

Dinku, Ashenafi Eneyew; Singh, Manjit; Singh, Sandeep

Article

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Effect of human capital on the performance of small and medium enterprises: a mediating role of innovation practice in Ethiopia

Ashenafi Eneyew Dinku, Manjit Singh and Sandeep Singh

School of Applied Management, Punjabi University, Patiala, India

ABSTRACT

In this knowledge economy era, people-dependent intangible organizational resources, such as human capital, drive SMEs' innovation and performance globally. However, scant literature examines the nexus between human capital, innovation, and SMEs' performance. Hence, the study aimed to examine the mediating role of innovation practice in the nexus between human capital dimensions (formal education and managerial skill) and the performance of SMEs. A proportionate stratified with a simple random sampling technique was used to take 425 representative owner-managers of SMEs in Ethiopia. CB-SEM was used for data analysis. Findings reveal that owner's managerial skills and formal education significantly and positively influence SME performance and innovation practice. However, innovation practice partially mediates the nexus between formal education, managerial skills, and SME performance. Hence, the study suggests for policymakers and stakeholders to play a critical role in aligning the formal education system and managerial skill development to stimulate innovation and improve SMEs' performance. The study also suggests for SMEs to leverage their owners' human capital for innovation-driven performance. Furthermore, this study contributes novel insights that add to the body of knowledge in the extant entrepreneurship field.

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Entrepreneurship and Small Business Management; Management of Technology & Innovation; Human Resource Management

1. Introduction

In this dynamic and competitive business environment, intangible resources, such as human capital, would make a difference in advancing a competitive advantage, fostering innovation, and value creation to bolster the performance of SMEs (Kasumawijaya & Astuti, 2023; Astuti et al., 2021; Dogbe et al., 2021). As the economic paradigm has shifted from an industrial revolution framework to a knowledge-based economy since the 20th century, organizations demand adequate human capital to support their performance (Khan & Quaddus, 2018). Also, the notion of large-scale firms that took advantage of economies of scale as the only driving force of growth and development until the 1960s has shifted to a more vital role for SMEs in the national economy worldwide (Wedeslassie et al., 2019). As a result, properly synchronizing human capital, innovation, and SME performance emerges as a potent mechanism for fostering national economic growth and the prosperity of individual organizations and business owners.

However, the contribution of human capital and innovation to the performance of small and medium enterprises (SMEs) and the national economy is often perceived as low in developing countries (Ussif & Salifu, 2020). For instance, Ussif and Salifu (2020) identified that low levels of education and improper record-keeping hinder the performance of 200 SME operators in Ghana, Nigeria, and Togo. Ahmad and Ahmad (2021) found that more than 80% of SMEs failed within three years of operation due to mismanagement, a lack of innovation, and a lack of strategic planning implementation in Pakistan. Also, in data collected from 2009 to 2018 in Ethiopia on the determining factors for the sustainability of SMEs, 320 or 49.23% of SMEs were found to be terminated or failed enterprises (Ayele & Derseh, 2024). Wedeslassie

CONTACT Ashenafi Eneyew Dinku  ashenefenyew@gmail.com  Punjabi University, NH 64, Urban State Phase II, Patiala, Punjab 147002, India

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et al. (2019) also identified that a lack of human capital, innovation, product and market development, government and public policy coordination failure, and financing sources are the critical challenges of SMEs' performance in Ethiopia. Similarly, poor management and a weak market chain caused 213, or 62.1% of sample micro and small-scale manufacturing enterprises, to fail in Ethiopia (Abera et al., 2019). The above evidence revealed that low levels of human capital and innovation cause poor performance of SMEs in developing countries, including Ethiopia. Hence, it calls for the attention of SME owners, policymakers, researchers, and stakeholders to alleviate the problem, particularly in a developing country context.

Moreover, it is conceptualized that the performance of SMEs is significantly enhanced by the interplay influence between SMEs' innovation practices and human capital. Innovation practices enhance the company's offerings, procedures, marketing strategies, and overall efficiency and help develop superior products to those of competitors (Dogbe et al., 2021). However, innovation practices in SMEs are emerging in developing countries and have been developed by big companies for profit in developed countries (Pachouti & Sharma, 2016). Also, studies on the nexus between innovation and the performance of SMEs are concentrated in the Western, Middle, and Far East and minimal in Africa (Ndesaulwa & Kikula, 2016). Hence, this study fills the research gap from the perspective of a developing country, Ethiopia.

In this study, human capital is measured by formal education (FE) and managerial skill (MS), which are the basics of human capital and are important for the competitiveness and performance of SMEs (Schultz, 1961). While previous studies examined the relationship between FE and MS with the performance of SMEs in isolation, these studies did not consider FE and MS from the perspective of measuring human capital (Appiah et al., 2023; Deng & Wang, 2023; Ahmad & Ahmad, 2021; Asah et al., 2015). Additionally, previous studies focused on the training, educational level, and experience dimensions of HC and have overlooked much of the FE and MS dimensions of HC (Dar & Mishra, 2019; Mubarik et al., 2020; Samagaio & Rodrigues, 2016).

Moreover, there is a lack of study on the mediating role of innovation practice (IP) in the nexus between HC and the performance of SMEs in the extant literature, except for a few related studies that have explored the mediating role of innovation on the nexus between HC dimensions (training, experience, and knowledge) and the performance of SMEs (Timothy, 2022; Aliyu et al., 2019; Prange & Pinho, 2017; Byukusenge & Munene, 2017). Hence, studying FE and MS as a measure of HC on the mediating role of innovation practice in the nexus between human capital and the performance of SMEs is a new approach that fills the research gap and advances the knowledge base of the entrepreneurship literature.

This study uses human capital theory (HCT) and resource-based view (RBV) as a theoretical foundation to examine the mediating role of IP in the nexus between human capital and the performance of SMEs. RBV posits that a firm's competitive advantage stems from its unique resources and capabilities, including human capital (Gerhart & Feng, 2021; Kraaijenbrink, 2011). Hence, people-dependent intangible organizational resources such as HC create competitiveness and sustainability advantages over tangible organizational resources such as physical assets and financial capital (Hall, 1993). Recently, the RBV has emphasized the need for increased attention to HC since HC is crucial not only to individual-level outcomes such as job performance and employee development but also for firm-level outcomes such as competitive advantage and capability development. Because of this, HC becomes a strategic issue for management (CIPD Technical Report, 2017). As a result, it implies that HCT advances from the RBV.

