

“Intellectual capital, bank longevity, and size: Pathways to sustainable growth in Saudi banking through competitive advantage”

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ARTICLE INFO

Selma Sidahmed Abdelrahim (2024). Intellectual capital, bank longevity, and size: Pathways to sustainable growth in Saudi banking through competitive advantage. *Banks and Bank Systems*, 19(4), 177-193.
doi:[10.21511/bbs.19\(4\).2024.14](https://doi.org/10.21511/bbs.19(4).2024.14)

DOI

[http://dx.doi.org/10.21511/bbs.19\(4\).2024.14](http://dx.doi.org/10.21511/bbs.19(4).2024.14)

RELEASED ON

Friday, 20 December 2024

RECEIVED ON

Monday, 09 September 2024

ACCEPTED ON

Wednesday, 11 December 2024

LICENSE



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JOURNAL

"Banks and Bank Systems"

ISSN PRINT

1816-7403

ISSN ONLINE

1991-7074

PUBLISHER

LLC “Consulting Publishing Company “Business Perspectives”

FOUNDER

LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

59



NUMBER OF FIGURES

2



NUMBER OF TABLES

8

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BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Received on: 9th of September, 2024
Accepted on: 11th of December, 2024
Published on: 20th of December, 2024

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INTELLECTUAL CAPITAL, BANK LONGEVITY, AND SIZE: PATHWAYS TO SUSTAINABLE GROWTH IN SAUDI BANKING THROUGH COMPETITIVE ADVANTAGE

Abstract

This study aims to investigate the role of Intellectual Capital (IC), Sustainable Competitive Advantage (SCA), Duration Since Firm Establishment (DSE), and Bank Size (S) in fostering Sustainable Growth (SG) in Saudi Arabia's banking sector. Data were collected from 2012 to 2022 from 10 commercial banks operating in the Saudi Arabian economy and listed on the Saudi Stock Exchange (Tadawul). The research employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze these relationships. Findings indicate that IC significantly enhances SCA ($\beta = 0.639$, $p < 0.001$), which robustly promotes SG ($\beta = 0.473$, $p < 0.001$). Additionally, a significant direct effect of IC on SG was observed ($\beta = 0.674$, $p < 0.001$). A significant relationship is also observed between DSE and SG ($\beta = 0.956$, $p < 0.001$), highlighting the advantage of longstanding establishments in leveraging accumulated resources for growth. However, the anticipated mediating role of IC in the relationship between DSE and SG was not supported statistically ($p = 0.075$), suggesting the potential for other variables to influence this dynamic relation. The study underscores the pivotal role of intellectual resources in driving competitive advantages and growth sustainability in the banking industry, particularly within the rapidly evolving economic landscape of Saudi Arabia. These findings offer valuable insights for policymakers and banking institutions looking to leverage intellectual assets and competitive positioning for long-term success.

Keywords

intellectual assets, competitive dynamics, growth analysis, banking performance, sustainability, strategic assets, market positioning, Saudi financial sector

JEL Classification

O34, O16, G21, L25

INTRODUCTION

The banking sector in Saudi Arabia is a fundamental pillar of the national economy, contributing significantly to economic development and financial stability. The Kingdom is moving towards Vision 2030, which aims to differentiate the economy and reduce oil dependence, emphasizing the importance of banks in financing major projects, providing financial assistance to the private sector and small and medium-sized enterprises, enhancing job creation, and encouraging innovation. The banking sector in the Kingdom is experiencing major transformations due to technological advances and innovations in financial services, including digital transformation and the adoption of financial technology (FinTech). These developments require Saudi banks to implement sustainable strategies that leverage intellectual capital to enhance their competitiveness and secure sustainable growth in a rapidly changing and challenging financial environment. Scholars across all major industries worldwide often propose intellectual capital as a critical foundation for sustainable growth and competitive advantage.



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Conflict of interest statement:
Author(s) reported no conflict of interest

Furthermore, numerous contexts present supporting evidence demonstrating intellectual capital's crucial role in achieving sustainable competitive advantages over time. For example, numerous studies demonstrate how intellectual capital contributes to firm performance, suggesting that the strategic use of intellectual capital can lead to higher market positions and is essential to enhancing innovation and operational effectiveness. Age significantly influences intellectual capital as older firms leverage their extensive knowledge, processes, and relationships. They improve operative frameworks, invest in human expertise, create customer loyalty, and increase intellectual resources. However, the impact depends on a firm's adaptability and innovation capabilities. Larger organizations with significant assets also tend to have different dynamics when using intellectual capital to grow and maintain a competitive advantage. Organizational size significantly impacts competitive advantage and sustainable growth. Larger banks have more resources, such as financial capital, technology infrastructure, and human capital, which enable them to implement differentiation strategies and achieve economies of scale. However, this can also introduce operational complexity and reduce the effectiveness of competing approaches. Despite resource restrictions, smaller banks often exhibit flexibility and innovation, enabling them to create niche markets and sustain growth through targeted approaches. This study examines the scientific issue of how intangible assets, particularly intellectual capital, influence sustainable growth in the banking sector, especially within the dynamic financial environment of Saudi Arabia. Nevertheless, the Saudi banking sector needs to sufficiently examine the role of intellectual capital in fostering sustainable competitive advantage and sustained growth, and how the longevity and size of banks can impact sustainable growth.

1. LITERATURE REVIEW AND HYPOTHESES

The research examines the impact of Intellectual Capital (IC) and Sustainable Competitive Advantage (SCA), as well as Duration Since Establishment (DSE), on achieving sustainable growth (SG) in the banking sector, specifically commercial banks operating in Saudi Arabia. An in-depth understanding of these associations will be necessary for future research; hence, examining available literature that similarly deals with these variables is essential.

