of the following hypotheses to guide further empirical investigation.

H1a: CEO financial behavior positively influences firm performance among SMEs.
H1b: CEO financial knowledge positively influences firm performance among SMEs.
H1c: CEO financial skills positively influence firm performance among SMEs.

b. CEO financial literacy and technological innovation

Within the dynamic and demanding environment of SMEs in Zimbabwe, the complex connection between the financial literacy of CEOs and technological innovation appears as a crucial issue for investigation. The RBT emphasizes the importance of internal resources, namely a leader's specialized knowledge and abilities, as essential factors for fostering innovation and establishing a distinct advantage in the market (Suardhika et al., 2018). In a challenging setting such as Zimbabwe, which is marked by significant resource constraints and economic instability, the importance of a CEO's financial literacy goes beyond conventional expectations. It is a crucial motivator for navigating economic uncertainties and directing strategic investments toward technical advancement and innovation. The impact of CEO financial literacy is particularly significant in Zimbabwe's SME sector, where capable and financially astute leadership can determine whether a company remains stagnant or experiences growth (Mutengezanwa, 2018). This makes CEO financial literacy a crucial factor in adopting and effectively implementing technological innovations (Manhiwa et al., 2016; Mashizha et al., 2019). The intricate nature of Zimbabwe's economic environment and the swift rate of technology advancements highlight the growing importance of CEOs' financial acumen. This factor plays a crucial role in fostering innovation and guaranteeing the long-term viability of SMEs in the area.

The financial behavior of a CEO pertains to their views and behaviors in the realm of financial management. In Zimbabwe, where economic conditions are frequently difficult, the strategic financial conduct of CEOs plays a vital role in creating a favorable atmosphere for innovation (Nleya and Chummun, 2022). CEOs who exhibit judicious financial behavior are prone to establish stability inside the organization, thereby fostering a heightened emphasis on and allocation of resources towards technical innovation. The correlation implies that exercising fiscal caution and engaging in calculated risks in financial affairs may be crucial in fostering innovation in small and medium-sized enterprises (Mashizha et al., 2019; Mutengezanwa, 2018). Moreover, the CEO's financial acumen, which includes comprehending financial markets, investment prospects, and economic patterns, is an additional crucial element. A CEO's profound understanding of financial matters can benefit Zimbabwe's intricate economic environment. It can assist in recognizing and capitalizing on chances for technological progress and aligning financial plans with innovative initiatives (Weill and Broadbent, 1998).

Furthermore, the financial skills of a CEO, which involve the practical use of financial expertise in decision-making, are crucial for transforming innovative concepts into feasible technological solutions (Proctor, 2010). Proficient financial skills empower CEOs to allocate resources efficiently, successfully mitigate risks associated with innovation, and adeptly

negotiate the financial dimensions of technology development and deployment. This skill set is essential in Zimbabwe, where resources are limited. It is necessary to make the most of every investment to advance technologically (Teece, 2010).

Hence, the following hypotheses were formulated:

H2a: CEO financial behavior positively influences technological innovation among SMEs.
H2b: CEO financial knowledge positively influences technological innovation among SMEs.
H2c: CEO financial skills positively influence technological innovation among SMEs.

c. CEO financial literacy and risk tolerance

It is crucial to understand the impact of CEO financial literacy on risk tolerance within the context of SMEs in Zimbabwe. The RBT offers a significant approach to examining this connection, suggesting that internal resources, such as a CEO's financial literacy, play a crucial role in determining a firm's strategic direction and ability to take risks (Obiora, 2023). CEO financial behavior is the manner in which CEOs handle financial management, encompassing their attitudes and behaviors toward risk (Wiseman and Gomez-Mejia, 1998). CEOs' financial behavior can significantly impact the risk tolerance of their enterprises amid Zimbabwe's unstable economic conditions. Companies headed by CEOs who demonstrate cautious and strategic financial conduct are inclined to tackle risks methodically, weighing possible profits against the inherent hazards of the unpredictable market (Mutengezanwa, 2018). This implies that the financial actions of a CEO can directly impact a company's ability to handle and accept risks.

Another crucial element is the CEO's comprehensive financial knowledge, which includes a deep awareness of financial principles, markets, and economic trends (Eniola and Entebang, 2017). In Zimbabwe, where economic conditions are intricate and frequently uncertain, a CEO's financial knowledge is vital for making well-informed judgments regarding risks. CEOs can utilize this knowledge to evaluate the probable consequences of different risk variables on their business and devise appropriate strategies (Mashizha et al., 2019). A comprehensive grasp of financial trends can enable CEOs to successfully navigate risks, aligning them with the firm's strategic objectives. Moreover, the financial skills of a CEO, which pertain to the practical use of financial expertise in decision-making, are essential for efficient risk management (Fraser et al., 2021). These abilities empower CEOs to recognize and evaluate risks and execute strategies that reduce these risks while taking advantage of potential opportunities. The practical financial skills of CEOs will play a critical role in managing and navigating risks in Zimbabwe's SME sector, where resources are typically limited and there is little room for mistakes (Manhiwa et al., 2016).

