

Revisiting the intellectual capital and sustainable financial growth relationship: the moderating role of GDP growth in the emerging economy

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ABSTRACT

Businesses are facing financial sustainability challenges, driven by economic volatility, underutilization of intangible resources, and limited understanding of how macroeconomic conditions affect the effectiveness of intellectual capital (IC). Thus, the current study aims to address these issues by investigating the effect of IC on sustainable financial growth (SFG) and the moderating role of GDP growth. Annual reports of listed firms at the Pakistan Stock Exchange (PSX) from 2016 to 2024 are used to collect secondary data. The modified value-added intellectual coefficient (MVAIC) model was used to measure the IC, and a composite index comprising profitability, operating capacity, solvency, and development ability indicators was used to measure SFG. Panel data techniques are used to analyze the data. The findings reveal that the MVAIC and its components have significant positive impacts on SFG. The results also show that GDP growth positively impacts SFG and significantly moderates the relationship between MVAIC and SFG. The Resource-Based View (RBV) theory supports these findings and posits that intangible resources can help firms enhance their long-term competitiveness and financial viability, especially in prosperous macroeconomic conditions. The results offer significant insights for managers and policymakers interested in improving SFG through effective MVAIC management.

Keywords: Intellectual Capital, Sustainable Financial Growth

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1. INTRODUCTION

The business environment in emerging economies is becoming increasingly competitive and unpredictable, and firms operating in SFG are facing more challenges (Naeem et al., 2025a). The volatility in the market, technological changes, economic instability, or resource constraints may often affect the long-term financial performance and competitiveness

of the firms (Ahmad, 2025). To address these challenges, MVAIC has been shown to be a strategic asset that can be useful to businesses for augmenting their innovation capability, operational efficiency, and stakeholder relations (Anser et al., 2024). In the knowledge economy era, a business has to have knowledge assets as well as physical assets to keep developing and stand out from the competition. Therefore, the role of MVAIC (HCE, SCE, RCE, and CEE) in an organization's sustainability has increased.

Previous research has explored the relationship between MVAIC and firm performance across various contexts (Ali et al., 2022; Farooq & Ahmad, 2023; Naeem et al., 2024). The existing literature broadly indicates that companies with stronger MVAIC capabilities are likely to have better financial performance, innovation performance, and market competitiveness. Human capital increases employee competencies and knowledge utilization, structural capital strengthens organizational systems and processes, and relational capital enhances relationships with customers and external stakeholders (Aithal, 2023). The MVAIC collectively enhances firms' value creation and competitive advantage. Most previous studies, however, have studied only traditional financial performance indicators, such as ROA, profitability, or firm value, with limited attention paid to SFG, which characterizes a firm's ability to grow in a sustainable way and its financial resilience over the long term (Munteanu et al., 2025; Pérez Estébanez & Sevillano Martín, 2025). Moreover, prior research has examined the impact of IC on firm performance without considering how macroeconomic conditions affect the firm's intangible resources (Abbas & Islam, 2026; Assfaw & Sharma, 2024). Value added from IC can vary widely under different economic conditions. The growing economy affords enterprises more opportunities, investment prospects, and demand for their services, enabling them to better utilize their intellectual resources. But in a weak, uncertain, and financially constrained economy, businesses can find it difficult to turn MVAIC into long-term financial return (Waliszewski et al., 2024). Therefore, macroeconomic conditions, particularly GDP growth, could significantly affect the relationship between IC, as measured by MVAIC and SFG.

There is still a lack of understanding of some key issues in the MVAIC literature. First, prior research (Ali et al, 2022; Farooq & Ahmad, 2023) examined short-term financial outcomes, whereas SFG is more of a measure of a firm's long-term financial stability and sustainability. Second, the moderating effect of GDP growth on the relationship between MVAIC and SFG has not been examined. The literature has rarely integrated firms' intangible resources with macroeconomic indicators used to assess SFG. This is because the organization's internal effectiveness is affected by its external environments, and this is not captured. This is important because companies don't operate in a gap, and the effect of IC is partly impacted by the overall economic climate.

The RBV of the firm focuses on the sustainable competitive advantage of resources that are valuable, rare, inimitable, and not substitutable (Barney, 2001). Within the RBV framework, MVAIC is a strategic intangible resource that enhances firms' ability to generate long-term value and sustain financial performance. However, RBV also implies that the effectiveness of internal resources may depend on external environmental conditions. GDP growth is an important contextual factor that may strengthen or weaken firms' ability to leverage IC for SFG. Therefore, this study extends the RBV perspective by incorporating macroeconomic conditions into the IC–performance relationship. Accordingly, this study addresses the following research questions: (1) Does MVAIC significantly affect the SFG of non-financial firms in Pakistan? (2) Do components of MVAIC influence SFG? and (3) Does GDP growth moderate the relationship between MVAIC and SFG?

This study focuses on non-financial firms listed on the PSX. Non-financial firms play an important role in Pakistan's economic development, industrial expansion, and employment generation. Financial institutions have limited institutional support and a less developed knowledge management system, making intangible resources more difficult to manage efficiently than tangible resources. Thus, the linkage between MVAIC and SFG is important for obtaining empirical insights into how firms in emerging economies can achieve long-term financial sustainability across different macroeconomic environments.

