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Growth effects of human capital, innovation, and entrepreneurial orientation in South African SMEs post-COVID-19

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Orientation: This article explores the growth dynamics of small and medium-sized enterprises (SMEs) in South Africa, a unique context within the global landscape, particularly post-coronavirus disease 2019 (COVID-19).

Research purpose: The study aims to develop and test a theoretical model to explore the relationships among entrepreneurial orientation (EO), human capital, innovation, motivation and firm's growth post-pandemic.

Motivation for the study: There is an urgent need to understand the critical factors influencing the growth of SMEs in South Africa, particularly during the COVID-19 pandemic.

Research design, approach and method: A quantitative and cross-sectional survey design was employed. A structured questionnaire was used to gather 497 responses from small firm owner-managers. Data were analysed using Smart PLS (version 3.2.9) for partial least squares structural equation modelling (PLS-SEM).

Main findings: Key findings indicate that innovation is a crucial mediator between EO and growth. In contrast, the impact of human capital on growth varies in the post-pandemic context.

Practical/managerial implications: The implications emphasise the need for targeted strategies that enhance EO, human capital, innovation and motivation within SMEs, ultimately supporting their growth and resilience after COVID-19.

Contribution/value-add: This study contributes to the literature by offering actionable insights for SMEs and policymakers, underscoring the importance of fostering EO, human capital, innovation and motivation to navigate post-pandemic challenges.

Keywords: human capital; innovation; entrepreneurial orientation; motivation; small firm growth.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic, caused by the SARS-CoV-2 virus, disrupted global business operations, with small and medium-sized enterprises (SMEs) being particularly hard-hit (Callaway et al. 2020; World Health Organization 2020). Originating in Wuhan, China, the virus spread quickly and, by March 2020, was declared a global pandemic (Callaway et al. 2020). Entrepreneurs, vital drivers of innovation and market development (Schumpeter 1942; Van Balen, Tarakci & Sood 2019), faced severe operational and market disruptions (Bacq & Lumpkin 2020; Maritz et al. 2020). In South Africa, SMEs, already struggling with high failure rates (70% – 80%) and limited access to capital (Mtambo, Lubbe & Ohei 2023), saw these challenges worsened during the pandemic, leading to financial distress, liquidity crises and operational barriers, including workforce shortages and supply chain disruptions (Bartik et al. 2020; Sharma et al. 2024). Furthermore, many SMEs struggled to transition to online business models because of inadequate digital infrastructure and financial constraints (Gqoboka, Anakpo & Mishi 2022).

Small and medium-sized enterprises are crucial to the South African economy, contributing over 50% of the nation's Gross Domestic Product (GDP) and employing around 60% – 70% of the workforce (Stats SA 2022). As key drivers of economic recovery, their growth and resilience are critical to the country's long-term economic stability. However, despite their significant role, many SMEs face persistent challenges that hinder their growth and sustainability, making it urgent to explore the factors influencing their post-pandemic recovery. Addressing these

challenges is vital for SMEs' survival and supporting broader socio-economic goals, such as job creation, poverty reduction and innovation-driven growth.

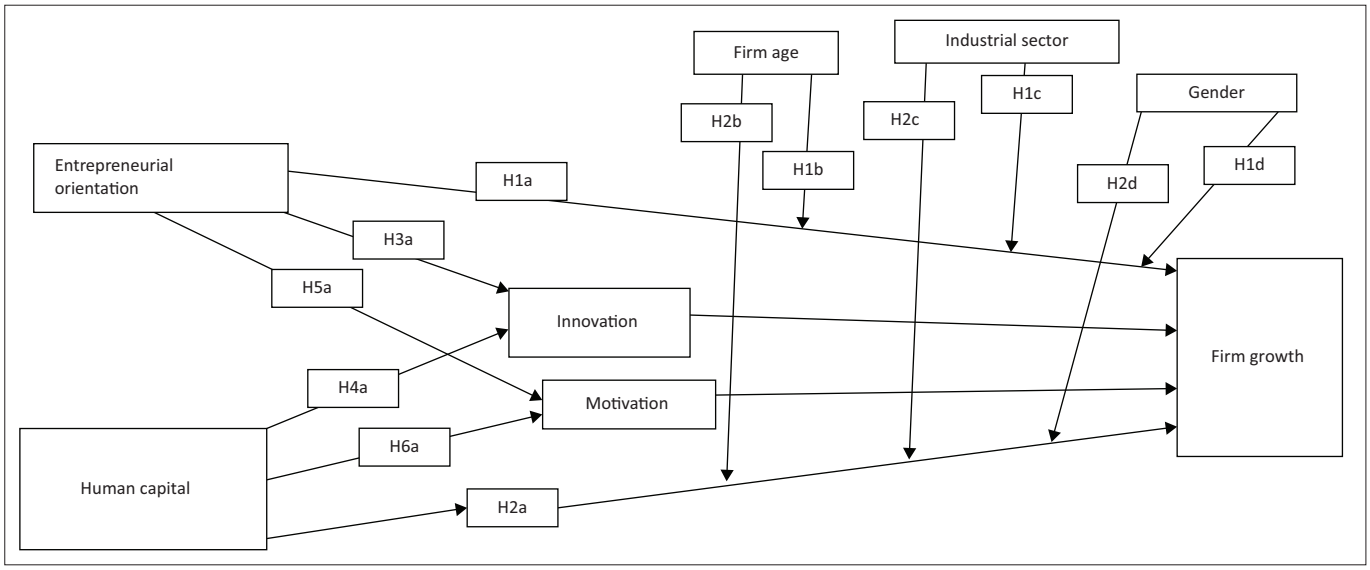
This study investigated the key factors influencing SME growth in this context: human capital, innovation, entrepreneurial orientation (EO) and motivation. While firm growth has been widely researched (Babina et al. 2024; Coad, Daunfeldt & Halvarsson 2018; Grazzi & Moschella 2018; Grillitsch, Schubert & Srholec 2019; Hart, Prashar & Ri 2021; Maury 2022; Rafiki et al. 2023; Tunberg & Anderson 2020; Yadav, Pahi & Gangakhedkar 2022), challenges persist as many SMEs, despite their growth potential, struggle to achieve sustainable expansion (Edwards 2021). While existing research has focused on individual growth determinants, there remains a need to understand how these factors interact and influence firm growth, especially in emerging economies such as South Africa (Covin & Wales 2019).

As shown in Figure 1, the conceptual model delineates how human capital and EO serve as independent variables, while innovation and motivation act as mediators. In addition, firm characteristics, industrial sector and gender are identified as moderating factors influencing firm growth, the dependent variable.