These factors lead to the formulation of the following hypotheses:

H3a: CEO financial behavior positively influences risk tolerance among SMEs.
H3b: CEO financial knowledge positively influences risk tolerance among SMEs.
H3c: CEO financial skills positively influence risk tolerance among SMEs.

d. Technological innovation and SME performance

The importance of technological innovation in enhancing business performance, especially in SMEs in Zimbabwe, is becoming more widely acknowledged (Makate et al., 2019). The RBT argues that a firm's competitive advantage and performance depend heavily on its distinct internal resources, such as technological skills (Suardhika et al., 2018). In Zimbabwe, SMEs frequently work with limited resources, making technology innovation a competitive advantage and a vital requirement for their survival and expansion (Mabenge, et al., 2022). The influence of technical innovation on the performance of SMEs in Zimbabwe is complex and has multiple aspects. It allows firms to optimize operational efficiencies, access new markets, and improve the quality of their products and services (Makate et al., 2019). This is especially pertinent in Zimbabwe's specific circumstances, where economic instability and difficulties with infrastructure might hinder conventional business methods (Manhiwa et al., 2016). However, implementing novel technologies might bring up notable challenges, such as the requirement for proficient staff, financial capital, and the capacity to adjust to swiftly evolving technical environments. Research has indicated that SMEs that effectively overcome these obstacles and utilize technology advancements tend to observe enhanced performance, demonstrated by higher revenue, more significant market share, and increased customer involvement (Makanyeza and Dzvuke, 2015; Jetter et al., 2009). The implementation of technical innovation in Zimbabwean SMEs is influenced by factors such as the firm's resource base, management capacity, and the external economic climate, despite the acknowledged significance of technological innovation. These elements can either enable or impede the successful incorporation of new technologies into business operations. Hence, it is crucial to comprehend the intricacies of technological advancement within Zimbabwe's SME industry (Chipambwa, et al., 2023). Given this backdrop, the following hypothesis is proposed:

H4a: Technological innovation has an effect on firm performance among SMEs.

e. Risk tolerance and SME performance

Risk tolerance refers to the ability to strike a harmonious equilibrium between prudent financial management and the readiness to seize chances, including a specific degree of risk (Falkner and Hiebl, 2015). Comprehending the significance of risk tolerance in shaping business success is becoming increasingly crucial. In Zimbabwe, SMEs frequently encounter economic obstacles such as market volatility and restricted capital accessibility (Manhiwa et al., 2016). Consequently, a firm's risk tolerance level shapes its strategic trajectory and overall success. Research suggests that SMEs in Zimbabwe, which exhibit a greater willingness to take risks, are more inclined to actively seek out development prospects, engage in innovation, and venture into new markets, even in the face of uncertain economic circumstances (Hock-Doepgen et al., 2021, Ismanto, et al., 2020).

Nevertheless, it is crucial to control this level of risk tolerance carefully. Engaging in excessive risk-taking without sufficient precautions can have harmful consequences, particularly in a volatile economic climate like Zimbabwe. On the other hand, an excessively cautious attitude can lead to overlooking possibilities and a lack of progress, impeding a company's ability to grow and adapt to competition and technological advancements (Hock-Doepgen et al., 2021). External factors, like regulatory frameworks, market trends, and economic stability, also impact the relationship between risk tolerance and SME performance in Zimbabwe. These factors can either enhance or reduce the effect of risk tolerance on a firm's performance. For example, in a less uncertain economic situation, the beneficial effects of risk tolerance on company performance may be more noticeable. However, in a highly unpredictable market, the same degree of risk tolerance could lead to varying outcomes (Falkner and Hiebl, 2015). Therefore, the following hypothesis is proposed:

H5a: Risk tolerance has an effect on firm performance among SMEs.

f. The moderating role of firm size

Firm size pertains to the magnitude and operational capability of a corporation. It provides insight into the magnitude of a company's operations (Stock et al., 2002). Exploring the moderating role of firm size on different dimensions of business performance is a promising area of study within the context of SMEs in Zimbabwe. The size of a firm can play a crucial role in reducing the impact of CEO financial behavior on firm performance. Within larger SMEs, there is a greater likelihood of implementing organized financial procedures and risk management techniques. This can result in more substantial effects on the company's overall performance.