This study employs a quantitative research design and panel data from 130 non-financial firms quoted on PSX for the period of 2016 to 2024. Panel diagnostic tests for heteroskedasticity, serial correlation, and cross-sectional dependence were conducted, and fixed-effects regression models with robust standard errors were then estimated. The results suggest that MVAIC and its components have a very positive effect on SFG. Moreover, the results indicate positive moderation of the relationship between MVAIC and SFG, suggesting that favorable macroeconomic conditions facilitate the conversion of intangible resources into long-term financial returns.

This study has several significant contributions to the literature. First, it adds to the body of knowledge on MVAIC in a way that is particularly relevant for knowledge-based economic growth, as financial metrics commonly used to assess economic performance are of limited value in that context. Second, the study contributes to the RBV literature by incorporating macroeconomic conditions into the relationship between intangible resources and firm sustainability. Third, an empirical analysis examines the moderating influence of GDP growth on the MVAIC-SFG relationship, which has received insufficient attention in prior research. Finally, this study contributes to the literature of MVAIC, SFG, and GDP growth in the context of Pakistan.

2. Literature Review

2.1 Theoretical Framework

Previous studies focusing on the IC and firm performance have adopted various theories, including Stakeholder Theory, Human Capital Theory, Knowledge-Based View, and Dynamic Capabilities Theory (Naeem et al., 2024; Farooq & Ahmad, 2023; Ali et al., 2022). These theories have been useful for understanding the role of intangible resources in improving organizational competitiveness and performance. However, these theories reflect internal organizational perspectives and do not explain how external macroeconomic conditions affect IC's effectiveness in providing SFG. Thus, this study adopts the RBV as the main theoretical framework, as it provides a more holistic and suitable explanation of the linkages between MVAIC, GDP growth, and SFG.

According to RBV, it is the resources of a firm that are valuable, rare, inimitable, and non-substitutable that create a sustainable competitive advantage (Barney, 2001). MVAIC is an intangible strategic asset that can enhance a firm's value-creation capability, efficiency, innovation capability, and long-term competitiveness. The HCE leads to higher employee knowledge and productivity; the SCE contributes to better organizational systems and processes; the RCE contributes to better relationships with external stakeholders; and the CEE contributes to firms' effective use of financial and physical resources. All of these elements of the IC enable enterprises to develop their finances over time in the most effective way, generating value and optimizing resources.

According to the RBV, intangible resources are effective when they relate to the environment outside the system. Firms are part of a larger economic system that affects how resources are used, what investments are made, and the firms' performance. During periods of economic growth, businesses can flourish due to increased market demand, consumer

spending, and an improved investment climate, all of which can positively impact the use of MVAIC. During economic downturns or periods of weak GDP growth, however, businesses may lack the resources to invest, which can dampen the impact of MVAIC. Thus, the GDP growth influences MVAIC and SFG, depending on the macroeconomic conditions. The RBV argues that MVAIC is a strategic organizational capability that contributes to sustainable financial growth and that GDP is a contextual variable that impacts the role of IC. The study further expanded the intangible resources to a firm level, and macroeconomic variables were also included, which made RBV more than an organizational phenomenon and provided a wider factor for explaining the SFG of the developing countries like Pakistan.

2.2 Hypotheses Development

2.2.1 Modified Value-Added Intellectual Coefficient and Sustainable Financial Growth

The significance of knowledge-based resources is increasing. Scholarly research has addressed the connection between MVAIC and the short-term performance, profitability, and organizational performance. Previous research has suggested that companies with larger intangible assets are more profitable, have stronger financial performance, can create a more innovative environment, and have a higher level of competitiveness in the long term (Ali et al., 2022; Farooq & Ahmad, 2023). MVAIC supports firms in improving the performance of their employees, processes, stakeholder relationships, and resource management. Thus, companies with a higher MVAIC are likely to be more financially stable and grow in the long run.

MVAIC is an intangible resource, a strategic asset that can contribute to sustainable competitive advantage and long-term value. HCE builds workers' knowledge, skills, and entrepreneurial abilities and creates companies' capacity to respond to the changing business environment. SCE improves organizational systems, routines, databases, and internal processes, resulting in better knowledge utilization and operational efficiency. RCE facilitates a firm's relationships with customers, suppliers, and external stakeholders, thereby enhancing its market reputation and customer loyalty. The CEE measure evaluates the company's effectiveness in using capital and financial resources to create the greatest value.

Previous studies have focused on traditional financial metrics, such as profitability, firm value, and return on assets, but only a few have considered SFG as a financial indicator assessing firms' long-term financial sustainability and resilience (Munteanu et al., 2025; Pérez Estébanez & Sevillano Martín, 2025). Although Naeem et al. (2025) investigated the relationship between MVAIC and financial sustainability, there is a lack of studies in emerging economies, especially on the role of MVAIC components in SFG. Thus, more empirical studies are needed. From the above discussion, the following hypothesis is formulated:

H1: Modified value-added intellectual coefficient has a significant effect on the sustainable financial growth of firms.

H2: Modified value-added intellectual coefficient components have a significant effect on firms' sustainable financial growth.