1.1. Relationship between intellectual capital and competitive advantage

According to Obeidat et al. (2021), companies that successfully use their precious human resources and competencies have a higher chance of being competitive. Bellucci et al. (2021) stated that IC is a crucial component of the learning organization concept and originates from the knowledge-creation process of businesses that thrive on continuous improvement. Intellectual capital (IC) refers to a worker's knowledge, skills, and competencies, essential to innovate the key processes by creating value. Intellectual capital broadly consists of hu-

man capital (HC), structural capital (SC), and relational capital (RC). Structural Capital Efficiency (SCE) pertains to the supportive infrastructure, processes, databases, and organizational culture that enable human capital to function effectively. It encompasses all the non-human storehouses of knowledge within an organization that support and amplify the capabilities of human capital (Bayraktaroglu et al., 2019). Capital Employed Efficiency (CEE) focuses on the financial aspect of IC, representing the financial policies and investments an organization makes to support its human and structural capital. CEE reflects how effectively a company utilizes its financial resources to generate returns on its invested Capital (Banker et al., 2014; Karyani & Rossieta, 2018). The common approach used to measure IC is the Value-Added Intellectual Coefficient (VAIC) method. VAIC is a quantitative measure to evaluate the efficiency of IC components by measuring the value that each component adds (VA) and contributes to all other components together, resulting in a firm's performance (Pulic, 1998).

Competitive advantage refers to a firm's ability to perform superiorly, which provides an edge over competitors and involves unique business strategies at a corporate or segment level (Porter, 2008). This advantage may show up as cost leader or differ-

entiation. The cost leader is a cost-based competitive advantage that depends on lower operational costs than rivals. On the other hand, by adopting differentiation, firms can deliver a unique value to customers, which justifies their willingness to pay despite higher prices through differentiation-based competitive advantage (Banker et al., 2014). These strategies enable the firm to create value for its customers in ways that competitors cannot readily replicate (Porter, 2008).

Sustainable competitive advantage refers to preserving and improving the competitive market position over time (Kadir et al., 2018). According to Barney (1991), the Resource-Based View (RBV) states that firms can achieve sustainable competitive Advantage (SCA) through resource characteristics, including being inimitable and non-substitutable. Similarly, Kamukama et al. (2011) stated that a sustained competitive position is achieved through intellectual capital performance.

The RBV provides a theoretical base for affecting intellectual capital on competitive advantage. It emphasizes that internal resources such as IC are essential in generating the unique capabilities of firms that competitors can hardly imitate (Barney, 1991). Yaseen et al. (2016) underscore the importance of IC in providing competitive advantage; their findings demonstrate that companies succeed over competition once they effectively utilize human, structural, and relational capital within them. Similarly, Kamukama et al. (2011) stated that a sustained competitive position is achieved through intellectual capital performance.

Several studies supported the synergy among IC components and its subsequent effects on sustainable growth and competitive advantage; for instance, Khan et al. (2019) explain how intangible assets, such as IC, can establish a source of long-term value and motivation for firms to outperform competitors. In addition, Lu et al. (2021) found that firms with a higher level of Human Capital Efficiency (HCE) tend to be more nimble, responsive to market shifts, and innovative, which is crucial for achieving sustainable competitive advantage. Also, Astuti et al. (2012) stated that intellectual capital, particularly human and structural capital, has also been shown to influence competitive advantage directly, dem-

onstrating that efficiently managed IC creates meaningful differences between a firm and its rivals. Moreover, Hermawan et al. (2020) believe intellectual capital positively influences competitive advantage and business performance, focusing on the pharmaceutical industry. This contribution underscores IC's value across different sectors. Todericiu and Stăniț (2015) contend that IC is the core competence of sustainable competitive advantage in SMEs.

The Knowledge-Based Theory of a firm further elaborates that knowledge assets contribute to competition advantage (Grant, 1996). Xiao and Yu (2020) confirmed that the evidence of corporate innovation backs IC, which has a mediating influence on developing a sustainable competitive advantage. Obeidat et al. (2021) argue that IC helps to develop a competitive advantage by supporting the creation of an innovative culture and practices within organizations. Handayani et al. (2020) state that management establishes its competitive advantage by strategically handling its IC. They emphasize how IC is pivotal for competitive strategies and superior business performance.

1.2. Relationship between competitive advantage and sustainable growth

The Sustainable Growth Rate is the maximum rate at which an organization can expand its sales, revenue, or equity without requiring further external financing. Sustainable growth (SG) essentially aids companies in increasing their profitability, cash flow, and share price without much additional environmental impact, natural resources, or human depletion. It is a long-term strategic process consolidating financial, social, and environmental matters inside the corporate operating framework (Xu et al., 2018).

Numerous studies investigated the relationship between Competitive Advantage and Sustainable Growth. Haseeb et al. (2019) found that social and technological challenges significantly boosted sustainable competitive advantage, and the competitive advantage increases sustainable business performance. Banker et al. (2014) exhibited that differentiation-based firms have stronger financial performance sustainability than cost leadership

strategy-based ones, they create accurate value, resulting in more scalable growth as loyal customers and equity around the brand asset of the business. Also, competitive advantage enables organizations to distinguish themselves from rivals, as highlighted by Mukhsin and Suryanto (2022). This differentiation allows companies to sustain a robust market position, improve customer loyalty, and optimize operational efficiency, fostering long-term sustainable growth. When companies strategically leverage their competitive advantage, they may more effectively align profitability with environmental and social sustainability objectives, securing short-term performance and enduring sustainable development. Saputra et al. (2023) emphasize that when companies develop a green competitive advantage by adopting practices that reduce environmental impact, they not only enhance their reputation but also improve long-term growth. Strategic alliances enhance this relationship by providing them access to additional resources and competencies, thus facilitating sustained expansion and the preservation of their competitive advantage. The interplay between competitive advantage and sustainable growth is facilitated by strategic management practices that include sustainability in core business operations (Werastuti et al., 2019). Pereira-Moliner et al. (2021) explored the association between sustainability, competitive advantage, and performance. They also find that the importance of SCA in firms' sustainability performance is more vital in service industries, suggesting a context-specific relationship. So, firms that compete on unique competitive structures, namely differentiation or cost leadership, are expected to be in a good position for sustained growth as these strategies allow them the ability and flexibility to adjust faster to changes both internally derived, such as environment alteration or otherwise market originated (Assensoh-Kodua, 2019).