Meanwhile, in smaller SMEs, the impact of a CEO's financial behavior on the company's performance may be more noticeable because of the more concentrated decision-making procedures (Mubeen et al., 2021). The size of a firm influences the impact of the CEO's financial knowledge on the firm’s performance. CEOs of larger SMEs can efficiently utilize their financial knowledge by leveraging a more comprehensive range of financial information and tools available to them. However, in smaller companies, the influence of the CEO's financial expertise on performance may be more immediate and direct, albeit it is restricted by the company's limited resources (Eniola and Entebang, 2017).

The financial skills of a CEO and their impact on a company's performance exhibit a comparable relationship. The size of the SME could ascertain the degree to which these skills can impact the total performance. Greater opportunities for implementing advanced financial strategies may exist in larger SMEs. However, in smaller SMEs, the CEO's practical financial skills may directly impact the business's day-to-day management and survival (Brigham and Daves, 2019).

Therefore, firm size is hypothesized to play a moderating role in several key relationships within SMEs in Zimbabwe:

H6a: Firm size moderates the relationship between CEO financial behavior and firm performance among SMEs.

H6b: Firm size moderates the relationship between CEO financial knowledge and firm performance among SMEs.

H6c: Firm size moderates the relationship between CEO financial skill and firm performance among SMEs.

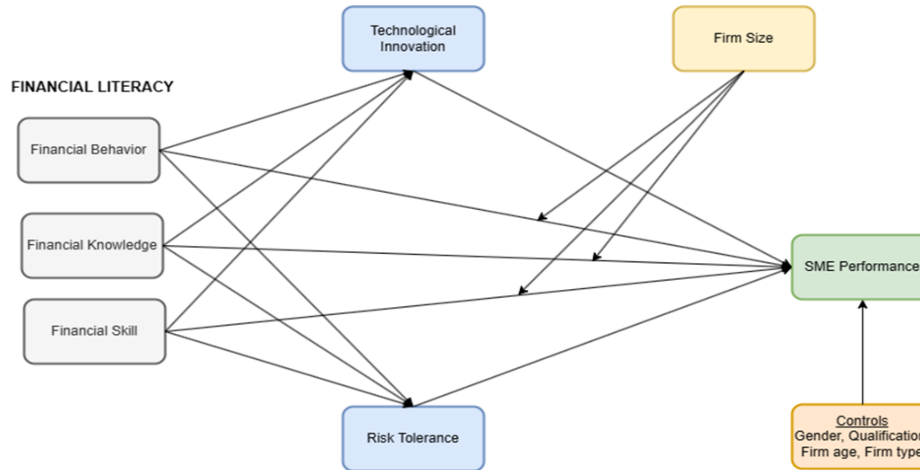

Fig. 1 Conceptual model and hypothesis

III. METHODOLOGY

A) *Variable Description*

a. Firm Performance

The firm performance construct was measured by four items described in the literature section: profitability, growth, innovation, and survival (Phillips and Kirchhoff, 1989). The questions used included: How will you rate your firm survival compared to other firms in the same industry; How will you rate the growth of your firm, etc. A 5-point Likert scale with 1-very bad and 5-very good was used to measure firm performance.

b. Financial Literacy

We measured financial literacy using financial behavior, financial knowledge, and financial skills. Financial behavior was adapted from Atkinson and Messy (2012) with questions including I carefully consider all enterprise purchases before making them; I keep a close watch on personal and enterprise financial affairs; I set long-term enterprise goals and strive hard to achieve them; I actively save or buy investments for the enterprise. The study used a 5-point Likert ranging from 11-strongly disagree to 5-strongly agree. Financial Knowledge was adapted from Jennah (2022) with questions including Imagine that five brothers are given a gift of $1000. If the brothers have to share the money equally, how much does each one get; Now imagine that the brothers have to wait for one year to get their share of the X. In one year, they will be able to buy Multiple choice: a) More, b) the same amount, or c) less than they could buy today. There were 5 questions, and we awarded one mark for each right answer and 0 for each wrong answer. The final score for financial knowledge was the sum of the correct scores for each respondent. The third factor, financial skill, was measured using a 5-point Likert ranging from 1- bad to 5 - excellent, including the ability to prepare a personal budget, accurately determine benefits and costs from financial dealings, and evaluate different financial products and services.

c. Risk-taking

We measured risk-taking as the CEO's ability to make financially risky decisions, hoping for a favorable outcome. We adapted the measure from Jetter (2010) with 4 items, each having a 5-point ranging from 1-strongly disagree to 5-strongly agree. The questions included: I bet on research and development leadership; I have a strong propensity for high-risk projects; I think that knowing the environment and courageous and wide-ranging actions are necessary to achieve the objectives of the company; When faced with uncertain decision-making, I usually take a courageous and aggressive stance to maximize the likelihood of exploiting potential opportunities.

d. Technological Innovation

Technological innovation was measured using a three-item measure adapted from (Madrid-Guijarro et al., 2021). The items compare the CEO's technological innovation with other companies in the same sector. With a 5-point Likert rand=ging from 1-very unfavorable to 5-favorable, the study asked questions such as: Comparing the products and services by your company with other companies in your sector; how many new goods or services your business introduces annually, how innovative it is when launching new services, and how quickly it reacts when other businesses in the industry launch new services.