This study makes a unique contribution by integrating human capital, innovation, EO and motivation into a single model and examining their interrelationships. In doing so, it builds on existing literature, extending the work of Mthanti and Ojah (2017), who found a link between human capital and EO, and Audretsch, Coad and Segarra (2014), Coad, Segarra and Teruel (2016) and Spescha and Woerter (2019), who explored the impact of innovation on growth. It also adopts a broader perspective on EO, using all five dimensions proposed by Lumpkin and Dess (1996) – innovativeness, autonomy, competitiveness, proactiveness and risk-taking – instead of just the three common dimensions (risk-taking, innovativeness and proactiveness) explored in many studies (Basco et al. 2020; Dzomonda & Fatoki 2019; Mthanti & Ojah 2017). In addition, this study extends the work of Ncube and Zondo (2018) and Delmar and Wiklund (2008) by examining the role of intrinsic motivation in SME growth, a factor particularly relevant in the South African context.

A key feature of this study is its inclusion of mediators (innovation and motivation) and moderators (gender, industrial sector and firm characteristics). Most previous studies have examined the direct relationships between these variables, often in isolation, without considering how mediators and moderators might influence these relationships. Integrating mediators and moderators offers a more comprehensive understanding of SME growth, especially in the post-pandemic context. Gender is included as a moderator because previous research shows that male and female entrepreneurs may face challenges, such as resource access, leadership styles and risk-taking (Ncube & Zondo 2018). Similarly, the industrial sector moderates the relationships between these factors because firms in different sectors – such as manufacturing, services or technology – experience distinct challenges and opportunities that can impact growth (Spescha & Woerter 2019). Finally, firm characteristics such as size and age moderate growth, as smaller or younger firms may have more flexibility but fewer resources, influencing their ability to capitalise on human capital and innovation (Coad et al. 2018).

This research fills critical gaps in the literature by developing and testing a conceptual model that not only explores the interplay between human capital, innovation, EO and motivation but also considers how gender, industry and firm characteristics shape these relationships. By integrating these diverse constructs, this study offers theoretical contributions and practical implications for policymakers and business leaders, providing actionable insights to foster SME growth and resilience in South Africa. Ultimately, this work



H, hypothesis.

FIGURE 1: Conceptual model of the determinants of firm growth.

contributes to the broader understanding of how SMEs can navigate the post-pandemic landscape and contribute to economic recovery and sustainability.

The rest of the article is organised as follows: Firstly, the theoretical framework section is presented. Secondly, a detailed literature review is provided. Thirdly, the research methods, data collection and analysis are presented. Subsequently, the findings and their implications for theory and practice are discussed. Fourthly, the study's limitations are presented, and finally, a conclusion is given.

Theoretical framework

This study utilises four key theoretical frameworks to guide the investigation of firm growth. This study applies these theories specifically to SMEs in South Africa, addressing empirical gaps in the existing literature. Firstly, Penrose's (1959) Theory suggests that internal resources and managerial decisions limit a firm's growth. Secondly, the Resource-Based View Theory (RBV) (Barney 1991; Wernerfelt 1984) argues that a firm's competitive advantage stems from its unique resources and capabilities, including human capital. Thirdly, Lumpkin and Dess's (1996) EO framework suggests that firms with a strong EO are more inclined to pursue growth-oriented activities. Lastly, Becker's (1964) Human Capital Theory highlights how investments in individual skills and knowledge enhance firm growth by fostering innovation and adaptability.

Literature review and hypotheses development

This section reviews the literature on EO, human capital, innovation, motivation, firm age, industry sector and gender and their influence on SME growth, particularly in the post-pandemic recovery phase. The review critically examines existing studies and highlights key gaps, inconsistencies and contextual factors that affect SMEs' ability to thrive in the current environment. Based on this analysis, hypotheses are developed to address these gaps, providing a solid foundation for empirically testing the relationships between these factors and firm growth in South African SMEs.

Relationship between entrepreneurial orientation and firm growth

Entrepreneurial orientation is a crucial framework for understanding how firms initiate and expand (Lumpkin & Dess 1996). It comprises five dimensions – risk-taking, innovativeness, proactiveness, autonomy and competitive aggressiveness – that collectively influence firm growth. While existing research often focuses on individual dimensions, such as innovativeness and risk-taking (Amin 2015), this study adopts a comprehensive approach by incorporating all five dimensions, providing a fuller picture of EO's role in firm growth. In today's dynamic business environment, SMEs must innovate, take risks and proactively respond to market changes to survive and grow (Omisakin et al. 2016).

The literature on EO and firm growth is mixed. Some studies, such as those by Curiumi et al. (2021) and Omisakin and Adagoke (2022), confirm a positive impact of EO on growth in contexts such as Iranian agricultural SMEs and New Zealand family enterprises. However, this relationship is often complex and context-dependent. While many studies report a direct positive correlation (Karimi, Daryani & Rahmani 2021; Omansikin et al. 2022), others suggest that the relationship is non-linear and influenced by additional variables, such as firm age or market conditions (Irawan, Mansor & Ramlee 2023; Šlogar et al. 2023).

The role of factors, such as industry sector and firm characteristics, as moderators in the EO-growth relationship remains underexplored. Omisakin and Adegoke (2022) mention the potential for such moderating factors, but there is little research on how specific elements, like gender or industrial sector, affect the EO–growth link. This study addresses this gap by focusing on these moderators within the South African SME context. Furthermore, much of the existing EO literature focuses on well-developed economies, leaving a gap in research on emerging economies such as South Africa. This study contributes to the literature by exploring EO's role in South African SMEs, which requires more attention, particularly in the post-COVID-19 context. Therefore, the hypothesis was developed as follows:

> **Hypothesis 1a:** There is a positive and significant association between entrepreneurial orientation and small firm growth.