1.3. Relationship between intellectual capital and sustainable growth performance

Intellectual capital is critical for improving an organization's sustainable growth and competitive advantage. Xu and Wang (2018) emphasized the direct impact of intellectual capital on financial performance and sustainable growth, claim-

ing that components of intellectual capital foster an organization's ability to sustain itself by supporting innovation capabilities leading to greater operational efficiency. Additionally, Ardiansari et al. (2018) highlighted how intellectual capital positively impacts financial performance and company valuation, reinforcing the notion that well-managed intellectual capital significantly contributes to sustaining competitive advantages and, by extension, sustainable growth. Ashraf et al. (2023) showed that intellectual capital was the main constituent of performance and growth, especially during pandemic periods such as COVID-19. Empirical evidence from studies of banking and microfinance institutions has confirmed a positive relationship between intellectual capital and sustainable growth. Faruq et al. (2023), Githaiga et al. (2023), and Mukherjee et al. (2019) support the theoretical propositions and demonstrate how the mobilized intellectual capital can yield sustainable endpoints. Kengatharan (2019) reinforces this notion by analyzing the correlation between intellectual capital, productivity, and organizational performance. The study highlights that the size of a corporation significantly influences the effective use of intellectual capital to improve productivity and overall performance. Due to their resource capacities, large corporations can more effectively leverage knowledge-based assets.

1.4. Mediating role of intellectual capital between duration since establishment and sustainable growth

According to Barney (1991), the resource-based view (RBV) theory assumes that organizations develop unique resources and knowledge through time. These paths aim to make valuable, rare, inimitable, and non-substitutable resources, and older institutions often enjoy benefits that stem from long-term existence, such as brand trust, customer loyalty, and accumulated organizational knowledge, which are essential drivers of sustainable growth through acquiring operational and marketplace efficiencies. Older firms often have well-developed ICs through accumulated experience and established networks, suggesting that DSE could positively influence ICs' effectiveness in enhancing financial performance (Becker, 2009;

Barney, 1991). Levitt and March (1988) stated that organizations develop improved procedures and strategies to respond to threats over time based on their years of experience and knowledge. By doing that, they are better suited for risk-taking situations, decision-making, and more, allowing them to grow sustainably. Xu and Wang (2018) showed a strong relationship between IC to financial performance leading to sustainable growth for several sectors, indicating those firms with longer DSE will have better processes that assist in leveraging their intellectual capital strategically.

Similarly, Ardiansari et al. (2018) found that IC significantly affects financial performance and firm value, which is more pronounced for older firms due to mature IC management found by collateral. Ashraf et al. (2023) compared the impact of IC on sustainable performance and growth among European hospitality firms before and during the COVID-19 crisis. They found that older firms with robust IC frameworks were better equipped to sustain performance during disruptive events.

1.5. Mediating role of intellectual capital between duration since establishment and sustainable competitive advantage

The relationship between a firm's duration since the establishment (DSE) and its intellectual capital (IC) provides a nuanced insight into how long-standing Organizations manage and leverage non-physical assets for sustainable growth. The Resource-Based View (RBV) and the Knowledge-Based Theory further support the mediating role of IC, positing that unique, inimitable intellectual resources enable firms to maintain competitive advantages that drive long-term growth (Barney, 1991; Grant, 1996). Intellectual capital is crucial in enhancing the relationship between durations since establishment and sustainable competitive Advantage (SCA). The IC is pivotal for banks to leverage their added knowledge and experience, translating it into strategic and competitive benefits (Ardiansari et al., 2018; Ashraf et al., 2023). Established banks with a rich base of IC tend to exhibit enhanced financial performance and growth sustainability by fostering innovative solutions and superior customer relations, which are

critical components of SCA (Agustia et al., 2021; Anggraeni et al., 2023). Thus, IC enhances performance metrics and embeds a sustainable growth path within firms, suggesting that the older the bank, the more effectively it can utilize its intellectual capital to foster competitive advantages and achieve sustainable growth.

1.6. Mediating role of competitive advantage between intellectual capital and sustainable growth

Competitive advantage may arise from both external and internal factors. The sources of competitive advantage need not be independent; nonetheless, they must collaborate to establish a sustained competitive advantage. The success criteria for achieving a competitive advantage in the organization include the development of a functional management strategy and the capitalization of intangible assets (Daniela, 2014). Organizations that maximize their IC arguably acquire an SCA and stand a higher chance of sustainable growth over time (Bayraktaroglu et al., 2019). Xu et al. (2021) articulated that structural capital supports organizational efficiency and strategic ability, influencing sustainable growth to indicate that competitive advantage is not an end but a means to attain sustainable growth in the long term. Similar studies, including Assensoh-Kodua (2019) and Astuti et al. (2019), have focused on enhancing IC for sustainable long-term competitive advantage. The results of IC are well demonstrated in an organization's sustainable growth.

1.7. Moderating role of organization size

The size of a company (SIZE) considerably influences the relationship between sustainable competitive advantage (SCA) and sustainable growth (SG). More significant organizations possessing greater assets and resources can more effectively utilize their sustainable competitive advantage to foster sustainable growth. Banker et al. (2014) contend that larger organizations, owing to their availability of resources, are better equipped to implement differentiation strategies that result in enhanced sustainable financial performance. Larger organizations with substantial assets tend to have different dynamics when using their IC