IV. RESULTS

A) Sample and Survey Administration

The data collection technique was through a structured questionnaire addressed to the CEOs of certain SMEs randomly selected from the pool of SMEs in Zimbabwe. The legitimacy of the survey was confirmed by a comprehensive pre-testing process prior to the creation of the final version. Following the pre-test, the necessary adjustments were made to improve the survey's previous iteration in terms of readability and clarity (Stefanitsis et al., 2013). As a result, the main source of data is an extensive cross-sectional questionnaire that was carried out from October to November 2023 by a specialized company that also carried out many control checks to ensure the survey's validity. A total of 271 responses were received, of which 202 were valid and were used for further analysis. Table 1 gives detailed information on the respondents' demographics. The study used the SPSS23 and AMOS 22 version statistical tools for the analysis.

Table 1: Respondents Demographics

Variable	Sub item	Frequency	Percentage
Gender	Male	65	32.5
	Female	137	67.5
Qualification	High School	57	28.2
	Diploma	42	20.8
	Degree	85	42.1
	Masters	18	8.9
Firm Age	Less than 2 years	22	10.9
	2 to 5 years	76	37.6
	5 to 10 years	55	27.2
	10 to 20 years	42	20.7
	Above 20 years	7	3.5
Position	Manager	59	29.2
	Owner	68	33.7
	Partner	22	10.9
	Chairman	37	18.3
	Director	16	7.9
Firm Size	6 to 9 employees	48	23.8
	10 to 49 employees	75	37.1
	50 to 250 employees	79	39.1
Business Type	Industry	36	17.8
	Mining	9	4.4
	Manufacturing	24	11.9
	Construction	28	13.9
	Wholesale and Retail	66	32.7
	Transport	18	8.9
	Financial and Insurance	11	5.4
	Other Services	11	4.9

B) Measures and Instrument Development

The questionnaire consisted of two segments, with the first segment containing the demographic information of the respondents and the second section containing the construct items that were considered for the study. All constructs used in the study were obtained and adapted from established and validated scales shown in Appendix 1. Each item of the constructs was measured using a 5-point Likert scale ranging from 1 to 5. The study also included control variables, specifically age, qualification, firm age, and firm type. Table 2 gives the mean and standard deviation of the constructs used in the study.

Table 2: Mean, Standard deviation, Skewness, and kurtosis of Constructs

	No.	Mean	Std. Dev.
Financial Behavior (FB)			
FB1	202	3.128	1.169
FB2	202	3165	1.170
FB3	202	4.002	1.090
FB4	202	3.862	.976
Financial Knowledge (FK)			
FK1	202	4.010	.968
FK2	202	3.228	1.465
FK3	202	2.165	1.097
FK4	202	2.684	1.230

FK5	202	3.440	1.157
Financial Skills (FS)			
FS1	202	3.548	.972
FS2	202	3.901	1.058
FS3	202	3.280	.928
Technological Innovation (TI)			
TI1	202	3.477	.982
TI2	202	4.214	1.055
TI3	202	3.448	1.002
Risk Tolerance (RT)			
RT1	202	3.113	.970
RT2	202	3.120	.381
RT3	202	3.207	.600
RT4	202	3.221	.608
Firm Performance (FP)			
FP1	202	3.451	1.002
FP2	202	3.223	.571
FP3	202	3.808	.442

C) Measurement model

The KMO and Bartlett's test for sampling adequacy was first conducted to ensure that our sample was adequate. A KMO value of 0.921 and a significant test indicated that our sample was adequate for further analysis. The study further conducted the confirmatory factor analysis (CFA) to ascertain the validity and reliability of the constructs. The outcome of the CFA indicated significant factor loadings for all constructs at the 0.001 significance level. The Average Variance Explained (AVE) by each construct was above the 0.5 threshold, and the Construct Reliability (CR) values were all above 0.7, which indicates that our constructs are reliable and can be used for further analysis (Hair 2010).

Further, we tested for discriminant validity with the results displayed in Table 5. The outcome reveals a significant correlation between the listed constructs; however, none is higher than the correlation shared between the construct and itself. This indicates discriminant validity (Bagozzi, 1981) and the absence of multicollinearity. The study further tested the reliability of the construct using the Cronbach alpha coefficient values. An alpha value greater than 0.7 indicates that constructs are reliable. As shown in Table 4, all alpha values were above 0.7, indicating that the constructs are reliable. The overall measurement model fitness check through the CFA indicated good fit indices for our measurement models with CMIN/DF = 2.83, p<0.001, CFI = 0.954, TLI = 0.933, NFI = 0.910 and RMSEA = 0.035 (Hair, 2010).