Similarly, HCT states that employees, managers and owners with a higher quality HC enriched with education and skills contribute significantly to the performance of SMEs (Wernerfelt, 1984). Education is of profound importance in improving the owner-managers efficiency and productivity through the inculcation of knowledge and abilities that are utilized in the operation of the business, thereby boosting the performance of the enterprises (Musavi & Maingi, 2018). Appiah and associates found that formal fashion education has a significant positive effect on the business performance of Ghanaian small-scale fashion designers (Appiah et al., 2023). However, studies underscored that the relationship between formal education and the performance of SMEs needs immense attention to critically implementing educational interventions through well-articulated entrepreneurship education in formal educational institutions to enrich students with adequate human capital in terms of knowledge, skills, and attitudes, which is an asset for their future business endeavors (Appiah et al., 2023). In this regard, Asghar et al. (2023) recommended that educators enable graduates/students to adopt the technology and generate new ideas in

various innovations to enhance business activities in a country. As a result, it calls for policy interventions to amend the educational programs of formal educational institutions to advance trainees'/business owners' human capital in various realms of knowledge, including entrepreneurial mindset, that enable them to start and run their future business endeavors.

This study contributes significantly to advancing existing knowledge in the entrepreneurship literature. It broadens the scope of the literature by examining the mediating role of IP in the nexus between FE and MS and the performance of SMEs, particularly from a developing country, Ethiopia, where there has been scant empirically tested prior research. It is also essential to create room for the regional SME offices, policymakers, and government to design appropriate policies, goals, and strategies to enhance the SME owners' human capital and the performance of SMEs. Moreover, the study provides lessons to promote entrepreneurship or technical education in formal educational institutions so that potential future owners of SMEs can acquire the necessary skills and knowledge or human capital to start their businesses and reach success. Furthermore, this study insists that business owners of SMEs continuously update themselves by taking timely and needed training to fill knowledge and skills gaps.

SMEs are the backbone of the Ethiopian economy next to agriculture and a source of employment for many young citizens, particularly in the private sector (Weldeslassie et al., 2019). Hence, Ethiopia has given considerable attention to fostering the performance and contribution of SMEs to gross domestic product, employment, and income generation through developing supportive policies and strategies. However, they are still challenged by a lack of access to capital financing, low innovation and human capital capabilities, and a lack of market linkages for their products (Ayele & Derseh, 2024).

Due to the above research gaps, this study examined the effect of owners' HC on the performance of SMEs and the mediating role of IP in the nexus between owners' HC and the performance of SMEs engaged in construction, manufacturing, urban agriculture, and service sectors in Dessie, Kombolcha, Kemisse, and Woldia cities of the Amhara regional states of Ethiopia.

The rest of this study is organized as follows. The literature review presents the theoretical and hypothesis section. Next is the materials and methods section, followed by the data analysis and results section. Discussions, conclusions, limitations and implications are discussed in that order.

2. Literature review

2.1. Theories underlying the study

2.1.1. Resource based view (RBV)

The RBV states that businesses can typically build a long-term competitive advantage when a firm can gain a competitive edge in its industry by having resources with unique attributes like rare, inimitable, valuable, and non-substitutable. It, in turn, leads to a sustained performance that significantly aids in the expansion and development of the business as a whole (Barney, 1991). Hence, when SMEs are supported by unique resources, such as human capital developed as a result of formal education and managerial skill development, they will have more innovative capabilities than others who do not apply such unique resources in their endeavors, consequently improving their performance.

From the RBV perspective, Wernerfelt (1984) considers managerial skills to be the foundation of a firm's superior performance and competitive advantage. SMEs with better expertise can identify market changes faster and recognize lucrative prospects before their rivals do (Pitelis, 2009). The human capital of the owners, which can be expressed in terms of managers and other employees' relationships, training, experience, and ideas are necessary for enhancing innovation and performance of SMEs (Dogbe et al., 2021).

2.1.2. Human capital theory (HCT)

The human capital theory states that the human accumulated knowledge acquired via formal education, training, and work-related experiences has leveraged the performance of SMEs (Gimeno et al., 1997). Bruderl and colleagues were the first scholars to apply human capital theory to the entrepreneurial setting (Bruderl et al., 1992), emphasizing that HC is a decisive factor in enhancing the capabilities of business owners. Before Bruderl and associates used the human capital theory in the entrepreneurial setting,

HC was perceived to enhance employees' capabilities in an organization's human resource management setting (Schultz, 1961). Hence, the investments made to improve the knowledge and skills of owner-managers will bring multi-fold returns to the SMEs' performance (Gyasi et al., 2020).

2.2. Human capital and the performance of SMEs

Human capital (HC) refers to the collection of economically productive human capabilities, including knowledge, health, skills, and other desirable attributes that contribute to successful endeavors acquired through general education and specialized skills. Skills are a subset of human capital tailored to specific tasks, jobs, or enterprises obtained through specialized education or training (African Development Report, 2011).

According to Somko et al. (2023), a comprehensive strategy involving education, healthcare, institutionalization, and investments in knowledge and skills is necessary for human resource development. Education and professional training are one approach to improving knowledge and skills and, consequently, human capital (Abdullayev, 2023). Health care also has a crucial role in extending life expectancy, decreasing illness and mortality rates, and fostering human capital advancement (Somko et al., 2023). Human resources development in businesses is also significantly influenced by professional development, innovation, and investments in human resources (Zhuravlev et al., 2018).

Multiple studies have underscored the pivotal role of human resources in MSMEs. The competence, leadership abilities, expertise, and knowledge of human resources have been shown to impact the performance of MSMEs significantly (Musthafa et al., 2024). Their influence on innovation and performance makes human resources a critical factor in the success of MSMEs (Hamsani et al., 2022). A study by Chika and Chike (2021) on 270 MSMEs' employees in Anambra further supports this, demonstrating that developing human capital through employee training can enhance MSMEs performance.

He and Estébanez (2023) conducted research on a sample of 846 Chinese SMEs from various industries. Their investigation revealed that human capital, particularly through highly skilled staff, significantly enhances the performance of SMEs. Similarly, Abdullayev (2023) noted that a manager's cognitive competence has a substantial influence on organizational performance. This underscores the crucial role of human capital in fostering economic development in the face of intense global competition (He & Estébanez, 2023).

Musthafa et al. (2024) conducted a literature review to investigate the characteristics of human capital that influence the performance of MSMEs. The HC dimensions revealed in the study, such as education and training, employee motivation and engagement, skills and competencies, employee health and well-being, innovation and creativity, communication and cooperation, digital skills, and entrepreneurship, were found to significantly impact MSME performance.

Furthermore, effective managerial skills are critical for the growth and success of MSMEs (Ng'ora et al., 2022). Financial management, marketing, human relations, and entrepreneurial skills are critical for effective business operations (Macedo et al., 2020). However, many MSME owners and managers lack these skills, particularly in financial management, marketing, and entrepreneurial abilities (Nambira & Namene, 2020).