2.2.2 GDP Growth as a moderator

The effectiveness of MVAIC depends on different macroeconomic environments. According to the RBV, internal organizational resources generate superior performance when firms operate under favorable environmental conditions that support effective resource utilization (Barney, 2001). Thus, the linkages between MVAIC and SFG can be either strengthened or weakened depending on the extent of economic growth. During periods of GDP growth, firms experience better business conditions, higher market demand, more investment opportunities, and greater access to

resources (Škare & Golja, 2014). Firms can make the most of their MVAIC to boost their innovation capacity, operational efficiency, and financial stability. Favorable investment in employees, technological systems, and stakeholder relations is more likely to pay off during periods of economic growth. The literature indicates that the entrepreneurial environment with positive macroeconomic conditions increases firms' ability to mobilize intangible resources for improved organizational performance (Buallay et al., 2019; Chirwa & Odhiambo, 2016).

Businesses, however, could face a drop in customer demand during a down or uncertain economy, fewer investment opportunities, and financial stress that diminishes the value of MVAIC. The best MVAIC in the world can have difficulty getting to the bottom line. Thus, the strength of the association between MVAIC and SFG might vary with GDP growth, which is a contextual factor. The MVAIC-SFG relationship has been broadly explored; however, the moderating effect of macroeconomic conditions has been largely overlooked in previous studies, particularly in emerging economies. This is a significant theoretical and empirical gap, as this study shows that the capacity to leverage MVAIC is partly dependent on the general economic conditions in which firms function. Thus, the following hypothesis is formulated:

H3: GDP growth moderates the nexus of modified value-added intellectual coefficient and sustainable financial growth.

2.3 Conceptual Framework

This study's conceptual framework, which comprises independent, dependent, moderator, and control variables, is presented in Figure I below.

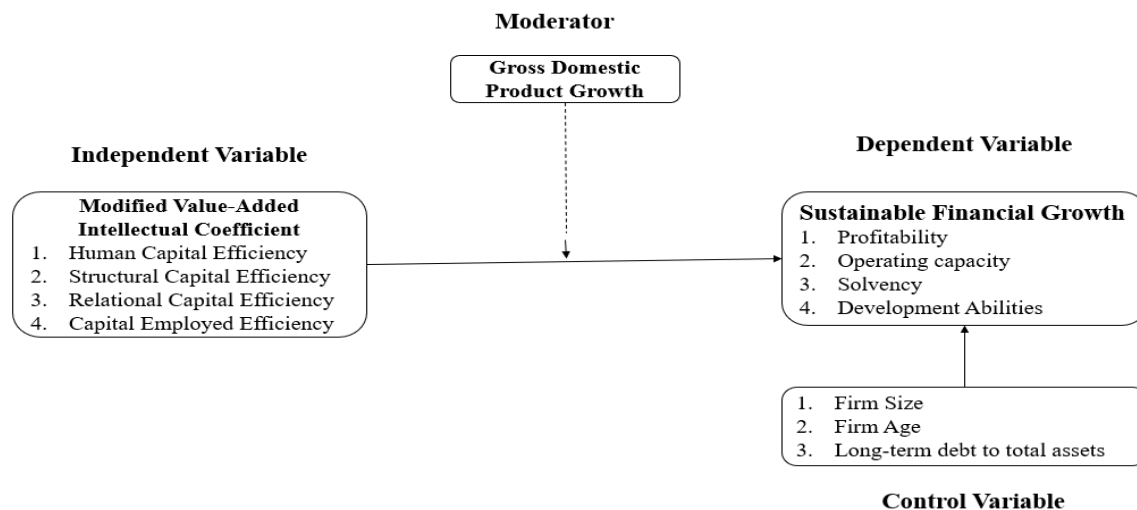


Figure I

3. Methodology

The study employed a quantitative, deductive approach to empirically test the relationships among MVAIC, GDP growth, and SFG in non-financial firms in Pakistan. The quantitative approach is suitable, as it tests theoretically developed hypotheses and uses numerical and panel secondary data. Secondary data were obtained from the annual reports of firms listed on the PSX, while GDP growth data were sourced from the World Bank database. The study is conducted for the time period from 2016 to 2024. The chosen period is after 2015, when companies began to take into account sustainable development and long-term financial stability following the adoption of the United Nations Sustainable Development Goals (SDGs).

The study utilizes a panel data approach because it includes cross-sectional and time-series variation across firms over several years. The advantages of panel data analysis over pure cross-sectional or time-series analysis are greater estimation efficiency and the ability to control for unobservables arising from firm-specific heterogeneity. The study's sample population comprises all non-financial companies listed on the PSX. Financial corporations were not included because the regulatory structure, accounting frameworks, and capital structure of financial firms differ from those of non-financial firms, potentially affecting the measurement of MVAIC and SFG.

The final sample consists of 130 non-financial companies listed on the PSX during 2016-2024, yielding 1,170 firm-year observations. The following criteria were used in the selection of the sample: (i) the firms must be listed continuously on the selected exchange for the entire period of study, (ii) the firms must publish a complete annual report for all the years studied, and (iii) the required information on financial and IC data must be available. These screening criteria guarantee consistency, reliability, and completeness of the dataset.

To minimize the influence of extreme observations and improve the reliability of the estimates, all continuous variables were winsorized at the 1st and 99th percentiles. Winsorization is commonly used in panel-data corporate finance studies to reduce the effect of outliers without removing observations from the sample.

3.1 Measurement of Variables

Variables that consist of independent, dependent, moderator, and control are presented below in a section-wise manner.