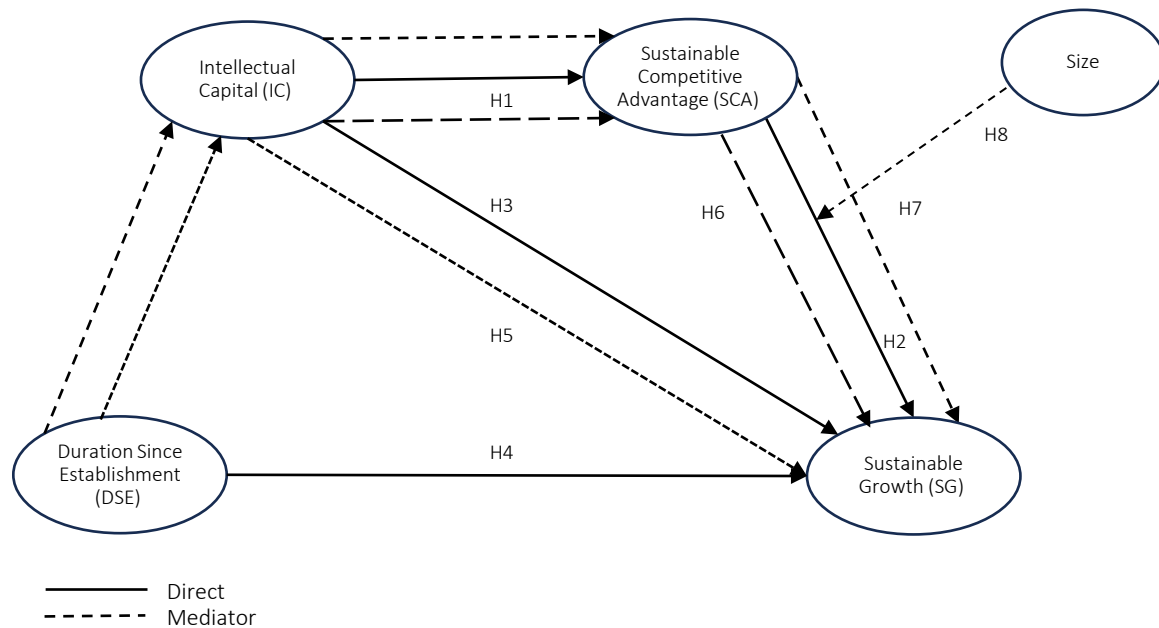


Figure 1. Research conceptual model

for growth and sustaining a competitive edge. Karyani and Rossietta (2018) also emphasize that the permanence of financial performance in the banking sector is more evident in larger enterprises. Their research indicates that large organizations can strategically employ generic methods such as differentiation or cost leadership owing to their extensive resource availability. This size advantage enables them to keep a competitive edge and promotes the long-term sustainability of their expansion. Organization size is a crucial modifier affecting enterprises' effectiveness in transforming their competitive advantage into lasting growth results. Kasoga (2020) asserts that investments in intellectual capital enhance financial performance, especially in larger organizations that can strategically utilize their intellectual capital for sustained advantages, resulting in enhanced financial performance.

Intellectual capital (IC), sustainable competitive advantage (SCA), and duration since establishment (DSE) have been emphasized in the literature as critical factors in fostering sustainable growth (SG). The Resource-Based View and Knowledge-Based Theories emphasize IC's significance in fostering long-term growth and competitive advantage. This is because firms with a high level of IC are more capable of adapting and innovating. In addition, the efficacy of IC and SCA is further re-

inforced by the size of the company, which allows larger organizations to leverage their resources to achieve sustainable growth more efficiently.

This study investigates the impact of intellectual capital (IC), sustainable competitive advantage (SCA), duration since firm establishment (DSE), and bank size on fostering sustainable growth (SG) in Saudi Arabia's banking sector. It explores the under-examined relationship between IC and SCA as mediators of sustainable growth in a rapidly evolving financial environment. Based on the literature review above, the paper will examine the following hypotheses:

- H1: Intellectual Capital (IC) positively influences Sustainable Competitive Advantage (SCA) in Saudi Arabia's banking sector.*
- H2: Sustainable Competitive Advantage (SCA) positively affects the Sustainable Growth performance (SG) of banks in Saudi Arabia.*
- H3: Intellectual Capital (IC) positively influences Sustainable Growth (SG) in Saudi Arabia's banking sector.*
- H4: A positive relationship exists between Duration Since Establishment (DSE) and Sustainable Growth (SG) in the Saudi banking sector.*

- H5: *Intellectual Capital (IC) mediates the relationship between Duration Since Establishment and Sustainable Growth (SG) in Saudi Arabia's banking sector.*
- H6: *Sustainable Competitive Advantage (SCA) mediates the relationship between Intellectual Capital (IC) and Sustainable Growth (SG) in Saudi Arabia's banking sector.*
- H7: *Intellectual Capital and Sustainable Competitive Advantage serially mediate the relationship between Duration Since Establishment (DSE) and Sustainable Growth (SG) in Saudi Arabia's banking sector.*
- H8: *Bank Size (SIZE) moderates the relationship between sustainable competitive Advantage (SCA) and Sustainable Growth (SG).*

2. METHOD

This study examines the impact of duration since the establishment (DSE) and Intellectual Capital (IC) on Sustainable Competitive Advantage (SCA) and Sustainable Growth (SG) in the Saudi banking sector. A robust quantitative research design was employed. The study adopts a quantitative approach using PLS-SEM, a sophisticated statistical tool that analyzes complex cause-effect relationship models involving multiple predictors and outcomes. Smart PLS version 4, developed by Ringle et al. in 2024, was used to perform the data analysis as it enables the analysis of combined ordinal and ratio scales variables as the duration since the banks' establish-

ment is an ordinal variable, while the other variables are in ratio scales (Hair et al., 2021).

2.1. Research design

This research is designed to investigate the impact of Duration Since Establishment (DSE) and Intellectual Capital (IC) on Sustainable Competitive Advantage (SCA) and Sustainable Growth (SG), respectively. This study focuses on commercial banks in the Saudi Arabian economy listed on the Saudi Stock Exchange (Tadawul). These banks were selected for their substantial representation of Saudi banking operations and their established practices in intellectual capital management and sustainable growth initiatives. Table 1 presents the banks included in this study, with vital characteristics such as bank names, size (measured by Natural Logarithm of Total Assets), duration since establishment, and market share.

The study's timeframe spans from 2012 to 2022, allowing for an analysis of long-term trends and impacts. Secondary data were obtained from banks' annual reports, financial statements, and other public disclosures. This approach ensures the data are reliable and valid under standardized financial reporting frameworks.

PLS-SEM was applied to this data set to test the hypothesized model. The analysis included assessing measurement models for reliability and validity and the structural model to examine the hypothesized paths between constructs. This method allows for assessing both the direct impacts of DSE and IC on SCA and SG and the indirect effects mediated through IC and SCA variables. Table 2 provides the measurements of the variables.