2.3. Human capital dimensions

As HC is a complicated, multidimensional phenomenon with many intangible dimensions, it is challenging to measure precisely by one variable, a collection of items, or their combined sum (Khan & Quaddus, 2018). As a result of these intangible attributes of HC, a common measurement model has yet to be developed in the literature so far to measure owners' HC in SMEs. Hence, scholars in the field have used different measurements for HC. For instance, Mubarik et al. (2020) have used experience, skills, education, abilities, and training as core dimensions of human capital for SMEs. Also, Dar and Mishra (2019) have developed knowledge, experience, education, and skills as a human capital measurement scale for SMEs. Moreover, Samagaio and Rodrigues (2016) considered education, experience, professional proficiency, proactivity, and personality as human capital attributes.

Empirical studies on the nexus between HC and the performance of SMEs showed that formal education and managerial skills as the components of human capital have yet to be studied well by previous researchers in SMEs in the entrepreneurship field (Hani, 2021; Beltramo et al., 2020; Popescu et al., 2020).

2.4. Hypothesis development

2.4.1. Formal education and the performance of SMEs

Formal education is a structured system that imparts knowledge to the learners in educational institutions, either in person or through e-learning platforms. Learning or education leads to acquiring knowledge, considered a strategic asset that makes a difference in SMEs' performance and competitive advantage by fostering innovation, adaptation to market changes, and resilience in the face of challenges (Tian et al., 2021). In connection, Park and Choi found that formal and informal learning positively influences South Korean SME performance (Park & Choi, 2016). Also, Deng and Wang (2023) asserted that formal education is a determining factor for students to make successful entrepreneurial decisions in the global innovation and emerging technology market. Moreover, adequate human capital education and training contribute to SMEs' high performance (Saah, 2022).

Moreover, the learning system that leans toward uplifting the performance of SMEs needs to be put in place depending on the knowledge gap of the owner-managers in the given context because well-educated and skilled owner-managers can give SMEs a competitive advantage in today's knowledge-driven economy (Debarliev et al., 2022). Also, understanding the effect of formal education on SMEs' performance can aid policymakers in formulating education and entrepreneurship policies, enabling tailored training and programs for employees and owners (Pham et al., 2023). Furthermore, the relationship between FE and the performance of SMEs needs to be studied well in the field. Hence, based on the preceding discussions, the study posits the hypothesis that;

Hypothesis 1: Formal education has a positive significant effect on the performance of SMEs

2.4.2. Managerial skill and the performance of SMEs

Managerial skills are the organizational resources necessary to address impending challenges, direct the firm's operations through the development of organizational planning, and deal with impending challenges (Asghar et al., 2023). Managerial skills help to make informed decisions, which contributes to effective management in today's competitive business landscape, giving SMEs a competitive advantage and significantly contributing to SMEs' performance (Sawaeen & Ali, 2020). In connection to this, the study done by Ahmad and Ahmad revealed that managerial skills significantly and positively affect the performance of SMEs in Punjab, Pakistan (Ahmad & Ahmad, 2021). Also, managerial skills, as measured by effective financial management, good interpersonal skills, tenant monitoring skills, good marketing skills, technologically versatile skills, problem-solving skills, and network capability skills, had a significant positive effect on the performance of small, medium, and large-scale agribusiness incubators in India (Bose et al., 2017).

In a nutshell, examining the nexus between managerial skills and SME performance signifies the importance of leadership, communication, and interpersonal skills in fostering a positive work environment, thereby enhancing the performance of SMEs (Daudu et al., 2015). Furthermore, managerial skills are one of the building blocks of human capital. However, they have yet to be studied well enough to advance human capital in the literature. Hence, based on the preceding discussions, it is proposed that;

Hypothesis 2: Managerial skill has a significant positive relationship with the performance of SMEs

2.4.3. The mediating role of innovation practice

From the theoretical perspectives of RBV and HCT, it is posited that innovation plays a crucial mediating role in the relationship between human capital and the performance of SMEs. According to RBV, unique organizational resources enhance the innovative competitiveness of SMEs, thereby contributing to their

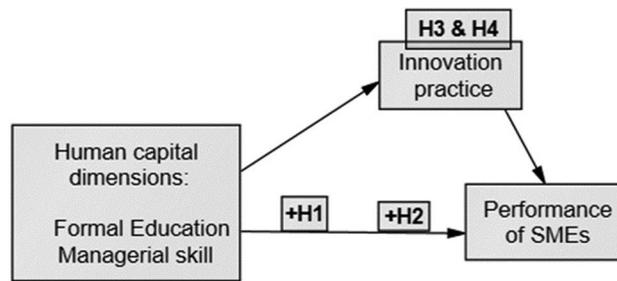


Figure 1. Conceptual research model.

higher performance (Barney, 1991). It is argued that continuous managerial skills development stimulates the generation and adoption of innovations that enhance SME performance (Wernerfelt, 1984). Similarly, HCT argues that educational investments foster the growth of human capital with technical skills and cognitive capabilities, enabling SMEs to more readily adopt and implement innovative practices, thereby enhancing organizational performance (Short, 2019).

Similarly, empirical studies revealed that innovation mediates the relationship between human capital and the performance of SMEs. For instance, marketing innovation partially mediates the relationship between top managers' human capital (managers' educational qualifications and years of experience) and SME productivity (Timothy, 2022). Also, organizational innovation has a complementary partial mediation effect in the nexus between personal drivers and SME international performance (Prange & Pinho, 2017). Similarly, innovation fully mediates the relationship between knowledge management and the performance of SMEs in Rwanda (Byukusenge & Munene, 2017). Aliyu and associates also identified a significant mediating role of innovation in the nexus between training and the performance of women in MSMEs in Nigeria (Aliyu et al., 2019). However, the mediating role of IP in the nexus between FE, MS, and the performance of SMEs is relatively uncharted in the extant entrepreneurship literature. As it contributes to advancing the body of knowledge of the extant entrepreneurship literature and based on the discussions above, the study proposes the following hypothesis:

Hypothesis 3: Innovation practice mediates the positive relationship between formal education and the performance of SMEs

Hypothesis 4: Innovation practice mediates the positive relationship between managerial skill and the performance of SMEs

2.5. Conceptual research model

The conceptual research model is developed based on the theoretical and empirical reviews of the study. Though multifaceted (Baylie & Singh, 2019), this study assesses the performance of SMEs by subjectively evaluating the owner-managers perceptions of their company profitability, market share, sales volume, and personal wealth (Zulkiffli, 2014). Figure 1 shows the conceptual research model that shows the nexus between human capital dimensions, innovation practice, and SMEs' performance.

3. Materials and methods

3.1. Sampling procedure

Ethiopia is one of the developing countries in East Africa, dominated by a young population, and its economy mainly lies in rural agriculture and SMEs. The researcher contacted the Labor and Skills and Industry and Investment Offices of Dessie, Kombolcha, Kemise, and Woldia cities to identify the types and sizes of SMEs in the Amhara region of Ethiopia. As a result, 857 private formal SMEs were identified from the 2022 annual report of these offices in the respective cities.