Relationship between human capital and firm growth

Human capital, the knowledge, skills and competencies gained through education and work experience, is pivotal in enhancing firm growth and economic productivity (Alay & Jeppe 2013). Entrepreneurs' human capital is critical for driving innovation and improving firm performance (Mthanti & Ojah 2017). Research consistently underscores the importance of human capital for SME growth, highlighting the fact that skilled entrepreneurs are more likely to innovate and achieve better business outcomes (Parker 2018; Unger et al. 2011). However, the relationship between human capital and firm growth is nuanced and varies depending on contextual factors, such as industry and market conditions (El Shoubaki, Laguir & Den Besten 2020). For example, Unger et al. (2011) found a positive correlation between specific human capital and firm success, while Marvel, Davis and Sproul (2016) and Khan and Quaddus (2018) noticed that the impact of human capital may differ across industries and external environments. Despite these insights, studies such as those by Magoutas, Papadogonas and Sfakianakis (2012) report positive impacts in manufacturing SMEs, while others, like those by Mustafa and Stella (2023), identify negative correlations in non-financial sectors. These inconsistencies indicate the need for further investigation into how human capital affects growth in various industry contexts and external conditions. Moreover, practical strategies for human capital investment remain underexplored, especially in the South

African SME context, where competition and market conditions differ substantially from other regions (Mutua, Kimanthi & Kinyili 2024). Therefore, the hypothesis was developed as follows:

Hypothesis 2a: There is a significant and positive association between human capital and small firm growth.

Relationship between innovation, entrepreneurial orientation and firm growth

Innovation is critical for firms aiming to sustain a competitive advantage, driving productivity by introducing new ideas, products and technologies that enhance operational efficiency (Barney 1991; Spescha & Woerter 2016). While innovation can take various forms, including product and process innovations, these are often integrated and not isolated (Carboni & Russu 2018; Schumpeter 1934). The relationship between R&D expenditure and firm growth is well-documented, though the impact can differ significantly across organisational contexts (Coad et al. 2016; Heij et al. 2020). Although innovation can foster growth, SMEs often struggle to capitalise on it as effectively as larger firms because of resource constraints and limited capabilities (Fuad, Purnamasari & Maksar 2023; Rosenbusch, Brinckmann & Bausch 2011). The link between innovation and EO has also been explored, with EO identified as a critical driver of innovation, thereby enhancing firm growth (Amin et al. 2016). Entrepreneurial orientation is seen as a mediator that facilitates the relationship between innovation and growth, with studies demonstrating that EO can improve innovation performance, which drives firm success (Kamik et al. 2021; Rochdi, Khatijah & Abi Sofian Abdul 2017). However, recent findings indicate that the effectiveness of digitalisation in fostering disruptive innovation depends on the level of EO, with some large firms perceiving digitalisation as a constraint rather than an opportunity (Kraus 2023).

Furthermore, research by Reyes-Gómez, López and Rialp (2024) highlights the fact that innovation fully mediates the relationship between EO and performance. Despite these insights, gaps remain in understanding how SMEs, particularly in emerging economies such as South Africa, leverage innovation and EO to overcome challenges related to limited resources. Further investigation is needed to explore the moderating role of external factors such as market conditions and sector-specific dynamics. Therefore, the hypothesis was developed as follows:

Hypothesis 3a: Innovation mediates the relationship between entrepreneurial orientation and small firm growth.

Relationship between innovation, human capital and firm growth

Skilled employees significantly contribute to innovation, enhancing problem-solving and process development (Lenihan, McGuirk & Murphy 2019). Larger firms benefit from a broader human capital pool, facilitating innovation (McGuirk & Jordan 2012). While the relationship between human capital and firm growth is well-established in developed countries, its effects in emerging economies are less understood. In developed nations, human capital accumulation typically boosts innovation and growth, although taxation policies may sometimes hinder this (Erikson et al. 2023). However, technological adaptation and the strategic use of human capital are crucial in developing countries. For example, in Uruguay, human capital donations significantly impact SME innovation (Segantini 2024). In SMEs, firm-specific and general human capital contribute to innovation and performance (Selivanovskikh 2023). Given the complexities of these relationships, further research is needed to explore the role of human capital in fostering innovation in South African SMEs, particularly in the post-pandemic era. Therefore, the hypothesis was developed as follows:

Hypothesis 4a: Innovation mediates the relationship between human capital and small firm growth.

Motivation

Entrepreneurial motivation is critical in shaping behaviours that drive firms towards growth and success (Patil & Arpitha 2023). Motivation, driven by underlying needs, influences entrepreneurial actions and decisions (Murnieks, Klotz & Shepherd 2020). Despite its significance in driving firm performance, much of the research has focused on the growth phase of businesses, leaving a gap in understanding motivation during the start-up and exit phases (Murnieks et al. 2020). Delmar and Wiklund (2008) highlight the fact that growth motivation significantly impacts entrepreneurial decisions and strategies. Furthermore, motivation mediates the relationship between EO and firm performance, particularly within micro-enterprises (Moko et al. 2024). The relationship between human capital and motivation is crucial, as skilled entrepreneurs are more likely to leverage motivation for business success (Ismail 2022). While motivation is recognised as essential for firm growth, further research is needed to explore its role within South African SMEs, especially in the post-pandemic recovery phase, where motivation strategies may need to adapt to new market conditions (Mustafa & Stella 2023; Pembi et al. 2023). Therefore, the hypotheses were developed as follows:

Hypothesis 5a: Motivation mediates the relationship between entrepreneurial orientation and small firm growth.

Hypothesis 6a: Motivation mediates the relationship between human capital, motivation and small firm growth.

Firm age

Firm age significantly influences growth dynamics, with younger firms generally exhibiting faster growth as compared to their older counterparts. Neneh and Van Zyl (2017) argue that younger firms often benefit from greater agility and an ability to adapt quickly to market opportunities, aided by their strategic positioning and innovative approaches. However, as firms age, growth rates tend to slow down, with research suggesting a generally

negative correlation between firm age and growth, although exceptions exist in lower distributions (Erdogan 2023). Older firms face distinct financial constraints, yet their resilience allows them to manage these challenges effectively, often showing a capacity to mitigate economic pressures on growth (Nguang et al. 2024). Interestingly, younger firms often experience irregular growth patterns as they mature (Capelleras & Federico 2024).

In addition, these firms may struggle to access the resources necessary for entrepreneurship-oriented strategies, such as innovation and process improvement (Raalskov et al. 2024). Family-owned businesses also face unique challenges related to human capital management because of their emotional dynamics, complicating their growth strategies (Bito et al. 2024). Further research is needed to explore how firm age interacts with firm characteristics and growth strategies, especially in the context of South African SMEs and emerging markets. More investigation into how age influences the relationship between EO and growth is also warranted, as this could guide strategy development. Therefore, the hypotheses were developed as follows:

Hypothesis 1b: Firm age moderates the relationship between entrepreneurial orientation and firm growth.

Hypothesis 2b: Firm age moderates the relationship between human capital and small firm growth.