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.921
Bartlett's Test of Sphericity	Approx. Chi-Square	5921.205
	Df	119
	Sig.	.000

D) Common Method Bias (CMB)

To verify the CMB likelihood, Harman's one-factor test was also performed. The value of the single component cannot be greater than 50% in order for it to emerge as the dominant factor and explain the majority of the variance. Results from the exploratory factor analysis (EFA) revealed that the first component accounted for 33.9 percent of the variation, and 69.6 percent of the overall variance was explained. Therefore, it was unlikely that CMB would have an impact on the study's data. In the end, the study found a composite moderated model, which limited CMB because the respondents were not likely to have imagined these kinds of interactions (Fuchs, 2012).

Table 4: Results of the measurement model

Factor	Item	Loading	Alpha	CR	AVE
Financial Behavior	FB1	0.884	0.951	0.923	0.751
	FB2	0.842			
	FB3	0.906			
	FB4	0.832			
Financial Knowledge	FK1	0.781	0.949	0.920	0.698
	FK2	0.880			
	FK3	0.792			
	FK4	0.902			

	FK5	0.816			
Financial Skills	FS1	0.775	0.919	0.858	0.669
	FS2	0.785			
	FS3	0.889			
Technological Innovation	TI1	0.881	0.894	0.876	0.704
	TI2	0.890			
	TI3	0.737			
Risk Tolerance	RT1	0.698	0.950	0.869	0.627
	RT2	0.911			
	RT3	0.774			
	RT4	0.768			
Firm Performance	FP1	0.812	0.886	0.879	0.708
	FP2	0.883			
	FP3	0.827			

Table 5: Mean, standard deviation, and discriminant validity of constructs

	Mean	SD	FB	FK	FS	TI	RT	FP
Financial Behavior	3.94	1.142	**0.866**					
Financial Knowledge	3.83	1.136	0.273	**0.835**				
Financial Skills	3.71	1.161	0.108	0.236	**0.817**			
Technological Innovation	4.08	0.986	0.331	0.401	0.443	**0.839**		
Risk Tolerance	4.05	1.002	0.295	0.333	0.370	0.511	**0.791**	
Firm Performance	4.13	0.768	0.332	0.299	0.510	0.319	0.423	**0.841**

E) Main Effect Regression Analysis

The study first tested the direct effect of each construct on the independent variable before doing further mediation and moderation analysis. The analysis was done using the AMOS 22 version. The structural main effect path analysis results indicated satisfactory model fit indices with CMIN/DF = 2.51, NFI = 0.911, CFI = 0.935, TLI = 0.922 and RMSEA = 0.03. The results show that financial behavior, knowledge, and skills have a statistically significant and positive effect on firm performance. An increase in financial behavior significantly increases firm performance by 33.8 percent, an increase in financial knowledge increases firm performance by 110.4 percent, and an increase in the financial skills of the CEO increases the firm's performance by 6.2 percent. Detailed results of the direct effect model are presented in Table 6 and illustrated in Figure 2.

Table 6: Main Effect Regression Weight

	Estimate	Std. Error	CR	p-value
Financial Behavior → Firm Performance	0.338	0.024	3.421	***
Financial Knowledge → Firm Performance	1.104	0.559	5.658	***
Financial Skills → Firm Performance	0.062	0.702	7.110	***

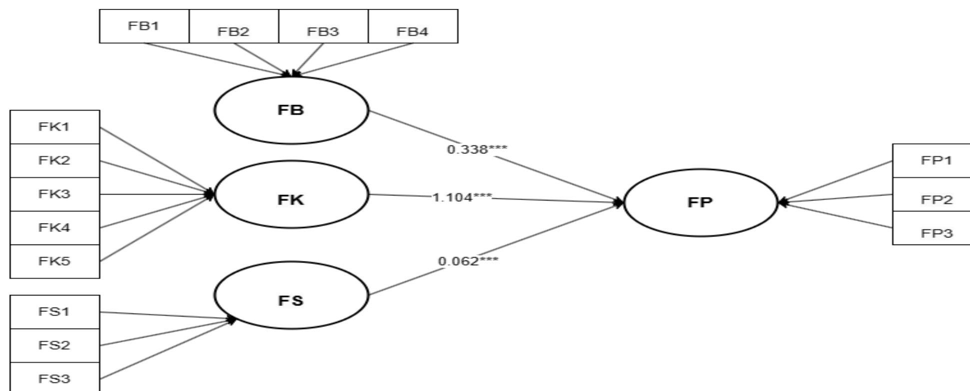

Fig. 2 Direct effect regression model

F) Mediation regression results

This section discusses the results obtained when technological innovation and risk tolerance are used to mediate the relationship between the CEOs' financial literacy and firm behavior. The result shows that financial knowledge, financial behavior, and financial skills all have a statistically significant and positive influence of 12.5, 54.2, and 2.8 percent,