A two-stage sampling technique was adopted. In the first stage, SMEs were considered as the primary sampling units. A pilot study was conducted on 50 randomly selected SMEs, making the final target population 807 SMEs after excluding 50 pilot SMEs. A total of 425 sample SMEs were included in the study by applying the Daniel Soper sample size determination formula with an anticipated effect size of 0.2, a desired statistical power level of 0.8, and a probability level of 0.05 (Soper, 2023). A proportionate stratified sampling technique was used to take representative SMEs from the strata of enterprises. Moreover, simple random sampling with a lottery method was used to sample SMEs within each enterprise's category. In the second stage, SME owner-managers were considered the secondary sampling units. A total of 425 owner-managers of the already identified 425 SMEs in stage one, one owner-manager from each enterprise, were included as respondents of the study purposively because better information regarding the study's objectives is obtained from them.

Moreover, to address potential response bias in the study, the samples were ensured to be randomized, as they were randomly drawn from the available lists of SMEs in the labor and skill, industry, and investment offices (Malhotra et al., 2017). Moreover, Harman's single factor and common latent factor methods were used to examine the potential response bias of respondents. The results revealed negligible response or common method bias in the study.

3.2. Ethical approval and informed consent

In order to comply with the ethical guidelines of conducting research involving human participants, the present study was approved by the Board of Postgraduate Studies and Research in the Faculty of Business Studies of Punjabi University, India, with a reference number of 265/Research. Moreover, written informed consent was obtained, and the ethical guidelines in research involving human participants, including describing the study's pure academic purpose, confidentiality of the participant's responses, and their willingness to participate voluntarily, were informed in the introductory part of the questionnaire. Additionally, the researcher started the data collection process after a formal support letter that clearly describes the purpose of the study from Wollo University, Ethiopia, where the researcher has been working, was submitted to and got full acceptance from the Industry and Investment and Labor and Skill Offices because these offices are responsible for the establishment and follow-up of SMEs.

3.3. Scale development

A structured questionnaire was developed comprising dichotomous, multiple-choice, and Likert scale items. A five-point Likert scale items were developed with strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). This indicates that the items have been developed using a quantitative approach. Five items were developed for the formal education construct. Two items, 'the company's owner-manager has improved his/her knowledge via education in formal educational institution' and 'the company's owner-manager has completed his/her education in formal educational institution', were developed by the researchers. The remaining three items were taken from (Mubarik et al., 2020) with some modifications in sentence wording. Eight managerial skill items were taken from (Asah et al., 2015; Agbim, 2013) with some modifications in sentence wording. Lastly, seven innovation practice and five performance of SMEs items were taken from (Baylie & Singh, 2019). Twenty-five Likert scale items were developed in total.

3.4. Data collection procedure

A questionnaire is the appropriate data-collecting instrument for explanatory research (Saunders et al., 2016). Due to this, a 5-point Likert scale questionnaire was developed. After being developed in English, the questionnaire was translated into Amharic, one of the local languages widely and commonly spoken in the study area, to make every respondent easily understand and respond. The Cronbach's alpha values of the pilot test ranged between 0.718 and 0.816, which is above the threshold value of 0.7 (Hair et al., 2019), indicating that the questionnaire is a reliable instrument to collect data from the respondents of

the study. As a result, a total of four hundred twenty-five questionnaires were distributed to the owner-managers of SMEs with the cooperation of the Industry and Investment and Labor and Skill offices' workers in person during a single period in 2023. Hence, a cross-sectional design was used.

3.5. Method of data analysis

EFA and CFA were carried out to validate the measurement models. Multiple responses, grand mean and standard deviation, and percentages were used for descriptive statistical analysis. Covariance-based structural equation modeling (CB-SEM) was used for hypothesis testing in the structural model. A 5% significance level was used to test the research hypotheses. Hence, the explanatory research design was suitably applied (Saunders et al., 2023). The analysis was supported by IBM SPSS Statistics Version 23 and IBM SPSS AMOS Version 23.

4. Data analysis and results

4.1. Descriptive analysis of respondents' and enterprises' profile

The responses of 403 respondents, which represent a 94.8% response rate, were used for data analysis, which is above normal (Saunders et al., 2023). The majority, 71.7%, of SMEs are owned and managed by males. Hence, it can show a gap for the concerned bodies that ensure equal participation of females with their male counterparts in the country's economic activity. The majority, 80.4% of the respondents, fall between 31 and 50 years old, and 14.6% below 30 years old. This indicates that emphasis has been placed on increasing youths' participation in becoming SME owners. The majority, 43.4% and 31.5%, of SMEs are operated in the manufacturing and service sectors, respectively. Construction and urban agriculture enterprises follow with 12.9% and 12.2%, respectively.

Similarly, 40.2%, 28.8%, 17.9%, and 13.2% of SMEs are located in Dessie, Kombolcha, Woldia and Kemissie cities, respectively. The study revealed that 68.5% of SMEs are small-size enterprises, whereas the remaining 31.5% are medium-sized enterprises. From this, one can infer that the majority of the enterprises are owned by small-size owners, which suggests that supportive efforts should have been extended to small enterprises to grow to medium-sized enterprises by the concerned bodies.

4.2. Measurement model

4.2.1. Exploratory factor analysis (EFA)

The data requirements in terms of missing values, outliers, unengaged responses, and normality were checked in SPSS and MS Excel before taking up further analysis. EFA is essential for self-developed instruments to assess construct validity (Fanny & Alzalit, 2021). While conducting EFA, Kaiser-Meyer-Olkin (KMO) and Bartlett's test of Sphericity, principal component analysis as extraction method, and varimax as rotation method were used. Moreover, item loadings with small coefficients below 0.4 were suppressed. The KMO test assesses data suitability for factor analysis by evaluating sample size adequacy, with values ranging from 0.8 to 1.0, and Bartlett's test of Sphericity shows a suitable correlation among the constructs to run factor analysis (Shrestha, 2021). In this study, the KMO sampling adequacy value of 0.910 and the Bartlett's test of Sphericity significant value of 0.000 indicate that the sample data is adequate for factor analysis.

Items coded as MS4 and MS7 were deleted because their communality loadings are below 0.4, which are considered less expressive of the items. The remaining items with communality loadings above 0.4 are maintained for further analysis. The total variance explained by the top five factors with Eigen values greater than one account for 61.46%, above the minimum threshold value of 50% (Shrestha, 2021). The rotated component matrix result depicts that an item coded as MS1 is cross-loaded in factor 3 with a loading of 0.505 and in factor 4 with a loading of 0.478. The difference between the loadings is 0.02 (0.505 - 0.478). When the difference between the cross-loaded item is less than 0.2, it indicates that it is highly loaded in two factors (Howard, 2016). Similarly, Hair et al. (2019) indicated that if the ratio of the square of the higher loading to the square of the lower loading for a cross-loaded item is less than 1.5,

that single item is significantly cross-loaded, which results in a discriminant validity problem. In the present study, MS1 has a ratio of $(0.505)^2/(0.478)^2 = (0.255/0.228) = 1.19$, which is below the threshold value of 1.5. For these reasons, item MS1 is deleted.