3.1.1 Dependent Variable

The SFG is the dependent variable, and its measurements are presented in Table 1 below. The dependent variable, SFG, comprises profitability, operating capacity, solvency, and development ability. SFG is an index of these.

Table 1. Sustainable Financial Growth

Sr. No	Variables	Measurement
i.	Profitability	a) Return on assets (ROA) = Total income over Total assets b) Return on equity (ROE) = Earnings available for common shareholders over Shareholders' Equity
ii.	Operating capacity	a) Total Assets Turnover = Operating Income over Total Assets b) Account Receivable Turnover = Operating Income over Account Receivable
iii.	Solvency	a) Current Ratio = Current Assets over Current Liabilities b) Quick Ratio = (Current Assets – Inventory) over Current Liabilities c) Cash Ratio = Cash and Cash Equivalents over Current Liabilities
iv.	Development Abilities	a) Total Assets growth rate = (End of year total assets – total assets at the beginning) / total assets at the beginning b) Net Assets growth rate = (End of year net assets – net assets at the beginning) over net assets at the beginning

3.1.1 Independent Variable

The MVAIC is an independent variable; its measurement is presented in Table 2 below. The independent variable, MVAIC, comprises HCE, SCE, RCE, and CEE. It is measured through MVAIC.

Table 2. Intellectual Capital

Sr. No	Variables	Measurement
i.	Human Capital Efficiency	Value added (VA) over Human capital (HC)
ii.	Structural Capital Efficiency	VA over Structural capital (SC)
iii.	Relational Capital Efficiency	VA over Relational capital (RC)
iv.	Capital Employed Efficiency	VA over Capital employed (CE)

Whereas;

- CEE is physical capital.
- VA is the difference between operational revenue and operating expenses, excluding staff costs.
- HC is labor-related costs.
- SC is the difference between VA and employee expenses.
- RC measured using marketing, advertising, and R&D indicators.
- CE is the capital's end-of-year worth.

3.1.3 Moderator

GDP growth is measured using real GDP, calculated as follows.

GDP Growth Rate = $[(\text{GDP at the End of the Period} - \text{GDP at the Beginning of the Period}) / \text{GDP at the Beginning of the Period}] * 100$

3.1.4 Control Variables

This study added control variables (firm size, firm age, and long-term debt to total assets) to strengthen the econometric model. Measurements of these variables are shown in Figure 3 below.

Table 3. Control Variables measurement

Sr. No	Variables	Measurement
i.	Fsize	Firm size is measured through market capitalization using this formula. Firm's <u>outstanding shares</u> x current market price of share.
ii.	Firm age	It is measured as the logarithm of the number of years from the date of incorporation to the current year. So the log of total years is a proper proxy of a firm's age.
iii.	Long-Term Debt to Total Assets	It is measured through the proportion of long-term debt against the company's total assets' book value.

3.2 Regression Model

The regression model is based on hypotheses.

Equation 1 consists of the IC and SFG relationship.

$$SFG_{it} = \beta_0 + \beta_1 MVAIC_{it} + \beta_2 FSize_{it} + \beta_3 Fage_{it} + \beta_4 LTDTA_{it} + \epsilon_{it}$$

Equation 2 consists of the components of the IC on the SFG relationship

$$SFG_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 RCE_{it} + \beta_4 CEE_{it} + \beta_5 FSize_{it} + \beta_6 Fage_{it} + \beta_7 LTDTA_{it} + \epsilon_{it}$$

Equation 3 consists of the moderating effect of GDP growth rate between IC and SFG.

$$SFG_{it} = \beta_0 + \beta_1 MVAIC_{it} + \beta_2 GDP_{Git} + \beta_3 IC * GDP_{Git} + \beta_4 FSize_{it} + \beta_5 Fage_{it} + \beta_6 LTDTA_{it} + \epsilon_{it}$$

Whereas;

SFG_{it} is Sustainable Financial Growth, $MVAIC_{it}$ =Modified Value-Added Intellectual Coefficient, HCE_{it} =Human Capital Efficiency, SCE_{it} =Structural Capital Efficiency, RCE_{it} =Relational Capital Efficiency, CEE_{it} =Capital Employed Efficiency, GDP_G_{it} =GDP growth rate, $FSize_{it}$ =Size of the firm, $Fage_{it}$ =Age of the firm, $LTDTA_{it}$ =Long-term debt to total assets, i = Firm, t = time, β_0 = Constant value, and ϵ_{it} = Error term.

3.3 Diagnostic Tests

Several diagnostic tests were conducted to ensure the reliability and robustness of the panel regression estimates. First, correlation analysis and variance inflation factor (VIF) tests were conducted to assess multicollinearity among the explanatory variables. The VIF values remained below the acceptable threshold of 5, indicating the absence of severe multicollinearity.

Second, the Modified Wald test was applied to examine heteroskedasticity in the panel data. Third, the Wooldridge test for autocorrelation was conducted to identify serial correlation across panels. Finally, the Pesaran CD test was employed to examine cross-sectional dependence among firms. The results indicated the presence of heteroskedasticity and serial correlation. Therefore, in the fixed-effects regression, robust clustered standard errors were used to ensure consistent and unbiased estimates.