respectively, on the CEOs' technological innovation. Additionally, Financial knowledge had a significant positive influence of 41.7 percent on risk tolerance, while financial behavior had a significant positive impact of 24.4 percent on risk tolerance. However, financial skills did not have a significant influence on risk tolerance. Further results showed that technological innovation and risk tolerance significantly and positively influenced the firm's performance. The results highlight the mediating role of risk tolerance and technological innovation on the relationship between financial literacy and firm performance. The detailed results are presented in Table 7 and illustrated in Figure 3.

Table 7: Mediation regression results

	Estimate	Std. Error	CR	p-value
Financial Behavior → Technological Innovation	0.125	0.271	6.321	***
Financial Knowledge → Technological Innovation	0.542	0.826	3.457	***
Financial Skills → Technological Innovation	0.028	1.105	4.208	***
Financial Behavior → Risk Tolerance	0.244	1.018	8.113	***
Financial Knowledge → Risk Tolerance	0.417	0.729	11.375	***
Financial Skills → Risk Tolerance	0.015	0.711	1.204	
Technological Innovation → Firm performance	0.770	0.327	5.462	***
Risk Tolerance → Firm Performance	0.410	1.001	4.308	***

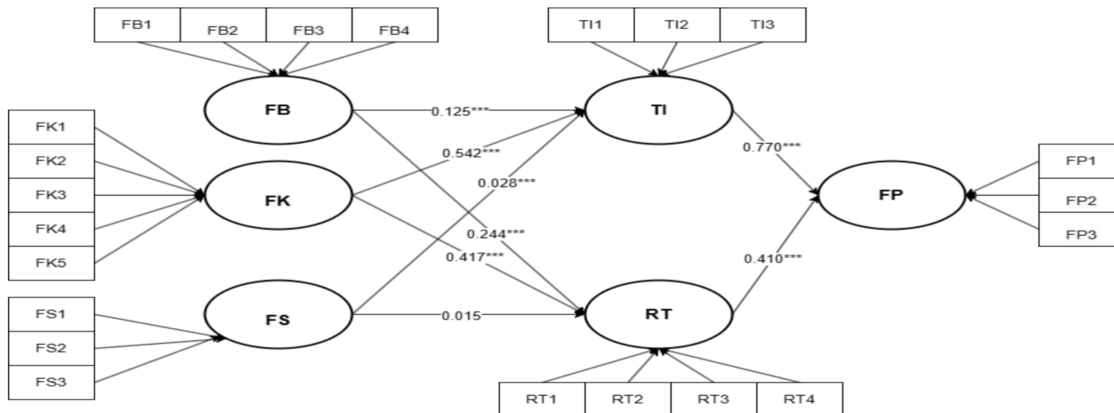

Fig. 3 Moderation effect model

G) Moderation effect analysis

In this section, we discuss the role of firm size as a moderator on the relationship between financial literacy and firm performance. The results yielded a significant coefficient for the interaction between firm size and financial behavior as well as firm size and financial knowledge. Increasing the firm's size significantly increases the positive relationship between financial behavior and firm performance by 11.3 percent. Additionally, increasing firm size significantly increases the positive relationship between financial knowledge and firm performance. However, there was no significant interaction between firm size and financial skills on firm performance. Table 8 displays the moderation effect's findings. The relationships between financial conduct and firm performance, financial knowledge and firm performance, and company size are moderating factors, as shown in Figures 4 and 5.

Table 8: Moderation Regression results

	Estimate	Std. Error	CR	p-value
Firm size → Firm Performance	0.242	0.770	3.228	***
Financial Behavior → Firm performance	0.421	1.103	5.719	***
Financial Behavior*Firm size → Firm performance	0.113	0.962	8.038	***
Financial Knowledge → Firm Performance	1.028	0.603	4.221	***
Financial Knowledge*Firm size → Firm Performance	0.550	0.798	5.284	***
Financial Skills → Firm Performance	0.251	0.285	3.114	***
Financial Skills*Firm Size → Firm Performance	0.815	0.445	1.002	