After the deletion of MS1, MS4, and MS7, dimension reduction was carried out, and KMO has increased from 0.910 to 0.913 with Bartlett's test of sphericity significance value of 0.000, and the communality loadings for all items are greater than 0.5, which ranges from 0.517 to 0.910. The total variance explained by five factors with Eigen values greater than one account for 66.52%. At this iteration of dimension reduction, factor 5 has only one item coded as FE5 with a loading of 0.952, which fails to form a construct because at least three items are needed to form a construct (Hair et al., 2019). Hence, an item coded as FE5 is deleted. After deleting FE5, dimension reduction was carried out, and factors were reduced to four. At this iteration, KMO is increased from 0.913 to 0.914 with Bartlett's test of sphericity significance value of 0.000. The total variance explained by these four factors is 64.65%. After the possible iterations, EFA generates four constructs with twenty one items that fulfil the reliability and validity issues.

4.2.2. Confirmatory factor analysis (CFA)

4.2.2.1. Model fit indices. While the goodness of fit indices such as CFI, GFI, IFI, and TLI are close to one and the badness of fit indices such as SRMR (Standardized Root Mean Square Residual) and RMSEA (Root Mean Square Error of Approximation) are close to zero, the model is a good fit (Hair et al., 2019). Also, while the chi-square divided by degrees of freedom (CMIN/DF) < 2, it is considered very good, and between 2 and 5, it is acceptable (Hair et al., 2014). As revealed in Table 1, the obtained values for all indices are within the acceptable threshold values, suggesting that overall good model fit is established in CFA model.

4.2.2.2. Construct reliability, convergent and discriminant validity, and CMB. As the Cronbach alpha and CR values are greater than 0.7, construct reliability is successfully established. As shown in Table 2, AVE ranged from 0.523 to 0.647, above the minimum threshold value of 0.5, for a good indication of adequate convergence (Owolabi et al., 2020). The CR values ranged from 0.828 to 0.901, above the minimum threshold of 0.7 (Shrestha, 2021). Moreover, the CR values are greater than the AVE values for each construct ensuring convergent validity. As revealed in Table 3, the diagonal bolded values, which are the square roots of AVE from observed items, are greater than the off-diagonal values, which are the correlations between constructs ensuring discriminant validity (Fornell & Larcker, 1981).

Moreover, Harman's single factor is 38.7%, which is less than the maximum threshold of 50%, which a single dominant factor explains the variations of all the factors (Eichhorn, 2014). The common variance is the square of common latent factor value, that is 9%, which falls below the maximum threshold value of 50% (Kassim et al., 2020). Based on this result, one can confirm and conclude that there is no substantial common method bias (CMB) in the responses of the study.

4.2.2.3. Multicollinearity and normality assessments. As shown in Figure 2, the correlation between formal education and managerial skill is 0.54, lower than the maximum threshold value of 0.75 (Cheung et al., 2024). It indicates that multicollinearity problem is not an issue in this study. Skewness and kurtosis values within the ranges of +1 to -1 indicate high normality. The ideal value for a symmetrical dataset should have a skewness of 0 (Hatem et al., 2022). Thus, the data distributions are highly normal, with skewness and kurtosis values ranging between -0.568 and +0.019 and between -0.145 and -1.271, respectively, for all items in this study.

Table 1. The goodness of fit indices in CFA.

Indices	Threshold value	Source	Obtained value
CMIN/DF	<5	Hair et al. (2014)	1.855
Comparative Fit Index(CFI)	> 0.9	Hair et al. (2014)	0.966
Goodness of Fit Index (GFI)	> 0.9	Hair et al. (2019)	0.927
Incremental Fit Index (IFI)	≥ 0.90	Bentler and Bonett (1980)	0.966
Tucker-Lewis Index (TLI)	≥ 0.95	Harrington (2009)	0.961
SRMR	≤ 0.08	Harrington (2009)	0.042
RMSEA	< 0.08	Hair et al. (2019)	0.046

Source: Author calculations.

Table 2. Factor loadings, reliability and convergent validity.

Constructs	Items	Standardize Loadings	Cronbach's alpha (α)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Formal education	FE1	0.846	0.815	0.828	0.551
	FE2	0.831			
	FE3	0.662			
	FE4	0.600			
Managerial skill	MS2	0.847	0.836	0.844	0.523
	MS3	0.597			
	MS5	0.800			
	MS6	0.658			
	MS8	0.685			
Innovation practice	IP1	0.766	0.893	0.891	0.539
	IP2	0.668			
	IP3	0.696			
	IP4	0.794			
	IP5	0.692			
	IP6	0.732			
	IP7	0.781			
Performance	P1	0.730	0.895	0.901	0.647
	P2	0.706			
	P3	0.816			
	P4	0.811			
	P5	0.939			

Source: Authors' calculations.

Table 3. Fornell and Larcker criterion.

Constructs	IP	FE	BP	MS
Innovation practice (IP)	0.740			
Formal education (FE)	0.424	0.743		
Performance (P)	0.495	0.572	0.805	
Managerial Skill (MS)	0.399	0.544	0.634	0.723

Source: Authors' calculations.

4.3. Descriptive analysis of the constructs

Multiple responses are developed in SPSS to assess how many of the total responses of a construct measured by its indicators are strongly disagreed (1), disagreed (2), neutral (3), agreed (4), and strongly agreed (5). Grand mean and grand standard deviation () for a construct are developed in MS Excel to assess the dispersion of the responses in the construct.

Table 4 presents the descriptive information of the constructs. The FE construct has 1612 responses with four items and 403 respondents. The majority, 94.3%, of the responses were replied either neutral or agree. It indicates that the owners-managers of SMEs in the Amhara region have acquired moderate knowledge or lessons from the country's formal education system. Similarly, MS, IP and the performance of SMEs practices are moderate in the Amhara region, Ethiopia. Moreover, the standard deviations for the constructs are 0.60, 0.64, 0.54 and 0.57. The difference between the highest and lowest standard deviations is 0.10. It indicates that there is not that much difference in the responses given by respondents for the study constructs at the given mean values.

4.4. Structural model

SEM simultaneously permits separate relationships for dependent variables (Hair et al., 2019). Once the validity and model fit assumptions are fulfilled in CFA, SEM will follow to examine the relationship between exogenous and endogenous constructs included in the study.