4. Results

4.1 Descriptive Statistics

Table 4. Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
SFG	1170	0.214	0.382	-0.541	1.942
GDPG	1170	3.052	2.814	-0.938	6.181
HCE	1170	3.894	2.512	0.481	14.721
SCE	1170	0.692	0.224	-0.471	0.931
RCE	1170	0.193	0.167	0.081	0.814
CEE	1170	0.541	0.336	0.154	2.321
MVAIC	1170	5.114	2.761	0.793	16.352
FS	1170	6.951	0.524	4.882	8.214
Fage	1170	36.842	14.671	9	85
LTDTA	1170	0.432	0.191	0.101	0.862

The descriptive statistics of the study are presented in Table 4. The results show that the average SFG is 21.4%, which means that businesses are financially viable. However, the mean value of GDP growth also fluctuates, suggesting that Pakistan's macroeconomic environment has also been changing between 2016 and 2024. HCE is one of the MVAIC

components, and it has a higher dispersion of scores, indicating the firms' varying degrees of effective use of the knowledge and competencies of their employees. The distributions of SCE, RCE, and CEE show a relatively uniform distribution across firms.

4.2 Correlation Analysis

Table 5. Correlation Matrix

Variables	GDPG	HCE	SCE	RCE	CEE	MVAIC	FS	Fage	LTDTA
GDPG	1								
HCE	0.251**	1							
SCE	0.214**	0.421**	1						
RCE	0.176**	0.381**	0.412**	1					
CEE	0.143*	0.352**	0.361**	0.394**	1				
MVAIC	0.152**	0.682**	0.571**	0.524**	0.483**	1			
FS	0.271**	0.204*	0.191*	0.154	0.172*	0.452**	1		
Fage	0.193**	0.131	0.144	0.113	0.094	0.391**	0.501**	1	
LTDTA	-0.174*	-0.121	0.061	-0.083	-0.071	-0.302**	0.263**	-0.291**	1

Note: *p < 0.05, **p < 0.01

The correlation matrix for all the study variables is presented in Table 5. The results indicate a positive correlation between SFG and MVAIC, as well as between SFG and MVAIC components. The positive relationship between GDP growth and MVAIC or SFG also implies that a positive macroeconomic climate can facilitate firms' long-term financial sustainability. Moreover, there is no high level of multicollinearity among the explanatory variables, as all correlation coefficients are below 0.80.

4.3 Multicollinearity Analysis

Table 6. Variance Inflation Factor

Variables	VIF	1/VIF
MVAIC	2.14	0.467
FS	1.42	0.704
LTDTA	1.31	0.763
GDPG	1.28	0.781
HCE	2.36	0.423
SCE	1.88	0.532
Fage	1.19	0.84
CEE	1.14	0.877
RCE	1.09	0.917
Mean VIF	1.65	

Table 6 reports the VIF results used to assess multicollinearity among the explanatory variables. The findings indicate that all VIF values remain below the acceptable threshold value of 5, suggesting the absence of serious multicollinearity

problems in the regression models. The relatively low VIF values confirm that the explanatory variables are sufficiently independent and suitable for panel regression analysis.

4.4 Panel Diagnostic Tests

Table 7. Panel Diagnostic Tests

Diagnostic Test	Test Statistic	Probability
Modified Wald Test (Heteroskedasticity)	214.63***	0.000
Wooldridge Test (Autocorrelation)	17.82***	0.000
Pesaran CD Test (Cross-sectional Dependence)	3.14***	0.002

Note: ***p < 0.01

Table 7 presents the panel diagnostic test results. The Modified Wald test indicates the presence of heteroskedasticity in the panel data. Similarly, the Wooldridge test confirms first-order serial correlation among firms over time. The Pesaran CD test further reveals cross-sectional dependence among firms. These findings justify the use of robust clustered standard errors within the fixed-effects estimation to obtain consistent and unbiased coefficient estimates.

4.5 Hausman Test

Table 8. Hausman Specification Test

Models	Chi ²	Prob > Chi ²	Preferred Model
Model 1	23.84	0.000	Fixed Effects
Model 2	18.92	0.002	Fixed Effects
Model 3	27.16	0.000	Fixed Effects

Table 8 reports the results of the Hausman specification test used to determine the appropriate panel estimation technique. The probability values for all models are statistically significant, leading to the rejection of the null hypothesis of the random-effects model. Therefore, the fixed-effects model is considered more appropriate because it effectively controls for unobservable firm-specific heterogeneity. Consequently, all regression models were estimated using the fixed-effects approach with robust clustered standard errors.

4.6 Regression Analysis

Table 9. Fixed-Effects Regression Results

Variables	Model 1	Model 2	Model 3
MVAIC	0.351***		0.284***
	-3.84		-3.26
HCE		0.058***	
		-4.21	
SCE		0.041**	
		-2.53	
RCE		0.517***	

		-3.72	
CEE		0.162**	
		-2.41	
GDPG			0.076**
			-2.48
MVAIC* GDPG			0.034***
			-3.11
FS	0.198***	0.142**	0.087**
	-3.01	-2.44	-2.29
Fage	0.039*	0.027*	0.004*
	-1.92	-1.84	-1.79
LTDTA	-0.214***	-0.057	-0.013*
	(-3.27)	(-1.21)	(-1.88)
Constant	2.316**	1.104**	0.663
	-2.56	-2.11	-1.09
Observations	1170	1170	1170
R ²	0.28	0.24	0.31
Number of Firms	130	130	130
Model Type	Fixed Effects	Fixed Effects	Fixed Effects

Note: Robust t-statistics are reported in parentheses.