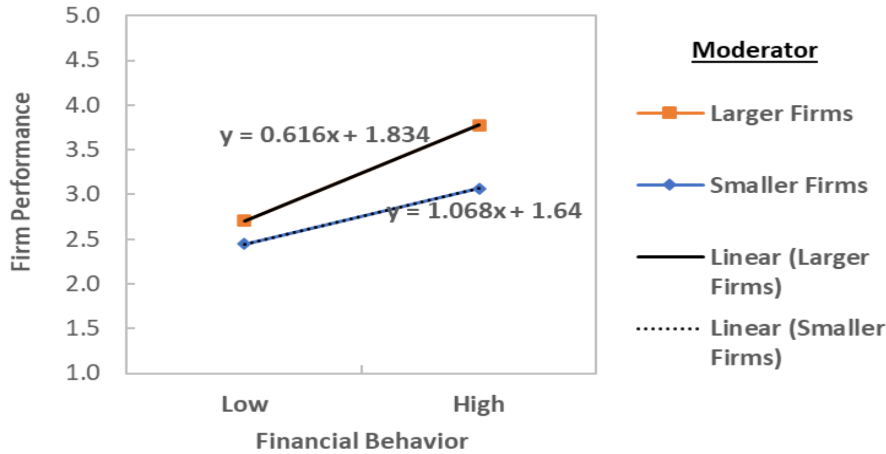

Fig. 4 The role of Firm size on the relationship between financial behavior and firm performance

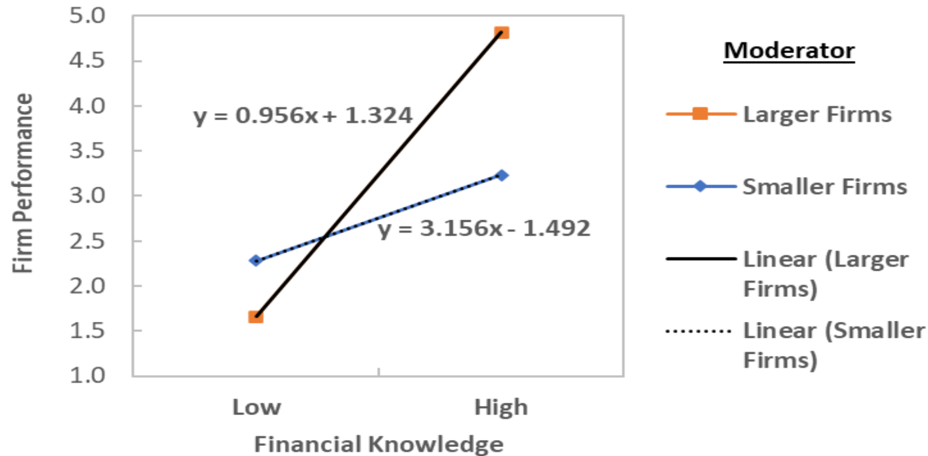

Fig. 5 Moderating the role of firm size on the relationship between financial knowledge and firm performance.

V. DISCUSSION

The study's findings provide important new perspectives on the relationship between business success and financial literacy, as well as the mediating and moderating effects of risk tolerance, technology innovation, and firm size. The findings are discussed in connection with the existing literature, and implications for practitioners and policymakers are outlined. Additionally, potential avenues for future research are suggested.

In examining the direct impact of financial literacy on firm performance, our study unveiled a robust and statistically significant positive association between CEOs' financial behavior, knowledge, and skills and the overall performance of their respective organizations. These findings resonate with and extend the existing body of research that underscores the pivotal role of financial literacy in executive decision-making and its subsequent implications for organizational outcomes (Ismanto et al., 2020; Mubeen et al., 2021). The observed substantial effect sizes emphasize the profound and multifaceted influence of financial literacy in shaping the success trajectory of organizations. These results affirm that organizations stand to significantly bolster their performance metrics by strategically investing in comprehensive financial education initiatives and fostering the continual development of financial skills among their leadership cadre (Obiora, 2023; Stefanitsis et al., 2013). This alignment with prior research highlights the robustness and consistency of the relationship between financial literacy and firm performance, reinforcing the importance of prioritizing financial literacy programs within the organizational development agenda.

In-depth mediation analysis has brought to light compelling evidence substantiating the pivotal roles of technological innovation and risk tolerance in mediating the intricate relationship between financial literacy and firm performance. The positive effects of financial behavior, knowledge, and skills on technological innovation and risk tolerance underscore a critical

dimension of leadership dynamics. This implies that CEOs with higher levels of financial literacy are more likely to embrace innovative technologies and demonstrate a heightened capacity for tolerating financial risks. These empirical observations align seamlessly with established literature emphasizing the positive impact of innovation and effective risk management on overall firm performance (Suardhika et al., 2018; Falkner and Hiebl, 2015). As elucidated by our findings, the interplay between financial literacy, technological innovation, and risk tolerance accentuates the need for organizations to appreciate and strategically address the indirect pathways through which financial literacy manifests its influence on firm performance. Organizations are encouraged to implement comprehensive training programs to capitalize on these dynamics beyond enhancing financial skills. These programs should also cultivate and reinforce innovation and risk-taking capabilities among the leadership, creating a synergistic approach to bolstering overall organizational performance (Suardhika et al., 2018; Chipambwa et al., 2023; Hock-Doepgen et al., 2021). This aligns with the broader organizational literature that recognizes the intertwined nature of financial literacy, innovation, and risk management in shaping the success trajectory of modern enterprises.