4.4.1. Squared multiple correlation

The coefficient of multiple determinations, represented by R^2 , can take on any value between 0 and +1 (Saunders et al., 2016). In the direct SEM model depicted in Figure 2, the R^2 value is 47% which shows

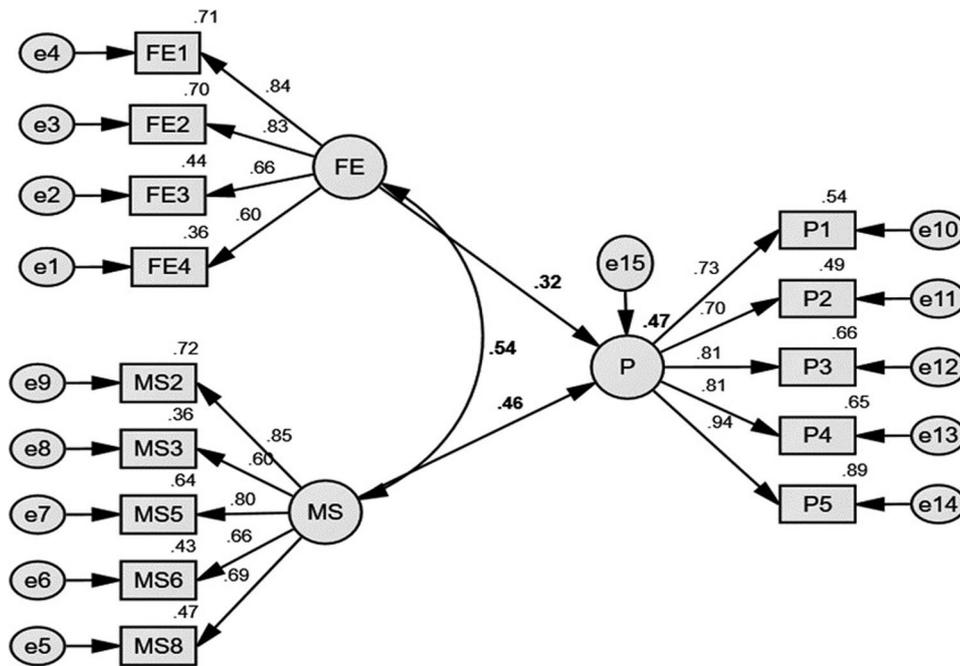


Figure 2. Direct structural model.

Table 4. Descriptive statistics of the constructs.

Constructs	Responses	Likert scale					Total	Grand	
		1	2	3	4	5		Mean	δ
Formal education	Number	0	68	799	720	25	1612	3.44	0.60
	Percent	0	4.2	49.5	44.7	1.6	100		
Managerial skill	Number	0	106	833	1023	53	2015	3.51	0.64
	Percent	0	5.3	41.3	50.8	2.6	100		
Innovation practice	Number	0	42	1495	1268	16	2821	3.45	0.54
	Percent	0	1.5	53	44.9	0.6	100		
Performance	Number	0	65	930	1006	14	2015	3.38	0.57
	percent	0	3.2	46.2	49.9	0.7	100		

that the endogenous construct, P, is explained by 47% through FE and MS constructs. Also, in the SEM mediation model depicted in Figure 3, the R² value is 51% which shows that the endogenous construct, P, is explained by 51% through FE, MS and IP constructs. R² values in both relationships suggest that the exogenous constructs are strong enough to explain the endogenous construct in the SEM relationship.

4.4.2. Hypothesis testing

4.4.2.1. Hypothesis testing in direct SEM. Table 5 demonstrates that formal education significantly and positively influences the performance of SMEs at ($\beta=0.352$, C.R. = 5.286, and $p<0.001$). Hence, hypothesis 1 is supported. Similarly, managerial skill significantly and positively influences the performance of SMEs at ($\beta=0.428$, C.R. = 7.210, and $P<0.001$). Therefore, hypothesis 2 is supported.

4.4.2.2. Hypothesis testing in mediation SEM through AMOS bootstrapping. The bootstrapping technique is widely used to assess the total, direct, and indirect effects in SEM analysis. Table 6 presents the values of the total, direct, and indirect effects calculated by the 2000 bootstrapping sampling technique in AMOS. In Table 6, VAF stands for Variance Accounted For, which shows the value for indirect effect divided by total effect. Total effect is the sum of indirect effect and direct effect. β represents standardized regression weights, p-value stands for probability value, or computed significance level (Zikmund et al., 2010).

Table 6 revealed that IP partially mediates the nexus between FE and P since the indirect and direct effects are significant. Hence, hypothesis 3 is supported. The VAF also signifies that the indirect effect accounts for 20% of the total effect, resulting in low partial mediation. Similarly, since the indirect and

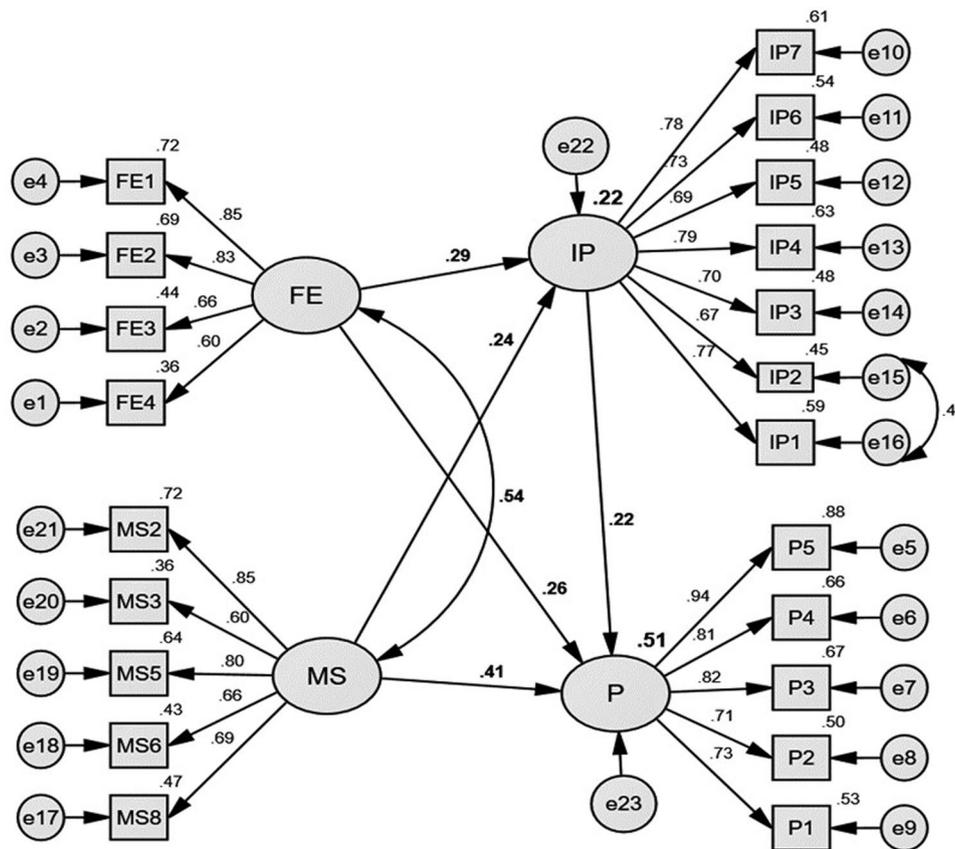


Figure 3. Mediated structural model.