Industrial sector

The relationship between EO and firm growth is significantly influenced by the industrial sector in which a firm operates. Sector-specific dynamics can alter the impact of EO on firm growth, with manufacturing industries often benefiting from aggressive competition, proactivity and risk-taking (Kosa, Mohammad & Ajibie 2018), while service sectors tend to show more focus on innovation and proactivity (Rigtering et al. 2014). Recent research highlights the fact that sector-specific employment in manufacturing and infrastructure industries is positively associated with firm growth (Beaudry & Swann 2009). Still, the applicability of these findings to South African SMEs remains underexplored. Evidence suggests that EO influences innovation ambidexterity in industrial SMEs, enhancing intellectual capital (Horchani et al. 2023). However, research focusing on sectoral variations in EO and firm performance is still scarce, particularly in emerging markets such as South Africa. Future studies should examine how different sectors in South Africa may shape the relationship between EO and growth, addressing the gap in sector-specific contextual factors. Therefore, the hypothesis was developed as follows:

Hypothesis 1c: Industrial sector moderates the relationship between entrepreneurial orientation and small firm growth.

Cowling, Liu and Zhang (2018) found that construction firms face employment declines while manufacturing firms often experience sales downturns. Gupta, Guha and Krishnaswami (2013) noticed that growth-oriented entrepreneurs prefer manufacturing over service sectors. Choi and Williams (2016) emphasise the importance of industry context in mediating effects, with sectors such as retail and wholesale in South Africa leading early-stage entrepreneurship (Bowmaker-Falconer & Herrington 2019/2020). Research indicates that human capital's impact on small firm growth varies by industry (Unger et al. 2011) and is influenced by technological advancements and market dynamics. In manufacturing, the influence of human capital on innovation varies by firm size, with skills critical for small firms and training essential for larger ones (Segantini 2024). Therefore, the hypotheses were developed as follows:

Hypothesis 2c: Industrial sector moderates the relationship between human capital and small firm growth.

Gender

Gender is a critical factor in entrepreneurship, influencing firm growth in diverse ways. Female-led SMEs often experience slower growth than male-led counterparts, with gendered societal expectations emphasising family support over expansion (Bournakis & Mei 2023; Neneh, Van Zyl & Van Noordwyk 2016). While women increasingly achieve parity in education and business skills (Peters et al. 2014), challenges persist in leveraging foreign investment and scaling firms. Female entrepreneurs benefit more from social capital, mentorship and role models than traditional financial resources (Nyakudya, Mickiewicz & Theodorakopoulos 2024). Furthermore, studies indicate that female entrepreneurs may have higher digital technology adoption in specific sectors (Živković, Štrbac & Paunović 2024). However, existing research often overlooks gender-specific barriers to innovation and growth in emerging economies, warranting a deeper examination of how gender impacts entrepreneurship in South Africa. Research on female entrepreneurship in emerging economies such as South Africa is needed, where distinctive challenges may influence firm growth (Aliamutu & Mkhize 2024; Woldesenbet Beta, Mwila & Ogunmokun 2024). Therefore, the hypotheses were developed as follows:

Hypothesis 1d: Gender moderates the relationship between entrepreneurial orientation and small firm growth.

Hypothesis 2d: Gender moderates the relationship between human capital and small firm growth.

Research methods and design

Participants and procedures

This study employed a quantitative research approach, a positivism paradigm and a cross-sectional design to explore the relationships between human capital, EO, motivation, innovation and firm growth among SMEs in South Africa. The target population comprised SMEs across various sectors. The sampling frame consisted of owner-managed firms identified through publicly accessible data sources, including the Small Enterprise Development Agency (SEDA) website, the Small Business Directory, various incubation hubs and Global Entrepreneurship Monitor (GEM) reports. Participants were selected based on their visibility in these sources, with priority given to those businesses with active

online profiles, such as websites or social media presence, which were considered indicative of digital accessibility and engagement. This approach ensured broad geographical and industrial representation. However, it is important to notice that this method may have excluded less digitally visible SMEs, notably smaller, rural or informal businesses with limited or no online presence.

Given the large size of the target population, a non-probability sampling approach, specifically convenience sampling, was employed. Convenience sampling allows participants to be selected based on their accessibility, in this case, using publicly available email addresses (Zikmund 2010). While convenience sampling can introduce sampling bias, this study took steps to mitigate this risk and ensure diversity in the sample. Specifically, the sample was drawn from multiple data sources, including online directories, industry reports and local business networks, representing a broad spectrum of South African SMEs across different industries and regions. By diversifying the sources from which participants were selected, the study incorporated SMEs of various sizes, sectors and geographical locations. This approach aimed to enhance the heterogeneity of the sample, providing a more comprehensive view of the challenges faced by SMEs in South Africa post-pandemic (Obilor 2018).

The primary data-collection instrument was a self-administered online questionnaire. A total of 492 completed questionnaires were received from the SME owner-managers, aligning with the recommended sample size for robust statistical analysis, particularly for partial least squares structural equation modelling (PLS-SEM) (Hair et al. 2021). The sample consisted of 52% male and 46% female owner-managers, with 2% opting not to disclose their gender. Geographically, the respondents were distributed across South Africa as follows: Gauteng (23%), Western Cape (12%), Free State and North West (11% each), Limpopo and Mpumalanga (10% each), Eastern Cape and KwaZulu-Natal (9% each) and Northern Cape (5%). In terms of industry, the largest share was in construction (13.3%), followed by professional, scientific and technical activities (12.7%), and accommodation and food services (10.1%). Other significant sectors included manufacturing (8.7%), wholesale and retail trade (8.0%) and motor vehicle repair (8.0%), while sectors such as arts, entertainment and healthcare each contributed around 5%, reflecting a diverse economic representation. In addition to collecting data, a pilot study with 30 owner-managers of SMEs in South Africa was conducted to refine the questionnaire and ensure its clarity and reliability.

Measures

The questionnaire was developed based on the research questions and a thorough literature review on firm growth, EO, human capital, innovation and motivation (Krosnick 2018). Section A collected demographic information, while Section B measured EO using a seven-point Likert scale, with items adapted from Miller et al. (1989) and Hughes and Morgan (2007). Section C assessed human capital through education and work experience based on past studies (Rauch & Rijsdijk 2013; Unger et al. 2011). Section D focused on innovation, with items drawn from the World Bank Enterprise Survey (2021), a standard for measuring firm innovation in global surveys. Section E evaluated motivation using a revised version of the Work Extrinsic and Intrinsic Motivation Scale (WEIMS) scale (Tremblay et al. 2009). Finally, Section F measured firm growth with items adapted from the World Bank Enterprise Survey (2021), a recognised instrument for measuring firm-level growth across diverse economies.