Table 1. Main characteristics of banks

Bank Name	Al Rajhi Bank	Saudi National Bank (SNB)	Riyad Bank	Saudi British Bank (SABB)	Banque Saudi Fransi	Arab National Bank (ANB)	Alinma Bank	Bank Albilad (BAB)	Bank AlJazira (BAJ)	Saudi Investment Bank (SAIB)	Sources
Year Established	1957	1953	1957	1978	1977	1979	2006	2004	1975	1976	Banks web site
SIZE (2022)	20.4519	20.6672	19.7006	19.5663	19.2626	19.1751	19.116	18.6795	18.5678	18.5075	Banks web site
Number of Branches	509	407	237	94	82	127	108	108	75	51	Banks web site
Market share in Q3 2022	25.30%	24.40%	11%	8.50%	7.30%	6.70%	6.40%	4.30%	3.20%	3%	Statista (2022)

Table 2. Variables measurement

Variable	Measurement	Citation(s)
Intellectual Capital (IC)	Calculated using Value Added Intellectual Coefficient (VAIC) method $VAIC = HCE + SCE + CEE$ $HCE = VA / HC$ $SCE = SC / VA$ $CEE = VA / CE$	Pulic (2004), Iazzolino and Laise (2013), Xu and Liu (2020)
Sustainable Growth Performance (SG)	$SG = P \times A \times R / (1 - P \times A \times R)$ P = profit margin (profit scaled by total sales) A = the asset turnover ratio (total sales scaled by total assets) T = the leverage factor (total assets scaled by end-of-period equity), R = the retention ratio (retained earnings scaled by profit)	Lu et al. (2021)
Sustainable Competitive Advantage (SCA)	$SG \& A / SALES$ $SALES / COGS$ $SALES / CAPEX$ $SALES / P \& E$	Barney (1991), Porter (8002)
Size (SIZE)	Logarithm of total assets	Zheng et al. (2022)
Duration Since Establishment	It is calculated as the years from the establishment to the present	Muhammad Arafat (2014)

3. DATA ANALYSIS AND RESULTS

Smart PLS (PLS-SEM) utilizes a component-based approach to structural equation modeling. It is predominantly utilized in exploratory research endeavors, although it can also be deemed suitable for confirmatory research purposes (Sarstedt et al., 2014). Moreover, within the model, there exist two distinct types of variables: exogenous latent variables, which serve to clarify other constructs, and endogenous latent variables, which are the constructs under examination (Hair et al., 2017a).

Further, a PLS path model consists of two elements: a structural model (inner model) and a measurement model (outer model). The measurement model provides results related to the scales' reliability and validity, and the structured model represents the relationships (paths) between the research constructs.

3.1. Measurement model

The measurement model assesses the reliability and validity of two key constructs: Intellectual Capital and Sustainable Competitive Advantage.

Intellectual capital demonstrates high reliability with Cronbach's alpha of 0.837, Composite Reliability (rho_a) of 0.953, and Composite Reliability (rho_c) of 0.904. Sustainable Competitive Advantage also shows strong reliability with Cronbach's alpha of 0.826, rho_a of 0.864, and rho_c of 0.891. The Average Variance Extracted (AVE) values for both constructs are well above the threshold of 0.5 (Henseler et al., 2015), with Intellectual Capital at 0.767 and Sustainable Competitive Advantage at 0.733, indicating that their respective constructs account for a significant proportion of the variance in the observed variables.

3.2. Discriminant validity assessment

The Fornell-Larcker criterion assesses discriminant validity, ensuring that a construct is truly distinct from other constructs within the model. According to Tarhini et al. (2015), the diagonal elements represent the square root of AVE for each construct, which should be greater than the off-diagonal elements in the corresponding rows and columns (inter-construct correlations). The five constructs show very low correlations with other constructs, suggesting they are distinctly measured (Table 4).

Table 3. Reliability and validity

Construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Intellectual Capital	0.837	0.953	0.904	0.767
Sustainable Competitive Advantage	0.826	0.864	0.891	0.733

Table 4. Discriminant validity

Fornell-Larcker Criterion	Duration Since Establishment	Intellectual Capital	Sustainable Growth	Sustainable Competitive Advantage	Size
Duration Since Establishment	1.000	–	–	–	–
Intellectual Capital	0.141	0.876	–	–	–
Sustainable Growth	0.053	0.861	1.000	–	–
Sustainable Competitive Advantage	–0.222	0.639	0.791	0.856	–
Size	0.272	0.575	0.383	0.374	1.000

The measurement model for the constructs of Intellectual Capital and Sustainable Competitive Advantage is robust, showing high levels of reliability and convergent validity. Discriminant validity is also established, as evidenced by the Fornell-Larcker criterion, which confirms that the constructs are distinct and not overly correlated. This robustness ensures that the constructs are appropriately measured, providing a solid foundation for further analysis within the structural model.

3.3. Structural model measurement

The structural model examines the overall explanatory power (R^2), path coefficients (β), and significance level.

The structural model’s assessment primarily examines the relationships between constructs, focusing on collinearity through Variance Inflation Factor (VIF) statistics. VIF is used to detect the degree of multicollinearity in regression analysis. A VIF value of 1 indicates no correlation between the independent variable and other variables, as shown in Table 5. Values between 1 and 5 suggest a moderate correlation and values above 5 often indicate problematic levels of collinearity that might distort the regression coefficients and p-values.