Table 5. Hypothesis testing in direct SEM.

Relationship	Estimate	S.E	C.R	P value
P <--- FE	0.352	0.067	5.286	<0.001
P <--- MS	0.428	0.059	7.210	<0.001
IP <--- FE	0.323	0.076	4.241	<0.001
IP <--- MS	0.225	0.063	3.578	<0.001
P <--- IP	0.292	0.064	4.589	<0.001

Note: FE: Formal education; MS: Managerial skill; IP: Innovation practice; P: Performance

Table 6. Hypothesis testing on mediation effects.

Relationship	Total effects		Direct effects		Indirect effects		VAF	Mediation result
	β	p-value	β	p-value	β	p-value		
P <--- IP <--- FE	0.323	0.001	0.257	0.001	0.066	0.000	0.20	Partial
P <--- IP <--- MS	0.459	0.001	0.405	0.001	0.054	0.000	0.12	Partial

Source: Authors' calculations.

direct effects are significant, IP partially mediates the nexus between MS and P. Hence, hypothesis 4 is supported. The VAF also indicates that the indirect effect accounts for 12% of the total effect, resulting in very low partial mediation.

4.4.3. Relative significance of the constructs

Standardized regression weights are used for relative comparison purposes. The information provided in Table 7 is taken from Figure 2 and Figure 3. Managerial skill has a higher positive effect compared to the positive effect of formal education on the performance of SMEs in the direct and indirect relationships of the constructs. However, FE has a higher effect than MS on IP.

Table 7. Standardized Regression Weights.

Relationship	Estimate (Mediation)	Estimate (Direct)
P <--- FE	0.26	0.32
P <--- MS	0.41	0.46
IP <--- FE	0.29	–
IP <--- MS	0.24	–

Source: Authors' calculations.

5. Discussions

The study's objective was to examine the direct and indirect relationship between human capital dimensions, innovation practice, and the performance of SMEs in Ethiopia. To do this, descriptive statistics and CB-SEM were used to analyze the data collected from 403 SMEs' owner-managers.

The result of this study reveals that FE significantly and positively affects the performance of Ethiopian private formal SMEs at ($\beta = 0.352$ and $p < 0.001$). Similarly, MS significantly and positively affect the performance of Ethiopian private formal SMEs at ($\beta = 0.428$ and $p < 0.001$). Hence, hypotheses 1 and 2 are supported. Prior empirical studies also supported that FE has a profound contribution to the performance of SMEs (Appiah et al., 2023; Saah, 2022; Musavi & Maingi, 2018). Similarly, prior studies supported that MS significantly contributes to SMEs' performance (Orji et al., 2023; Beltramino et al., 2020; Bose et al., 2017). These results suggest that SME owner-managers who are acquainted with relevant human capital gained via formal education and better managerial skills significantly improve the performance of SMEs (Musthafa et al., 2024; Abdullayev, 2023). Hence, the local SME supervisory offices, namely the Labor and Skill and Industry and Investment offices, in their parts should arrange different short-term capacity-building training in collaboration with other stakeholders, including universities, management training institutes, and NGOs to enhance the human capital of SME owner-managers.

The study also found that FE has a significant and positive effect on the innovation practice of SMEs with ($\beta = 0.323$ and $p < 0.001$). Similarly, MS has a significant and positive effect on the innovation practice of SMEs with ($\beta = 0.225$ and $p < 0.001$). This is consistent with the result of Vixathep and Phonvisay (2019), who state that entrepreneurial human capital, comprising education and experience, substantially increases the probability of SME innovation practices. Also, Urban and Verachia (2019) specified that management support in resource provision and idea creation at the firm level is crucial for fostering a culture of innovation. Furthermore, IP has a positive and significant effect on the performance of SMEs with ($\beta = 0.292$ and $p < 0.001$). Previous studies also supported that IP has played a pivotal role in mounting the performance of SMEs in these ever-changing business environments across various contexts (Mabenge et al., 2022; Kimathi & Elegwa, 2019).

However, IP has a low partial mediating effect on the nexus between FE and the performance of SMEs since the direct effect with ($\beta = 0.257$ and $p = 0.001$) and indirect effect with ($\beta = 0.066$ and $p = 0.000$) are significant and VAF is 20%. Hence, hypothesis 3 is supported. Similarly, IP has a low partial mediating effect on the nexus between MS and the performance of SMEs since the direct effect with ($\beta = 0.405$ and $p = 0.001$) and indirect effect with ($\beta = 0.054$ and $p = 0.000$) are significant and VAF is 12%. Hence, hypothesis 4 is supported. The low partial mediating result indicates that both the direct and indirect effects enhances the performance of SMEs though the direct effect is much significant than the indirect effect in enhancing the performance of SMEs. Prior studies by Timothy (2022) and Prange and Pinho (2017) supported that innovation partially mediates the nexus between HC components and the performance of SMEs. Also, Byukusenge and Munene (2017) study supported that innovation fully mediates the nexus between HC component (knowledge management) and the performance of SMEs.

6. Conclusions

Based on the results and discussions of the study, the relationship between human capital, innovation, and the performance of SMEs are highly linked with the focus given to HC and innovation by the SMEs and the different stakeholders, including the government, in various contexts. As a result, this study's low partial mediation result is relatively consistent with the innovation environment in developing countries, where innovation is at the emerging level. Hence, to advance the effect of FE and MS on innovation

practices, in turn enhancing the performance of SMEs, policymakers should align the formal education system and managerial skill development systems via inculcate strategies to make future owner-managers human capital competent enough to foster the innovation practice of organizations, particularly SMEs to improve their performance.

The issues of education, innovation, and SME performance are linked to the Ministry of Education, Ministry of Labor and Skills, Investment Commission, Ministry of Industry, and Ministry of Innovation and Technology in the Ethiopian context. Hence, these institutions and interested stakeholders should take the initiative to play key roles in transforming the entrepreneurship-oriented formal education system and innovation culture to transform the performance of SMEs in Ethiopia. For instance, policymakers should revise the educational curricula of educational and training institutions by incorporating entrepreneurship and technical-oriented courses. Also, SMEs should formulate innovative strategies to boost their future innovativeness, in turn, enhance their performance.

Furthermore, innovation culture is a keen instrument for fostering SMEs' productivity, growth, and sustainable performance globally. Hence, while innovation is backed by adequate human capital enriched with quality formal education and managerial skills, the contribution of innovation to the competitiveness and sustainable performance of SMEs would be higher, particularly in this knowledge economy era. So, it is better to invest in innovation and HC no matter how much it costs the SMEs and the government.