Analytical approach

Data were analysed using Partial Least Squares Structural Equation Modeling (PLS-SEM). This method is particularly suited for exploring complex relationships in management studies, allowing for simultaneous evaluation of measurement and structural models (Hair et al. 2021). Data analysis commenced with descriptive statistics using SPSS and inferential statistics with Smart PLS version 3.2.9.

Initially, the measurement model's (outer model's) validity and reliability were assessed. This involved calculating composite reliability (CR) and Cronbach's alpha to ensure internal consistency, with thresholds set at 0.7 (Nunnally 1978). The average variance extracted (AVE) was also evaluated, with a minimum acceptable value of 0.5 (Fornell & Larcker 1981). Convergent and discriminant validity were confirmed, demonstrating that the constructs represented their intended underlying concepts meaningfully. The findings indicated that all constructs met the criteria for reliability and validity, as detailed in Table 1.

Following the validation of the outer model, the structural model (inner model) was examined to test the hypotheses. This involved assessing the significance of path coefficients, coefficients of determination (R^2), effect sizes (f^2) and predictive relevance (Henseler, Ringle & Sinkovics 2009). Variance Inflation Factor (VIF) values were calculated to check for multicollinearity, ensuring that values remained below the threshold of 5.0 (Sarstedt & Cheah 2019). *R*-squared values were utilised to measure the strength of relationships, with an alpha level of 0.05 set for determining statistical significance. Bootstrapping, a nonparametric method, assessed the significance of path coefficients, producing two-tailed *p*-values and 95% bias-corrected confidence intervals. Ringle, Wende and Will (2005) accepted an alternative hypothesis when the confidence interval did not include zero, and the *p*-value was less than or equal to 0.05. The path coefficients aligned with theoretical expectations.

Mediation effects were tested using the bootstrapping method proposed by Preacher and Hayes (2004). This analysis was crucial for understanding the indirect relationships among constructs. The structural model's adherence to quality standards was verified before mediation analysis, ensuring robust conclusions regarding causal relationships. Furthermore, moderation effects were evaluated by integrating a moderator variable into the path

TABLE 1: Results of the measurement model.

Construct	Cronbach's alpha	Cronbach's alpha based on standardised items	CR	AVE	Discriminant validity (HTMT < 0.85)
Entrepreneurial orientation	0.710	0.728	0.815	0.524	YES
Human capital	0.726	0.714	0.791	0.628	YES
Innovation	0.755	0.814	0.852	0.588	YES
Motivation	0.904	0.876	0.796	0.725	YES
Firm growth	0.788	0.775	0.782	0.691	YES
Firm age	0.894	0.895	0.779	0.864	YES
Industrial sector	0.797	0.766	0.724	0.626	YES

CR, composite reliability; AVE, average variance extracted; HTMT, heterotrait-monotrait ratio.

model, represented as an interaction term. The equation for this relationship illustrated how the effect of the independent variable varied with changes in the moderator. Statistically significant interaction terms indicated that the moderator influenced the constructs' relationship.

Ethical consideration

An application for full ethical approval was made to the University of the Witwatersrand Human Research Ethics Committee (non-medical), and ethics consent was received on 15 November 2021. The ethics protocol number is H21/10/20. The researchers adhered to strict research ethics by asking respondents to participate voluntarily in the survey. They were apprised in clear terms of the purpose of the study and their right to withdraw from participating at any stage of the research process without any sanctions. Respondents were also assured of the privacy and confidentiality of any information supplied during the study.

Results

Descriptive statistics

The study presents a comprehensive demographic overview of the respondents. Regarding gender distribution, 52% of owner-managers were male, while 46% were female, with a small proportion (2%) choosing not to disclose their gender. The mean gender score is 1.50 (standard deviation [SD] = 0.54). The respondents' ages ranged from 20 to over 71, with an average age of 44 (SD = 11.08), predominantly falling within the 41–45 years age bracket (17.9%). Ethnically, 32.6% identified as black African, 26.6% white, 21.5% mixed race and 19.3% Indian or Asian, resulting in a mean ethnicity score of 2.40 (SD = 1.19). Regarding educational qualifications, 25.8% held Master's degrees, with a varied distribution across educational levels (mean score: 4.67, SD = 1.55). In marital status, 55% of respondents were married, 35% were single and 10% did not disclose their status. Geographically, Gauteng had the highest representation at 23%, indicating a diverse provincial distribution (mean location score: 4.63, SD = 2.40). The data also highlight a peak in business establishment in 2015, with 45 new firms, while the Construction industry accounted for 13.3% of respondents. Lastly, 61.4% of firms operated as private companies (Pty) Ltd, reflecting a range of legal statuses within the surveyed population. This demographic diversity enriches the study's insights into the operational landscape of SMEs.

Measurement model

Assessment of the measurement model (outer model)

The reflective measurement model seeks to validate the reliability and validity of construct measures, thus affirming their suitability for incorporation into the path model (Hair et al. 2021). Evaluating the reflective measurement model entails assessing discriminant validity, indicator reliability, convergent validity and internal consistency reliability (including measures such as Cronbach's alpha, reliability coefficient rhoA and CR) (Hair et al. 2019). The measurement model was assessed using the Partial Least Squares Structural Equation Modelling technique, which allowed for a thorough evaluation of construct reliability and validity. Table 1 provides a comprehensive assessment of Cronbach's alpha, CR, AVE and discriminant validity, which are pivotal in evaluating the robustness of the measurement model in this study. The following steps were undertaken:

Step 1: Indicator Reliability

Indicator reliability was assessed by examining loading values, with acceptable loadings set at a threshold of 0.708 (Hair et al. 2012). All items within the constructs met this criterion, affirming their reliability.

Step 2: Internal Consistency Reliability

Internal consistency reliability was assessed using Cronbach's alpha and CR. The findings revealed that all constructs surpassed the minimum threshold of 0.70, indicating satisfactory reliability across the measurement items. The results demonstrate high internal consistency among the measurement items (Nunnaly 1978).

Step 3: Convergent Validity

Convergent validity was evaluated by examining the AVE for each construct, with the criterion set at a minimum of 0.50. The results indicated that all constructs met this requirement, confirming their ability to explain at least 50% of the variance in their respective items. The findings reinforce the robustness of the measurement model, highlighting the constructs' capacity to accurately capture their intended theoretical dimensions (Chin 1998; Hair et al. 2017).