3.4. The model’s explanatory power

The explanatory power of a model in structural equation modeling is determined using R-square

Table 5. Collinearity statistics (VIF)

Construct	VIF
Duration Since establishment → Intellectual Capital (IC)	1.000
Duration Since establishment → Sustainable Growth (SG)	1.374
Intellectual Capital (IC) → Sustainable Growth (SG)	2.311
Intellectual Capital (IC) → Sustainable competitive Advantage (SCA)	1.000
Sustainable Competitive Advantage (SCA) → Sustainable Growth (SG)	2.059
Size → Sustainable Growth (SG)	1.989
Size X Sustainable Competitive Advantage (SCA) → Sustainable Growth (SG)	1.300

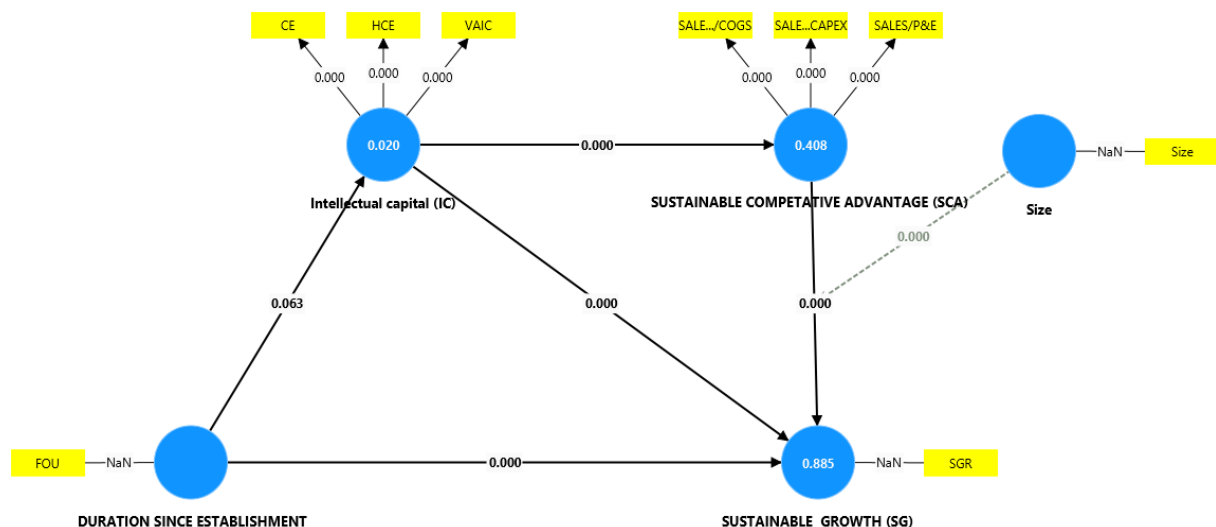


Figure 2. Structural model

Table 6. Coefficient of determination (R-squared)

Construct	R-Square	R-Square Adjusted
Intellectual Capital	0.02	0.019
Sustainable Competitive Advantage	0.408	0.407
Sustainable Growth	0.885	0.884

(R^2) and adjusted R-square values (Hair et al., 2017b). These statistics represent the proportion of variance in the dependent variables that the independent variables in the model can explain. R-square values range from 0 to 1, with higher values indicating better explanatory power. Adjusted R-square adjusts the R-square value to account for the number of predictors in the model, providing a more accurate reflection of the model's efficiency, especially in models with multiple predictors. The results of PLS-SEM in Table 6 show that R^2 for IC is 0.02. These values are very low, suggesting that the model explains only 2% of the variance in Intellectual Capital. This indicates that the predictors included in the model are not adequately capturing the factors that influence Intellectual Capital; SCA is 0.408, the model explains approximately 40.8% of the variance in Sustainable Competitive Advantage, which is a moderate explanatory power, and SG is 0.884. These values are quite high, which indicates that the model explains about 88.4% of the variance in Sustainable Growth. This demonstrates strong explanatory power, suggesting that the model effectively captures most factors influencing Sustainable Growth.

3.5. Path coefficients and hypotheses testing

Table 7 summarizes the results of the hypotheses testing related to the impact of Intellectual Capital, Sustainable Competitive Advantage, and other variables on Sustainable Growth Performance.

Hypothesis *H1* posits a significant relationship between Intellectual Capital (IC) and Sustainable Competitive Advantage (SCA). The data show a very strong positive effect of IC on SCA with a path coefficient of 0.639, a sample mean of 0.655, and a low standard deviation of .055 leading to a high-value T statistic (11.603) Results and a p-value of 0.000, which strongly supports the hypothesis. The findings emphasize the importance of intellectual capital for building sustainable competitive advantages in organizations. This result implies that banks

that successfully create and exploit their intellectual capital potentially generate great benefits in obtaining long-term strategic success. Hypothesis *H2* examines the relationship between Sustainable Competitive Advantage (SCA) and Sustainable Growth (SG). The path coefficient from the findings is 0.473, with a sample mean of 0.476 and a standard deviation of 0.068. The T statistic of 7.011 and a p-value of 0.000 supported the hypothesis well, stating that SCA has a significant positive effect on SG. Accepting this as true highlights the importance of competitive advantages in fostering sustained growth within organizations. Hypothesis *H3* posits that Intellectual Capital (IC) directly influences Sustainable Growth (SG). This hypothesis was strongly supported, showing a significant direct effect of IC on SG. The path coefficient of 0.674, alongside a sample mean of 0.687 and a standard deviation of 0.090, results in a T statistic of 7.514 with a p-value of 0.000. It highlights that intellectual capital is vital in driving growth by maintaining one's lead for good or better. It underscores that efficient administration and optimal application of intellectual input like human potential, company information resources, and client links positively affect long-term growth and sustainability.

Hypothesis *H4* tests the relationship between Duration Since Establishment (DSE) and Sustainable Growth (SG) within organizations. The findings affirm a substantial positive impact of DSE on SG, evidenced by a high path coefficient of 0.956, with a sample mean of 0.968 and a standard deviation of 0.255. The T-test value is 3.751 and the p-value is 0.000, which supports the hypothesis. It shows that the older startup means they have been in business for a long time and will be capable of growing and creating sustainability. This occurs because of incremental resource gathering and market knowledge superiority due to learning an operational advantage over time.