In a nutshell, in this knowledge era, firms' intangible resources, such as human capital, mount enormous performance improvements by far more than the tangible resources that firms usually own and use. Hence, investing in HC development and innovation enhances the knowledge and skills of SMEs' owners, which drives them to perform better and more competitively.

7. Theoretical contributions and practical implications

7.1. Theoretical contributions

This study contributes to the literature in various ways. First, the study findings deduce that human capital dimensions (FE and MS) positively and significantly influence the performance of SMEs. So, the study substantiates the human capital theory, which theorizes that human capital has incredibly leveraged organizations' performance. Second, the choice of FE and MS as dimensions of HC has yet to be studied well by previous researchers. So, FE and MS as measures of HC are new and better ways of looking at HC dimensions, unlike previous researchers who focused on educational level, experience in the sector, and training as the components of human capital (Dar & Mishra, 2019; Mubarik et al., 2020). Thus, this study further enriches the dimensions of HC in the entrepreneurship literature. Third, this study also supports the RBV in that while educated and skilled owner-managers run SMEs, the innovative practices of SMEs will be improved, again making SMEs outperform their rivals in profitability, market share, and sales (Barney, 1991). Fourth, IP has a mediation effect on the nexus between FE, MS, and the performance of SMEs. So, the present study contributes theoretical support for IP's mediating role in the relationship between FE, MS, and the performance of SMEs in the extant entrepreneurship literature. In other words, this study proposed a new model for future researchers in the field, focusing on the mediating role of IP on the nexus between FE, MS, and the performance of SMEs.

7.2. Practical implications

Besides its theoretical contributions, this study offers practical implications that underscore the pivotal role of owner-managers and policymakers in driving performance within SMEs in Ethiopia:

First, the study highlights how important it is for SMEs to invest in their human capital and promote an innovative culture. This can boost the sustainability and competitiveness of SMEs by directing strategic decision-making and resource allocation. Second, the study suggests that SME owner-managers should take short-term capacity-building training and education programs. Third, owner-managers of SMEs should update themselves with contemporary knowledge and managerial skill gap training in progressive ways via online education programs and technology-based training such as e-commerce. This will improve their dynamics of

thinking outside the box in various innovative activities, such as incremental and radical innovations, which, in turn, can enhance SMEs' performance.

Moreover, the study's partial mediation relationship between human capital, innovation, and the performance of SMEs can offer valuable insights to the government and policymakers for creating and implementing policies that encourage entrepreneurship, enhance workforce competencies, and create innovation ecosystems that support SME growth. Governments and policymakers, for instance, create policies for investing in human capital development through entrepreneurial education, continuous professional development, and vocational training specific to SMEs' needs. Policymakers should also encourage cooperative networks between SMEs, large enterprises, academic institutions, and governmental organizations to support SMEs' innovation and performance. Tax relief for those SMEs that participate in innovation-related activities like research and development, product development, and process improvements could be used by policymakers to encourage innovation. Additionally, by encouraging a mindset shift toward continuous improvement and creativity, governments should support an innovative culture within SMEs.

7.3. Limitations and future implications

Based on the limitations identified in this study, the following implications were forwarded to future researchers and policymakers. The data were collected only from the owner-managers of SMEs in Ethiopia. The possibility of obtaining biased information on their companies from the owner-managers can be validated if employees can also participate in the study. So, future researchers shall include employees as sources of information so that the findings will be more plausible. Geographically, the study is confined to four cities in Ethiopia's Amhara region. The study shall have more impact if its external validity or generalizability is sound. So, future researchers shall extend the geographical scope by adding more cities from Ethiopia.

Moreover, any future researchers interested in the study shall replicate the study in a different context globally. FE and MS constructs were used as measures of HC in this study. Future researchers shall enrich the HC dimensions by adding the variables 'attitude and informal education/learning'. Attitude is one of the KAS attributes (knowledge, attitude, and skills) used to measure the human resource competency level. Like formal education, informal learning or education needs to be studied as one of the dimensions of human capital (Park & Choi, 2016). This study uses composite or generic innovation practice as a construct. Future researchers shall investigate innovation by specific product, process, market, and organizational innovation (Kahn, 2018; Gault, 2018; Atalay et al., 2013; Bohosievici, 2009). Hence, future researchers can extend the HC-IP-Performance research model. This study only took SMEs. As large-size enterprises are also important for the nation in various aspects, future researchers shall replicate the study on large-scale enterprises in Ethiopia. The present study used a cross-sectional design. The performance trends in SMEs across extended periods are vital for policymakers. Hence, future researchers shall use a longitudinal design.

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Author contributions

Ashenafi Eneyew Dinku contributed in the conception and design of the title, data collection and feeding in software, analysis and interpretation of the data; drafting of the paper, and read and approved the final manuscript to be published. Professor Manjit Singh contributed in the conception and design of the title, analysis and interpretation of the data, critically revising the manuscript, and read and approved the final manuscript to be published. Dr. Sandeep Singh contributed in the conception and design of the title, analysis and interpretation of the data, critically revising the manuscript, and read and approved the final manuscript to be published.

Disclosure statement

No potential conflict of interest was reported by the author(s).

About the authors

Ashenafi Eneyew Dinku is an Assistant Professor in the Department of Management at Wollo University, Dessie, Ethiopia. He is currently pursuing his PhD in University School of Applied Management at Punjabi University, Patiala, India. He completed his BA and MBA degrees from Addis Ababa University, Ethiopia. His key research areas include corporate social responsibility, human resource management, leadership, and entrepreneurship.

Dr. Manjit Singh is a Professor at the University School of Applied Management, Punjabi University, Patiala, is a seasoned academician with an illustrious research career. Over nearly three decades, he has contributed extensively to Management and Commerce education, publishing 140 scholarly articles in leading national and international journals. His research spans corporate governance, financial well-being, and sustainability, with significant contributions to socially responsible investing and financial inclusion. Dr. Singh's work has been recognized with prestigious awards, has successfully guided more than 38 Ph.D. scholars and has a remarkable international engagement including leadership roles in Rwanda and participation in programs by Stanford University, UNESCO and IIEP underscoring his global research impact. As an advocate for interdisciplinary research, Dr. Singh remains committed to advancing academic inquiry and fostering innovative solutions to contemporary business and economic challenges.

Dr. Sandeep Singh is acting as an Assistant Professor at University School of Applied Management, Punjabi University, Patiala, Punjab, India. He is also acting as associate editor for International Journal of Technology Transfer and Commercialisation. He is qualified in diverse areas like LLB, MBA (HR) and Ph.D. in Management. He has more than ten years' experience in teaching and research. He is trainer of various softwares like SPSS, AMOS, Warp-PLS, Smart-PIS, ADANCO and JAMOVl.

Data availability and materials statement

Data available on reasonable request from the corresponding author.

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