In our investigation of the moderating factors shaping the relationship between financial literacy and firm performance, firm size emerged as a crucial contextual variable. The moderation analysis unveiled significant interaction effects between financial behavior, knowledge, and firm size, underscoring the nuanced dynamics in different organizational contexts (Mabenge et al., 2022). Particularly noteworthy is the indication that the positive influence of financial literacy is notably amplified in larger organizations. These results suggest that larger firms stand to gain disproportionately in terms of performance enhancement from CEOs with heightened financial literacy, emphasizing the strategic advantage of cultivating financial acumen in leadership within expansive organizational structures. However, it is essential to note that the moderation effect of firm size on the relationship between financial skills and firm performance did not reach significance. This intriguing finding prompts further exploration and implies that the impact of financial skills on firm performance may not be solely contingent on the organization's size. It opens avenues for future research to delve into other potential contextual factors that might play a moderating role in shaping the relationship between specific dimensions of financial literacy, such as skills and firm performance. This underscores the complexity of the interplay between financial literacy and organizational outcomes, prompting scholars to look beyond size as the sole determinant of the moderating effects within the financial literacy–firm performance nexus.

VI. CONCLUSION

This study significantly enriches the existing literature in several noteworthy dimensions. Firstly, our empirical findings provide robust support and expand upon the scholarly discourse by presenting compelling evidence highlighting financial literacy's direct and positive impact on firm performance. The empirical connections between financial behavior, knowledge, and skills with firm performance contribute significantly to a deeper comprehension of how financial literacy manifests in tangible organizational outcomes (Mashizha et al., 2019). Secondly, our exploration of mediation effects enhances the literature by delving into the intricate mechanisms through which financial literacy influences firm outcomes. Identifying technological innovation and risk tolerance as noteworthy mediators highlights the multifaceted relationship between financial literacy and organizational success (Makanyeza and Dzvuke, 2015; Hock-Doepgen et al., 2021). This understanding gives practitioners and scholars a more comprehensive view of the intricate pathways through which financial literacy translates into tangible organizational improvements. Lastly, recognizing firm size as a moderator in the financial literacy-firm performance nexus introduces a valuable contextual perspective to our research. By acknowledging the role of firm size, this study paves the way for future investigations to explore the intersectionality of financial literacy with various organizational dimensions. These subtle insights align seamlessly with the growing acknowledgment that organizational contexts play a pivotal role in shaping the outcomes of financial literacy initiatives (Mabenge et al., 2022). Overall, this study's contributions provide valuable insights that advance the understanding of how financial literacy influences firm performance, elucidate the underlying mechanisms at play, and acknowledge the contextual factors that can influence these relationships, collectively enhancing the richness and relevance of the literature in this field.

The practical implications derived from our study underscore the critical importance of cultivating financial literacy among organizational leaders as a fundamental driver of enhanced performance and resilience. Our findings advocate for a holistic approach when designing training programs and interventions, encouraging organizations to move beyond the conventional emphasis solely on financial knowledge and skills. Instead, there is a pressing need to prioritize the development of a risk-tolerant mindset and the capacity to embrace technological advancements adeptly. This comprehensive perspective aligns seamlessly with the challenges faced by contemporary organizations, emphasizing the significance of nurturing adaptable leaders who can navigate the dynamic business landscape effectively (Eniola and Entebang, 2017). Furthermore, our research sheds light on the differential impact of financial literacy in organizations of varying sizes. Larger enterprises stand to gain significantly from heightened financial literacy among their leadership. Considering these findings, organizations are strongly encouraged to recognize the amplified benefits of financial literacy initiatives. This highlights the necessity for

strategic investments in leadership development programs tailored to address the unique needs of enterprises of different sizes (Mubeen et al., 2021). This strategic approach ensures that interventions are effective and customized to the specific organizational context, thereby maximizing their impact on firm performance.

These recommendations offer practical insights for organizational leaders and human resource professionals seeking to optimize the advantages of financial literacy initiatives within their particular organizational settings. By embracing a holistic approach to leadership development and recognizing the diverse needs of organizations based on size, leaders can effectively leverage financial literacy to foster resilience, drive performance improvements, and navigate the complexities of today's ever-evolving business environment.

Interest Conflicts

The publication of this paper does not present any conflict of interest, according to the authors.

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