H5 states that Duration Since Establishment indirectly influences Sustainable Growth through the mediation of Intellectual Capital. Nevertheless,

Table 7. Path coefficients and hypotheses testing

Hypothesis	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Status
<i>H1</i> : Intellectual Capital (IC) → Sustainable Competitive Advantage (SCA)	0.639	0.655	0.055	11.603	0.000	Accepted
<i>H2</i> : Sustainable competitive Advantage (SCA) → Sustainable Growth (SG)	0.473	0.476	0.068	7.011	0.000	Accepted
<i>H3</i> : Intellectual Capital (IC) → Sustainable Growth (SG)	0.674	0.687	0.090	7.514	0.000	Accepted
<i>H4</i> : Duration Since Establishment → Sustainable Growth (Sg)	0.956	0.968	0.255	3.751	0.000	Accepted
Assessment of the Mediator construct						
<i>H5</i> : Duration Since Establishment (DSE) → Intellectual Capital (IC) → Sustainable Growth (SG)	0.610	0.622	0.424	1.440	0.075	Rejected
<i>H6</i> : Intellectual capital (IC) → Sustainable competitive advantage (SCA) → Sustainable Growth (SG).	0.302	0.313	0.057	5.271	0.000	Accepted
Assessment of the Serial Mediators construct						
<i>H7</i> : Duration Since Establishment (DSE) → Intellectual Capital → Sustainable Competitive Advantage → Sustainable Growth	0.273	0.276	0.185	1.477	0.070	Rejected
Assessment of the Moderator construct						
<i>H8</i> : Size (SIZE) x Sustainable Competitive Advantage (SCA) → Sustainable Growth (SG)	-0.063	-0.055	0.018	3.390	0.000	Accepted

this result was rejected according to the statistical results. The path coefficient has a relatively high value of 0.610, and the sample mean is 0.622 for this effect. Nonetheless, a high standard deviation of 0.424 and a T statistic value of 1.440 compared to $p = 0.075$ indicate that the indirect effect of DSE on SG through IC is not significant statistically. The rejection of *H5* suggests that while DSE and IC individually may impact SG, the specific pathway where IC mediates the relationship between DSE and SG does not hold significant predictive power in this study's model. However, this could mean that other factors or types of capital (e.g. financial capital and technologies) may be more important in addition to the duration of the establishment of sustainable growth. Hypothesis *H6* examines whether Intellectual Capital (IC) influences Sustainable Growth (SG) through the mediation of Sustainable Competitive Advantage (SCA). The findings support this hypothesis robustly, as evidenced by a path coefficient of 0.302, with a sample mean of 0.313 and a standard deviation of 0.057. The T statistic is 5.271, and the p-value is 0.000, confirming the hypothesis with strong statistical significance. This acceptance indicates a significant pathway whereby IC enhances SCA, positively impacting SG. This suggests that developing and managing intellectual capital within an organization builds competitive advantages and contributes directly to the organization's sustain-

able growth. This relationship underscores the strategic importance of nurturing intellectual resources as a means of fostering not just immediate competitive gains but long-term growth.

The study evaluated the serial mediation of Intellectual Capital (IC) and Sustainable Competitive Advantage (SCA) in the relationship between Duration Since Establishment (DSE) and Sustainable Growth (SG). The findings reveal a significant total effect of DSE on SG with a coefficient of 1.839 ($p < 0.005$), indicating a strong overall influence. However, the direct effect of DSE on SG was comparatively minor at 0.0956 ($p < 0.005$), suggesting that while the duration since the establishment has a substantial overall impact on sustainable growth, its direct influence is relatively modest. Hypothesis *H7*, involving serial mediation through IC and SCA, was tested with an indirect effect coefficient of 0.273 (Table 8). The associated confidence interval ranged from -0.030 to 0.579; with a T statistic of 1.477 and a p-value of 0.070, this hypothesis was rejected. This rejection indicates that the path from DSE through IC and SCA to SG does not hold strong enough statistical significance to confirm it as a reliable mediator in this model.

Hypothesis *H8* examines the interaction effect of organizational size (SIZE) and Sustainable Competitive Advantage (SCA) on Sustainable

Table 8. Serial mediation analysis summary

Total Effect	Direct Effect	Relationship	Indirect Effect	Confidence Interval		T Statistics	P Value	Results
				Lower Bound	Upper Bound			
Duration Since Establishment → Sustainable Growth 1.839 p < 0.005	Duration Since Establishment → Sustainable Growth 0.0956 p < 0.005	H7: Duration Since Establishment → Intellectual Capital → Sustainable Competitive Advantage → Sustainable Growth	0.273	-0.030	0.579	1.477	0.070	Rejected

Growth (SG). The results show a negative coefficient of -0.063 , with a sample mean of -0.055 and a standard deviation of 0.018 . The T statistic is 3.390 , and the p-value is 0.000 , leading to the acceptance of this hypothesis. Despite the statistical significance, the negative coefficient is notable, suggesting that as size increases, the positive impact of sustainable competitive advantage on sustainable growth slightly decreases. These results suggest that the relationship between SCA and SG is 0.473 for an average level of bank size. For a higher level of bank size (e.g., size is increased by one standard deviation unit), the relationship between SCA and SG decreases by the amount of interaction term ($0.473 - 0.063$). On the contrary, for lower levels of bank size (e.g., size decreases by one standard deviation point), the relationship between SCA and SG becomes ($0.473 + 0.063$). This result indicates that while SCA contributes to SG, the organization's size might moderate this effect, so larger organizations might not experience the same growth benefits from their competitive advantages as smaller ones.

4. DISCUSSION

The discussion of the results from this study on the roles of Intellectual Capital (IC), Sustainable Competitive Advantage (SCA), and Duration Since Establishment (DSE) in driving Sustainable Growth (SG) in organizations, particularly in the banking sector, highlights crucial insights that resonate with current academic discourse. The findings robustly support Hypothesis *H1*, showing a substantial effect of IC on SCA; this aligns with the studies by Anggraeni et al. (2023) and Forte et al. (2017), who also highlight the pivotal role of intellectu-

al capital in enhancing a firm's competitive position, thereby suggesting that intellectual capital is a crucial driver for developing enduring competitive advantages within firms. Mulyasari and Murwaningsari (2019) investigate the role of intellectual capital in enhancing competitive advantage, financial performance, and company value in Indonesia's banking sector. Their findings indicate that intellectual capital significantly contributes to these aspects, underscoring its importance in the banking industry. The findings from Hermawan et al. (2020) stated that intellectual capital drives competitive advantage in pharmaceutical companies; this indicates that it also may play a crucial role in the banking industry. By leveraging intellectual capital, banks can improve their stability, foster sustainable growth, and maintain a competitive edge in a rapidly evolving financial landscape.