Step 4: Discriminant Validity

Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT), with values below 0.85 indicating adequate discriminant validity between the constructs (Henseler, Ringle & Sarstedt 2015). The analysis confirmed that all constructs adhered to this criterion, signifying that each construct is sufficiently distinct. The HTMT results indicated clear differentiation among constructs, further strengthening the validity of the measurement model. The results are depicted in Table 2. It can be observed that the HTMT ratios for most of the correlations are below the recommended threshold, suggesting satisfactory discriminant validity.

Hypothesis testing

Structural model (inner model)

After confirming satisfactory construct validity by assessing the outer model, the study uses PLS-SEM (variance-based SEM) to test hypotheses and evaluate the inner model. Testing the inner model allows for proposed hypotheses to be accepted or rejected. Evaluation indicators encompass the significance of path coefficients, the coefficient of determination (R^2), effect sizes (f^2) and predictive relevance (Henseler et al. 2009). The structural model analysis aimed to explore the intricate relationships among the independent variables – EO and human capital – mediating variables (innovation and motivation) and the dependent variable (firm growth). This assessment included mediation and moderation effects, enhancing the understanding of the dynamics at play in the context of firm performance.

Mediation relationships

To examine the effects of mediation, the study followed the four-step procedure proposed by Baron and Kenny (1986) and further refined by Preacher and Hayes (2004) through bootstrapping methods suitable for PLS-SEM. The first step involved evaluating the relationship between the independent and dependent variables without considering the mediators. In the second step, the analysis focused on the connections between the independent and mediating variables. The third step examined whether the mediators significantly impacted firm growth. The final step involved assessing the entire model to determine whether the previously significant relationships between the independent and dependent variables diminished or became non-significant with the inclusion of the mediators.

Moderation relationships

The moderation analysis in this study focused on evaluating how certain variables influence the relationships between EO, human capital and small firm growth. In this context, the coefficients associated with interaction terms were scrutinised for their significance, as these coefficients indicate whether moderation effects exist. Specifically, the *p*-values related to the independent variables, moderator variables and their interaction terms are critical for understanding the dynamics of these relationships (Henseler et al. 2009).

Reconceptualised model

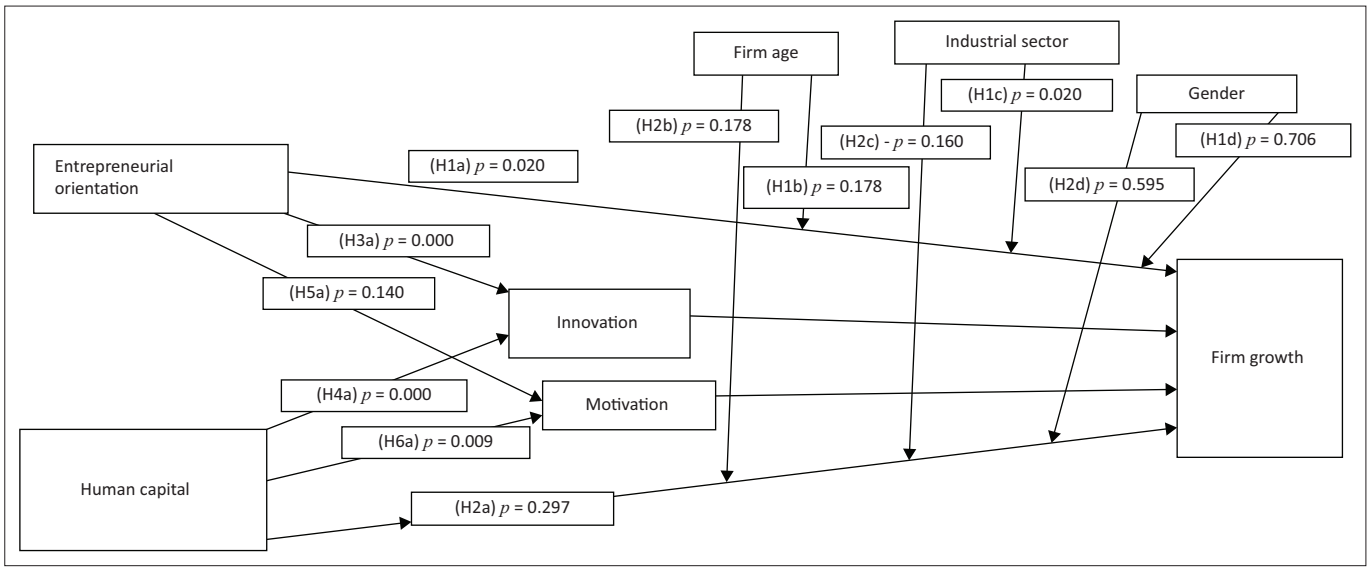
Figure 2 illustrates the reconceptualisation model of the study revealing the strength of each of the relationships.

Discussion

This study investigates the relationship between EO and small firm growth, supporting the hypothesis that EO positively influences growth. The findings align with established theoretical frameworks, particularly those of Covin and Slevin (1989), who emphasised proactive, risk-taking and innovative behaviours as key drivers of competitive advantage. In addition, the results support the work of Lumpkin and Dess (1996), who highlighted the importance of distinct EO dimensions in shaping a firm's trajectory. Specifically, this study underscores that the dimensions of EO – such as innovation, proactivity and risk-taking – collectively contribute to firm growth, confirming previous empirical findings (Karimi et al. 2021; Rauch et al. 2009). While the positive relationship between EO and growth is consistent with prior research the study also reveals the complexity in this relationship (see Table 3). The variance explained by EO (10.4%) is modest, suggesting that other factors may contribute to firm growth, which warrants further examination. This aligns with Irawan et al. (2023), who found that the impacts of different EO dimensions can vary across industries and firm types. For instance, smaller firms might experience more pronounced benefits from innovativeness, whereas larger firms may gain more from risk-taking behaviours. These insights suggest that EO's role in growth is contingent upon the firm's size, industry and strategic context, providing a nuanced understanding that contrasts with the more straightforward, linear models proposed in some earlier studies.

TABLE 2: Heterotrait-monotrait ratios of correlations for the measurement model.

Variables	Entrepreneurial orientation	Human capital	Innovation	Motivation	Firm growth	Firm age	Industrial sector
Entrepreneurial orientation	-	-	-	-	-	-	-
Human capital	0.584	-	-	-	-	-	-
Innovation	0.368	0.317	-	-	-	-	-
Motivation	0.197	0.129	0.498	-	-	-	-
Firm growth	0.391	0.269	0.728	0.085	-	-	-
Firm age	0.346	0.435	0.300	0.324	0.320	-	-
Industrial sector	0.268	0.010	0.261	0.435	0.586	0.349	-



H, hypothesis.