*p < 0.10, **p < 0.05, ***p < 0.01

Table 9 presents the fixed-effects regression results examining the relationship between IC, GDP growth, and SFG. Model 1 investigates the direct effect of MVAIC on SFG. The findings indicate that IC has a positive and statistically significant effect on SFG, suggesting that firms with stronger IC efficiency are more likely to achieve long-term financial sustainability. The results support the argument that intangible knowledge-based resources enhance firms' value creation capability and sustainable competitive advantage.

Model 2 investigates the influence of components of MVAIC on SFG. The results show that all three factors, namely HCE, SCE, RCE, and CEE, are positively related to each other and to SFG, with significance levels of less than 0.01. The importance of stakeholder relations and external network relationships for the future financial sustainability of firms is highlighted by RCE as one of the components with the highest positive impact. The positive impact of HCE is also large, reflecting the significance of knowledge, expertise, and innovation potential in the context of sustainable growth through employees.

The moderating effect of GDP growth on the MVAIC-SFG relationship is examined in Model 3. The results show that GDP growth has a positive effect on SFG. The interaction term of MVAIC and GDP growth is statistically significant and positive, thus confirming the moderating effect of GDP growth. The findings show that the good macroeconomic conditions are significant in helping firms to make MVAIC a success in SFG. Therefore, the effect of MVAIC is higher in

the boom periods of the economy, wherein market demand rises, opportunities for investment are better, and business conditions are better.

5. Conclusion, Implications, and Recommendations

5.1 Conclusion

This research examined the link between MVAIC and SFG in non-financial companies listed on PSX and the moderating effect of GDP growth. This study employed a panel data set of 130 companies from 2016 to 2024 and adopted a fixed-effects regression model with robust standard errors to generate reliable and stable estimation. The results offer robust empirical evidence on the positive impact of MVAIC on the firm's SFG. Results also indicate that all aspects of MVAIC (HCE, SCE, RCE, and CEE) have a positive influence on long-term financial sustainability.

The findings also confirm that positive GDP growth results in better sustainable financial growth and significantly reinforces the link between MVAIC and SFG. This means that positive macroeconomic variables have a positive impact on how efficient companies are in the use of their intellectual resources in the creation of value over time and financial sustainability. The study, accordingly, offers some evidence that the mix of forces that influence a firm's internal capacities and external economic pressures is a critical factor in the SFG level of a firm. The findings support the RBV as it states that there are key intangible assets that can contribute to sustainable competitive advantage, particularly in favorable external conditions.

The study makes important contributions to the MVAIC literature. First, it expands on existing research, using SFG instead of conventional financial measures. Second, it adds macroeconomic elements to the MVAIC–performance relationship, which is dampened by GDP growth. Third, the study has an empirical approach and is therefore a contribution to the scant literature in the field of IC and SFG in the emerging economy of Pakistan.

5.2 Theoretical Implications

The study has a number of important theoretical implications. First, it reinforces the application of the RBV concept yet again, as it demonstrates that MVAIC is likewise a strategic intangible resource that can be used to support firms' SFGs. The results validate the importance of knowledge-based resources, organizational capabilities, and stakeholder relationships as key enablers of long-term value creation and competitive advantage. Second, the study has been added to the RBV research by integrating the macroeconomic conditions into the MVAIC–performance relationship. Most of the previous studies centered on internal firm resources and, to some degree, ignored the external economic environment. The current results show that the success of MVAIC is partially related to good macroeconomic indicators such as GDP growth. The study is therefore a first step towards reconciling the firm-level resource-based theory with the macroeconomic contextual analysis. Third, the study is a part of the growing sustainability literature and extends the concept of sustainable financial growth beyond the traditional literature, which focuses on profitability. This gives a more comprehensive view of MVAIC's contributions to the long-term financial sustainability and resilience of companies, as well as their growth trajectory towards a sustainability-based direction.

5.3 Practical Implications

The results provide important practical implications for managers, investors, and policymakers. The results show that investing in MVAIC is of critical importance for financial development for managers. The key areas for enhancing the efficiency of human, structural, and relational capital are employee development, training, innovation capacity, knowledge sharing systems, and employee relationship management. In particular, the positive effects of RCE are

noteworthy, indicating that businesses should aim to strengthen ties with customers, suppliers, and other stakeholders to improve the sustainability of their operations in the long term.

The findings show that the IP strategy of managers should be associated with the macroeconomic conditions. When the economy is doing well, companies must expand their investments in knowledge resources, innovation projects, and organizational skills, thereby taking advantage of the economy to work efficiently to meet the demands for SFG. The study emphasizes the importance of stable macroeconomic policies and knowledge-based economic development for policymakers. Policies should be formulated to generate innovation, technological development, human capital, and organizational learning. Economic stability and sustainable GDP growth policies can indirectly improve the utilization of the IC of companies. The research also offers valuable guidance to investors, showing that companies with greater IC capacities are more likely to achieve sustainable long-term financial growth. Thus, there is a need to take into account firms' MVAIC efficiency and sustainability-oriented abilities when deciding on the investment.