Furthermore, the results corroborate Hypothesis *H2*, demonstrating a significant direct relationship between SCA and SG, affirming competitive advantages as vital drivers of long-term sustainability. This finding is supported by Barney's (1991) theory of firm resources as foundational to sustaining competitive advantage. Kamukama et al. (2011) and Madhani (2010) stated that competitive advantages are critical for the sustainable growth of organizations and suggest that competitive advantages preserve a firm's market position and drive long-term growth.

Likewise, the direct impact of IC on SG (*H3*) substantiates the knowledge-based view of a firm, as discussed by Kengatharan (2019) and Becker (2009), emphasizing the direct role of intellectual capital in fostering an organization's

growth. Hashim et al. (2015) indicate that intellectual capital components, such as human capital, structural capital, and relational capital, play a crucial role in enhancing a firm's performance, thus supporting the notion that effective management of intellectual assets significantly drives superior financial outcomes. In their study, Xu et al. (2020) highlight how efficient utilization of intellectual capital resources, such as human, structural, and relational capital, can enhance corporate performance and sustainability. Mukherjee et al. (2018) demonstrated a significant impact of IC on corporate sustainable growth. Their results revealed that almost all the explanatory variables, Physical Capital, Relational Capital, Innovation Capital, and Process Capital, are notable influences in explaining corporate sustainable growth.

According to Asutay and Ubaidillah (2023), intellectual capital, encompassing human, structural, and relational components, significantly increases the banks financial performance, while the proper management of these assets enhances the firm's profitability and innovation. Additionally, the significant impact of DSE on SG (H4) concurs with the literature that posits older firms are better positioned to leverage accumulated resources and experiences toward sustainable outcomes (Kadir et al., 2018; Todericiu & Stăniș, 2015). However, the rejection of H5 indicates that while IC significantly impacts SG, its mediating role between DSE and SG might be influenced by other variables or direct influences, suggesting a need for further exploration into different types of capital or strategic assets. This aligns with insights from Zheng et al. (2022),

who argue that the straightforward effects of intellectual capital might be contingent on other factors not directly observed in the model, such as organizational structure or external market conditions.

The acceptance of H6 underlines the pathway through which IC enhances SCA and SG, supported by seminal works by Grant (1996) and Barney (1991) on how strategic resource management can foster sustained growth and competitive outcomes. This result suggests that intellectual resources such as knowledge, expertise, and networks are essential for cultivating enduring competitive edges and fostering organizational growth. These results align with Zheng et al. (2022) and Ashraf et al. (2023), who emphasize the pivotal role of intellectual capital in boosting organizational performance and adaptability. According to Agustia et al. (2021), there is a significant relationship between IC and SG, mediated by SCA in the financial sectors. The findings from H8 introduce complexities in how competitive advantages are influenced by organizational size, with larger firms possibly facing diminishing returns in leveraging these advantages for growth, aligning with the discussions by Banker et al. (2014) and Wuttaphan (2017) about strategic challenges faced by larger organizations compared to smaller entities. This nuanced view suggests that while SCA contributes to SG, the impact varies with organizational size, indicating that larger entities might not experience the same growth benefits from their competitive advantages as smaller ones, as Ashraf et al. (2023) discussed. On the other hand, Forte et al.'s (2017) study provides valuable insights into measuring intellectual capital. They found that size and age negatively affect IC value.

CONCLUSIONS AND RECOMMENDATIONS

This study investigates the impact of intellectual capital (IC), sustainable competitive advantage (SCA), duration since firm establishment (DSE), and bank size on fostering sustainable growth (SG) in Saudi Arabia's banking sector. It explores the under-examined relationship between IC and SCA as mediators of sustainable growth in a rapidly evolving financial environment. The results from this study verify the critical impact of IC on enhancing SCA, which subsequently encourages SG. These results underscore that effectively managed intellectual resources are necessary for banks seeking to sustain growth and competitiveness. Furthermore, the positive impact of DSE on SG suggests that more established banks, with their wealth of accumulated resources and experiences, can leverage their longstanding presence for sustainable outcomes. Interestingly, the expected mediating effect of IC between DSE and SG was not supported, indicating the potential for other factors to play more substantial roles in influencing sustainable growth in this context.

In Saudi Arabia's banking sector, banks should focus on enhancing intellectual capital by investing in employee development, sophisticated information systems, and robust customer relationship management to sharpen competitive advantages and foster sustained growth. Furthermore, established banks should leverage their sustained market presence to diversify investment portfolios and expand into new markets, utilizing their well-established reputations. Moreover, considering the non-significant mediation effect of intellectual capital on the link between duration since establishment and sustainable growth, banks are encouraged to adopt innovative growth strategies that include the implementation of technological advancements or forming strategic partnerships.

The policy framework should support intellectual capital development through incentives such as tax exemptions for investments in training and technology. In addition, promoting innovation can be facilitated by fostering an enabling environment that supports collaboration with fintech companies, supports R&D activities, and encourages the establishment of innovation hubs to stimulate a competitive and dynamic banking sector in Saudi Arabia.

The study's focus on Saudi Arabia's banking sector may limit the applicability of its findings to other sectors or regions. Reliance on secondary data could also constrain control over the quality of the data, potentially affecting the robustness of the conclusions drawn.

Future research could expand the scope to include multiple sectors and geographical regions to enhance the generalizability of the findings and provide a comparative perspective on the impact of Intellectual Capital across different contexts. Investigating the impact of emerging technologies like artificial intelligence and blockchain on developing and utilizing Intellectual Capital could provide critical insights for banks aiming to maintain competitive advantages in a rapidly evolving digital landscape. Future studies should investigate other potential mediators in the relationship between DSE and SG, such as financial capital, technological advancements, or organizational culture, to provide a more comprehensive understanding of the factors influencing sustainable growth in the banking sector. Further research could also examine the impact of macroeconomic factors and global economic changes on the relationships between IC, SCA, and SG, especially in the context of oil price fluctuations and economic diversification efforts in Saudi Arabia.

AUTHOR CONTRIBUTIONS

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