FIGURE 2: Reconceptualised model.

TABLE 3: Results of the assessment of the direct relationships of the inner model.

Constructs and hypothesis	*p* (one-tailed)	Acception or rejection of null hypothesis	R^2 measures
H1a	0.020	Rejected	0.104
H2a	0.297	Accepted	0.047
H3a	0.000	Rejected	0.107
H4a	0.000	Rejected	0.096
H5a	0.140	Accepted	0.532
H6a	0.009	Rejected	0.112

H, hypothesis.

While human capital may play a role, other factors likely contribute more significantly to variations in firm performance. The results of this study suggest no significant association between human capital and small firm growth (Hypothesis 2a), indicating that human capital does not directly influence small firm growth in this context. This finding aligns with Mustafa and Stella's (2023) study, which also found that human capital efficiency did not guarantee firm growth in Nigerian non-financial firms, suggesting that the role of human capital is more nuanced. Despite these findings, existing literature generally supports a positive relationship between human capital and firm growth. Unger et al. (2011) found that general and specific human capital positively correlates with firm success. Becker's (1964) seminal work suggests that investments in education and work experience enhance productivity, thus driving growth. Similarly, Marvel et al. (2016) emphasise the importance of education and work experience in facilitating firm success. However, this study highlights the fact that the impact of human capital may depend on other factors, particularly within the South African context. Researchers such as Marconatto et al. (2021) and Gürbüz and Akyol (2020) stress the importance of firm size, funding, training and networking, suggesting that human capital's effect on firm growth is contingent on a combination of internal capabilities and external conditions.

The relationship between EO and firm growth has been characterised by mixed outcomes in existing literature (Shan, Song & Ju 2016), suggesting further exploration. This study aimed to address this gap by investigating the mediating role of innovation in the EO–firm growth relationship. The findings reveal a strong positive relationship between EO, innovation and firm growth, supporting Hypothesis 3a. Entrepreneurial orientation positively influences innovation, which in turn drives small firm growth. However, the complexity of this relationship suggests that while EO can foster innovation, the interaction between these variables may involve additional underlying factors that warrant further investigation. This result aligns with previous studies (Ince, Imamoglu & Karakose 2023; Karimi et al. 2021; Kraus et al. 2023; Reyes-Gómez et al. 2024; Wach, Maciejewski & Głodowska 2022), reinforcing the critical role innovation plays as a mediator in the EO–growth relationship.

Similarly, the findings supported Hypothesis 4a, which posits that innovation mediates the relationship between human capital and small firm growth. The study underscores the essential role of human capital in driving innovation within small firms, with innovation acting as a key mechanism for translating human capital into firm growth. This study's results contribute to the existing body of knowledge by emphasising the complexity of the human capital-innovation-growth nexus. The findings align with the work of McGuirk and Jordan (2012), McGuirk, Lenihan and Hart (2015), Lenihan et al. (2019) and Eriksson, Lindén and Papahristodoulou (2023), further validating the significant role human capital plays in fostering innovation as a driver of firm growth. However, the intricate nature of this relationship suggests that other factors, such as firm-specific resources or market conditions, may influence the extent to which human capital can foster innovation and growth.

Hypothesis 5a, which proposed that motivation mediates the relationship between EO and small firm growth, yielded no

statistically significant mediation effect. This finding diverges from much of the existing literature, which has emphasised motivation's pivotal role in entrepreneurial success. Studies by Alqahtani, Uslay and Yeniyurt (2024), Huang et al. (2024) and Moko et al. (2024) have highlighted the significant influence of motivation on EO and firm growth. Yet, this study suggests that motivation does not significantly mediate the EO growth relationship. This discrepancy may be attributed to contextual factors or other unmeasured variables that could moderate the influence of motivation. While the results show no direct mediation effect, it is important to recognise that motivation remains a key driver of entrepreneurial activity and firm performance. The findings suggest that the impact of motivation on growth might vary across different contexts, indicating the need for further exploration into how motivational factors interact with EO in diverse environments.

In contrast, Hypothesis 6a, which proposed that motivation mediates the relationship between human capital and small firm growth, revealed a statistically significant positive mediation effect. This suggests that human capital influences motivation, positively affecting firm growth. These findings underscore the importance of both human capital and motivation as complementary drivers of small firm growth. They highlight that investments in human capital directly contribute to firm growth and foster motivation, which propels growth. The results suggest that fostering a motivational environment within firms and the development of human capital is essential for enhancing firm performance and growth. This study reinforces the idea that human capital development and motivation are interdependent factors that drive entrepreneurial success, aligning with prior research that emphasises the combined importance of these elements in fostering firm growth (Lenihan et al. 2019; McGuirk & Jordan 2012; McGuirk et al. 2015).

The analysis of Hypothesis 1b explored whether firm age moderates the relationship between EO and small firm growth. The results indicated that while firm age has a statistically significant main effect on firm growth ($p = 0.32$), the interaction between EO and firm age was not statistically significant ($p = 0.178$). This suggests that firm age does not significantly influence how EO affects firm growth. This outcome both supports and challenges existing literature. On the one hand, it corroborates the notion that firm age is a significant factor influencing growth (Rauch et al. 2009). On the other hand, the lack of moderation suggests a divergence from some studies that imply a more complex interaction between firm age and EO (Neneh & Van Zyl 2017). This contrast emphasises the possibility that while firm age is important, the influence of EO may be robust across different age categories of firms.

The analysis of Hypothesis 2b, which examined whether firm age moderates the relationship between human capital and small firm growth, revealed that firm age does not significantly alter this relationship. While firm age primarily affected growth, the interaction between human capital and firm age was not statistically significant. These findings challenge the existing literature, which suggests that older firms may leverage human capital differently. However, this study indicates that human capital consistently contributes to growth, regardless of firm age, suggesting that its value remains important across all stages of firm development. While firm age and human capital are crucial for growth, their interaction appears less influential than previously thought. This provides a more nuanced understanding of how human capital influences small firm growth, irrespective of age.

The analysis of Hypothesis 1c examined whether the industrial sector moderates the relationship between EO and small firm growth. The results indicate that the industrial sector plays a significant moderating role, with the effectiveness of EO varying across sectors, particularly in manufacturing. This finding underscores the importance of considering industry context when studying the relationship between EO and firm growth. It aligns with past research, such as studies by Rigtering et al. (2014) and Mosonik, Maru and Komen (2024), highlighting a strong positive link between EO and growth in the manufacturing sector. This suggests that EO's impact is not universal, and sectoral differences should be accounted for in future research to understand its effects better.