5.4 Recommendations

This study offers recommendations for future research. The first step companies should take is to invest more in the development of MVAIC, including staff development, systems, innovative infrastructure, and relationships with stakeholders. Enhancing such nonfinancial resources can have a major impact on a firm's long-term financial viability and competitive advantage.

Second, the implementation of knowledge management systems and organizational cultures geared toward innovation should be encouraged in companies so that MVAIC can be used effectively. It is important to support continual learning, employee creativity, and the sharing of knowledge among one another to realize the full potential of MVAIC. Third, policies need to be formulated to support knowledge-based economic development through encouraging technological advancement, digital transformation, innovation capability, and human capital development. Stable and sustainable macroeconomic growth can help firms to secure long-term financial sustainability by providing intellectual resources.

Fourth, companies need to integrate macroeconomic risk assessment into strategic planning and resource provisioning. The success of MVAIC is, in part, related to economic conditions, and managers need to adopt strategies that help firms adjust to shifting economic conditions. Lastly, future studies on other sectors and emerging economies should enhance generalizability. Further research can also include other macroeconomic indicators, such as inflation, interest rates, institutional quality, and political stability, to provide a more complete picture of the external conditions affecting MVAIC and SFG.

References

- Abbas, E. and Islam, T.U., 2026. A new perspective on the finance-growth nexus: a time-frequency analysis. *Studies in Economics and Finance*, 43(1), pp.259-279.
- Ahmad, F., 2025. The relationship between intellectual capital, financial stability, firm performance, market value, and bankruptcy risk: Empirical evidence from Pakistan. *Journal of the Knowledge Economy*, 16(1), pp.1347-1395.
- Ahsan, T. and Qureshi, M.A., 2021. The nexus between policy uncertainty, sustainability disclosure and firm performance. *Applied economics*, 53(4), pp.441-453.

- Aithal, P.S., 2023. How to create business value through technological innovations using ICCT underlying technologies. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 7(2), pp.232-292.
- Ali, S., Murtaza, G., Hedvicakova, M., Jiang, J. and Naeem, M., 2022. Intellectual capital and financial performance: A comparative study. *Frontiers in psychology*, 13, p.967820.
- Alshukri, T., Seun Ojekemi, O., Öz, T. and Alzubi, A., 2024. The interplay of corporate social responsibility, innovation capability, organizational learning, and sustainable value creation: does stakeholder engagement matter?. *Sustainability*, 16(13), p.5511.
- Anser, M.K., Naeem, M., Ali, S., Huizhen, W. and Farooq, S., 2024. From knowledge to profit: business reputation as a mediator in the impact of green intellectual capital on business performance. *Journal of Intellectual Capital*, 25(5-6), pp.1133-1153.
- Assfaw, A.M. and Sharma, D., 2024. Does corporate governance spur bank intellectual capital in an emerging economy? A system GMM analysis from Ethiopia. *Future Business Journal*, 10(1), p.8.
- Barney, J.B., 2001. Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of management*, 27(6), pp.643-650.
- Bilan, Y., Mishchuk, H., Samoliuk, N. and Grishnova, O., 2019. ICT and economic growth: Links and possibilities of engaging. *Intellectual Economics*, 13(1), pp.93-104.
- Buallay, A., Cummings, R. and Hamdan, A., 2019. Intellectual capital efficiency and bank's performance: A comparative study after the global financial crisis. *Pacific Accounting Review*, 31(4), pp.672-694.
- Cabrita, M.D.R. and Bontis, N., 2008. Intellectual capital and business performance in the Portuguese banking industry. *International Journal of technology management*, 43(1-3), pp.212-237.
- Castro, R. and Moreira, A.C., 2024. Unveiling paradoxes: navigating SMEs readiness in the post-pandemic normality. *Cogent Business & Management*, 11(1), p.2330114.
- Chen Goh, P., 2005. Intellectual capital performance of commercial banks in Malaysia. *Journal of intellectual capital*, 6(3), pp.385-396.
- Chirwa, T.G. and Odhiambo, N.M., 2016. Macroeconomic determinants of economic growth: A review of international literature. *The South East European Journal of Economics and Business*, 11(2).
- Corrado, C., Haskel, J., Jona-Lasinio, C. and Iommi, M., 2016. *Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth* (No. 2016/08). EIB Working Papers.
- Dynan, K. and Sheiner, L., 2018. *GDP as a measure of economic well-being* (Vol. 43, No. 1, pp. 1-52). Hutchins Center Working Paper.
- Farooq, M. and Ahmad, N., 2023. Nexus between board characteristics, firm performance and intellectual capital: an emerging market evidence. *Corporate Governance: The International Journal of Business in Society*, 23(6), pp.1269-1297.

- Farooq, M., Noor, A. and Naeem, M., 2023. Does family ownership moderate the relationship between board characteristics and corporate social responsibility? Evidence from an emerging market. *Asian Journal of Business Ethics*, 12(1), pp.71-99.
- Fornell, C., Rust, R.T. and Dekimpe, M.G., 2010. The effect of customer satisfaction on consumer spending growth. *Journal of marketing research*, 47(1), pp.28-35.
- Gazzola, P., Pavione, E., Amelio, S. and Mauri, M., 2024. Sustainable strategies and value creation in the food and beverage sector: The case of large listed European companies. *Sustainability*, 16(22), p.9798.
- Gleißner, W., Günther, T. and Walkshäusl, C., 2022. Financial sustainability: measurement and empirical evidence. *Journal of Business Economics*, 92(3), pp.467-516.
- Hong, J.P., 2017. Causal relationship between ICT R&D investment and economic growth in Korea. *Technological Forecasting and Social Change*, 116, pp.70-75.
- Hordofa, D.F., 2023. The moderating effect of income inequality on the relationship between economic growth and political economy, human capital, innovation, and saving channels in ethiopia. *Discover Global Society*, 1(1), p.21.
- Jordão, R.V.D., Almeida, V.R.D. and Novas, J., 2022. Intellectual capital, sustainable economic and financial performance and value creation in emerging markets: the case of Brazil. *The Bottom Line*, 35(1), pp.1-22.
- Liu, J., Chaminade, C. and Asheim, B., 2015. The geography and structure of global innovation networks: a knowledge base perspective. In *Global and Regional Dynamics in Knowledge Flows and Innovation* (pp. 140-157). Routledge.
- Mahoney, J.T. and Kor, Y.Y., 2015. Advancing the human capital perspective on value creation by joining capabilities and governance approaches. *Academy of Management Perspectives*, 29(3), pp.296-308.
- Mammadov, B., 2025. Slowing Global Growth and Rising Recession Risks: Causes, Consequences, and Policy Responses. *Porta Universorum*, 1(3), pp.224-244.
- Marin, R., 2023. Knowledge economy: An intangible assets-based economy. *Journal of Eastern Europe Research in Business and Economics*, 906396.
- Munteanu, I., Ionescu-Feleagă, L., Ionescu, B.Ş., Condrea, E. and Romanelli, M., 2025. From Metrics to Meaning: Research Trends and AHP-Driven Insights into Financial Performance in Sustainability Transitions. *Sustainability*, 17(14), p.6437.
- Naeem, M., Ali, S., Islam, M. and Rehman, A., 2024. Does Intellectual Capital mediate the relationship of Artificial Intelligence Investment, and Firm Value in Pakistani Non-Financial Firms?. *NICE Research Journal*, 17(3), pp.63-76.
- Naeem, M., Ali, S., Mehboob, A., Rehman, A. and Siraj, M., 2026. Do board diversity influence capital structure decisions? A use of GMM and RLS estimator. *Corporate Governance: The International Journal of Business in Society*, 26(2), pp.484-496.
- Naeem, M., Ali, S., Memon, S. and Memon, S., 2025. Green Intellectual Capital as a Catalyst for Organizational Innovation: A Systematic Literature Review. *RADS Journal of Business Management*, 7(2).

- Naeem, M., Amin, M.S. and Ali, S., 2025. From Knowledge to Growth: Investigating Intellectual Capital's Impact on Financial Sustainability in Emerging Economies. *Journal of Management & Social Science*, 2(2), pp.333-346.
- Pérez Estébanez, R. and Sevillano Martín, F.J., 2025. Business sustainability and its effect on performance measures: A comprehensive analysis. *Sustainability*, 17(1), p.297.
- Perumandla, S., Pradhan, S.K., Bhattacharyya, S.S. and Narayanan, S., 2025. Sustainable development goals through the lens of ESG, CSR, SRI and GF: research agenda through an integrated framework and topic modelling. *Benchmarking: An International Journal*, pp.1-34.
- Rastić, A., Stevanović, T. and Antić, L., 2021. Intangible assets impact on sustainable growth rate of enterprises in the Republic of Serbia. *Facta Universitatis, Series: Economics and Organization*, (1), pp.383-396.
- Roos, G., 2017. Knowledge management, intellectual capital, structural holes, economic complexity and national prosperity. *Journal of Intellectual Capital*, 18(4), pp.745-770.
- Škare, M. and Golja, T., 2014. The impact of government CSR supporting policies on economic growth. *Journal of policy modeling*, 36(3), pp.562-577.
- Slimani, S., Omri, A. and Abbassi, A., 2024. Financing sustainable development goals in Sub-Saharan Africa: Does international capital flows matter?. *Sustainable Development*, 32(6), pp.6656-6685.
- Stanley, T.D., Doucouliagos, H. and Steel, P., 2018. Does ICT generate economic growth? A meta-regression analysis. *Journal of economic surveys*, 32(3), pp.705-726.
- Tan, C., 2022. Private investments, public goods: Regulating markets for sustainable development. *European Business Organization Law Review*, 23(1), pp.241-271.
- Taş, N., Hepsen, A. and Önder, E., 2013. Analyzing macroeconomic indicators of economic growth using panel data. *Journal of Finance and investment Analysis*, 2(3), pp.41-53.
- Waliszewski, K., Cichowicz, E., Gębski, Ł., Kliber, F., Kubiczek, J., Niedziółka, P., Solarz, M. and Warchlewska, A., 2024. Digital loans and buy now pay later from LendTech versus bank loans in the era of 'black swans': Complementarity in the area of consumer financing. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 19(1), pp.241-278.
- Youndt, M.A., Subramaniam, M. and Snell, S.A., 2004. Intellectual capital profiles: An examination of investments and returns. *Journal of Management studies*, 41(2), pp.335-361.