The analysis of Hypothesis 2c explored whether the industrial sector moderates the relationship between human capital and small firm growth. While industry-specific factors were found to impact growth significantly, the results indicate that the industrial sector does not significantly alter the effect of human capital on growth. This finding suggests that while the industry shapes overall growth, it does not mediate the relationship between human capital and development. This distinction adds nuance to previous research that emphasises the importance of the industrial sector in entrepreneurial success (Choi & Williams 2016; Cowling et al. 2018; Gupta et al. 2013; Segantini 2024).

The analysis of Hypothesis 1d explored whether gender moderates the relationship between EO and small firm growth. The results suggest that gender does not significantly alter the positive relationship between EO and growth. This finding indicates that the impact of EO on firm growth is consistent, regardless of whether the firm is male-led or female-led. This is notable, given the ongoing discourse on gender in entrepreneurship (Bournakis & Mei 2023; Brixiová, Kangoye & Said 2020; Honyenuga 2019; Octaviyani & Endang 2024; Trinh et al. 2023; Živković et al. 2024), which often highlights gender-based disparities. The findings suggest that while gender plays a role in entrepreneurial contexts, it does not moderate the effect of EO on firm growth, indicating that EO can drive growth across genders equally.

The analysis of Hypothesis 2d aimed to assess whether gender moderates the relationship between human capital and small firm growth. The results show that while gender significantly influences small firm growth, it does not significantly moderate the impact of human capital on growth. This suggests that the effect of human capital on firm growth is similar for both male-

and female-led firms. This finding contrasts with studies by Nyakudya et al. (2024) and Pereira and Manzo (2024), which suggest that gender can shape the relationship between human capital and growth. These results highlight the complexity of the gender-growth dynamic, suggesting that other factors, such as industry or firm age, may play a more substantial role in mediating this relationship.

Implications

This study advances the understanding of the factors that drive small firm growth, particularly within South Africa's post-COVID-19 SME landscape. Developing a model that integrates human capital, EO, innovation and motivation provides valuable insights into the key determinants of growth in a challenging economic environment. The findings emphasise enhancing internal resources, particularly human capital and managerial decision-making, to foster growth. This aligns with Penrose's (1959) theory that internal resources are critical for firm growth, especially for SMEs facing the challenges of the post-pandemic economy. The study suggests South African SMEs should develop their human capital through training, upskilling and effective managerial strategies to ensure sustainable growth. The results highlight the value of unique resources, such as human capital and innovation, in creating a competitive advantage. This underscores the need for SMEs to invest in these resources to differentiate themselves in a competitive marketplace. The study supports the RBV by showing that firms that effectively leverage internal resources are better positioned to achieve long-term success.

The study's findings demonstrate that EO, particularly its proactive, innovative and risk-taking dimensions, is a critical driver of firm growth. Small and medium-sized enterprises should foster a culture of entrepreneurship by promoting these traits among their leadership teams and encouraging entrepreneurial behaviour that can lead to competitive advantage. This is consistent with the broader EO literature and suggests that an integrated approach to EO can yield tangible benefits for small businesses. Consistent with Human Capital Theory (Becker 1964), the research highlights the fact that human capital plays a central role in driving firm growth. The intrinsic motivation of entrepreneurs is crucial for navigating post-pandemic challenges. Small and medium-sized enterprises should, therefore, focus on developing and nurturing their workforce's skills, particularly in leadership and innovation, to enhance overall firm performance. Innovation remains central to driving growth, with non-R&D innovation proving especially valuable during economic uncertainty. Firms are encouraged to diversify their innovation efforts beyond traditional R&D to include business model innovations, market expansions and digital transformation strategies. This approach aligns with Audretsch et al. (2014) and Coad et al. (2016) and offers SMEs practical avenues to foster growth, even in challenging economic climates such as the COVID-19 pandemic.

Limitations and future research directions

This study presents several limitations that simultaneously open up opportunities for future research. This study has several limitations that highlight opportunities for future research. Firstly, while we examined the collective impact of human capital, EO, innovation and motivation on firm growth, these constructs are inherently multifaceted. Future research could explore the nuanced impact of each EO dimension (e.g. risk-taking, proactiveness) on small firm growth across different sectors, particularly in post-pandemic contexts. A comparative study could examine whether specific EO dimensions are more effective in certain industries, such as manufacturing versus services. Furthermore, while this study emphasised human capital, future research should distinguish between general versus specific human capital and its sectoral impacts. Investigating whether specific expertise (e.g. managerial vs. technical skills) drives growth in particular sectors could offer more profound insights. Another avenue for research involves managerial decision-making frameworks, especially during uncertainty. Exploring how cognitive biases (e.g. optimism, risk aversion) affect EO implementation would help understand how managers navigate volatile environments like COVID-19. Longitudinal studies are needed to assess how the relationships between EO, human capital, and innovation evolve, particularly in response to external shocks. These studies could reveal long-term growth patterns and the sustainability of EO's effects. Finally, qualitative research, such as case studies, could explore how SMEs operationalise EO, human capital and innovation in practice, focusing on non-technological and resource-limited contexts.

Conclusion

This study examines the factors influencing the growth of small firms within South African SMEs post-COVID-19, focusing on EO, human capital, innovation and motivation. The research highlights the significant role of EO in driving growth, with innovation serving as a crucial mediator. While human capital has a less direct impact on growth, it remains essential for fostering innovation and motivation, which ultimately drive firm success. The findings align with Penrose's Theory of Growth and the RBV, emphasising that a firm's growth depends on its unique resources, particularly human capital and innovation. The study also reveals that the impact of EO and human capital on growth varies across industries, suggesting the importance of industry context in understanding these relationships. While the study offers valuable theoretical and practical insights, it also points to areas for future research, such as exploring the specific dimensions of EO, types of human capital and the influence of managerial styles. Longitudinal and qualitative studies could further clarify these dynamics. This research contributes to entrepreneurship theory and practice, offering insights for SMEs, policymakers and researchers. It underscores the need for strategic investments in human capital, innovation and managerial capabilities to support sustainable firm growth in a post-pandemic context economy.

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Author's contribution

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Data availability

The study's findings and related figures and tables are presented in the published article. However, because of privacy and confidentiality concerns, the raw data of the questionnaires cannot be shared. Any additional data requests can be directed to the corresponding author, F.N.M., for consideration.

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