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Enhancing E-Commerce SME Performance through Human Capital, Organizational Culture, and Product Innovation: The Mediating Role of Employee Performance

Dan LIAO[1], Chaithanaskorn PHAWITPIRIYAKLITI[2], Pirayut PATTANAYANON[3] and Sid TERASON[4]

Abstract

This study investigates the impact of human capital, organizational culture, and product innovation on entrepreneurial performance in e-commerce small and medium enterprises (SMEs) in Shanghai, hypothesizing that these factors positively influence entrepreneurial performance with employee performance as a mediating variable. Approximately 375 entrepreneurs and staff from e-commerce SMEs participated, providing pertinent data through validated questionnaires rated on a 5-point Likert scale. Utilizing a quantitative research design, the study employed SEM-PLS analysis to examine relationships among human capital, organizational culture, product innovation, employee performance, and entrepreneurial performance. The findings indicate that human capital, organizational culture, and product innovation significantly impact entrepreneurial performance, with human capital having the most substantial effect, followed by product innovation. Employee performance was found to mediate these relationships, enhancing organizational competitiveness. Effect sizes and confidence intervals demonstrated strong content validity and statistical significance. The study concludes that strategic management of human capital, fostering a supportive organizational culture, and encouraging product innovation are crucial for improving entrepreneurial performance in e-commerce SMEs. These results suggest that SMEs should invest in human capital development, create an innovation-friendly environment, and emphasize effective leadership and ethical behavior. The implications highlight the importance of these factors in achieving success in the competitive e-commerce market, emphasizing the need for strategic management practices that prioritize human capital and organizational development to drive performance outcomes. This research provides actionable insights for SMEs seeking to enhance their competitiveness and sustainability in the rapidly evolving e-commerce landscape, underscoring the critical role of human capital and innovative organizational practices.

Keywords: *Human Capital, Organizational Culture, Product Innovation, Employee Performance, e-Commerce SMEs*

INTRODUCTION

Small and medium-sized enterprises (SMEs) are crucial drivers of economic development, particularly in high-tech and labor-intensive sectors. These enterprises are pivotal in fostering innovation, creating jobs, and enhancing export growth. In China, SMEs have played a significant role in the country's economic transformation, contributing substantially to its global trade participation (Wang & Lin, 2013). However, the rapid changes in the global market and technological advancements pose significant challenges to these enterprises, necessitating continuous innovation and adaptation to maintain their competitive edge.

Despite their importance, SMEs often face numerous obstacles that hinder their growth and sustainability. These challenges include limited access to financial resources, inadequate infrastructure, and a lack of skilled labor (OECD, 2005). Moreover, SMEs are frequently characterized by their resource constraints, which make it difficult for them to invest in the necessary research and development (R&D) activities to drive innovation. This situation is particularly acute in high-tech and labor-intensive sectors, where the pace of technological change is rapid, and the competition is intense (Lepak & Snell, 1999).

The problem that this study seeks to address is the need for effective strategies that SMEs can employ to overcome these challenges and enhance their entrepreneurial performance. Specifically, this research focuses

[1] College of Innovation and Management, Suan Sunandha Rajabhat University, Thailand

[2] College of Innovation and Management, Suan Sunandha Rajabhat University, Thailand

[3] College of Management, Mahidol University

[4] Faculty of Sports and Health Science, Kasetsart University, Thailand, E-mail: fsssid@ku.ac.th

on three critical factors: human capital, organizational culture, and product innovation. Human capital, encompassing the skills, knowledge, and experience of employees, is a vital resource that can drive innovation and improve performance (Becker, 1993). Organizational culture, defined by the shared values, beliefs, and practices within a company, significantly influences its capacity to innovate and adapt to changing market conditions (Schein, 2010). Product innovation, involving the development of new or improved products, is essential for maintaining competitive advantage and achieving growth (OECD, 2005).

Previous research highlights the importance of these factors in enhancing organizational performance. For instance, Becker (1993) and Lepak and Snell (1999) identified human capital as a critical driver of innovation and performance in SMEs. Similarly, Schein (2010) and Cameron and Quinn (2011) emphasized the role of a supportive and innovative organizational culture in achieving organizational success. The positive influence of product innovation on entrepreneurial performance has been widely validated, with studies using the Oslo Manual (OECD, 2005) demonstrating its significance in various contexts.

However, there is a gap in the literature regarding the combined impact of human capital, organizational culture, and product innovation on the entrepreneurial performance of SMEs in China. Most existing studies have examined these factors in isolation, without considering their interrelationships and their collective influence on performance. Furthermore, few studies have focused specifically on the high-tech and labor-intensive sectors, where the need for effective innovation strategies is most pressing.

This study aims to fill this gap by providing a comprehensive analysis of how human capital, organizational culture, and product innovation influence the entrepreneurial performance of e-commerce SMEs in China. By examining these factors together, the research seeks to offer a holistic understanding of the dynamics that drive SME performance and provide actionable insights for business leaders and policymakers.

The study is derived from the pressing need to enhance the competitiveness and sustainability of SMEs in the rapidly evolving global market. The findings are expected to contribute to the development of strategic management practices that prioritize human capital development, foster a positive organizational culture, and encourage continuous product innovation. Ultimately, the research aims to help SMEs navigate the challenges they face, capitalize on their strengths, and achieve long-term success in the competitive e-commerce landscape.

In summary, this research addresses a critical problem facing SMEs in China: the need for effective strategies to enhance entrepreneurial performance in the face of rapid technological changes and intense global competition. By focusing on the interplay between human capital, organizational culture, and product innovation, the study aims to provide valuable insights that can inform both academic understanding and practical management practices, ultimately contributing to the growth and sustainability of SMEs in the high-tech and labor-intensive sectors.

LITERATURE REVIEW

Small and medium-sized enterprises (SMEs) are widely recognized for their critical role in fostering economic growth, innovation, and employment (OECD, 2005). The innovation capacity of SMEs, particularly in high-tech and labor-intensive sectors, is essential for maintaining competitive advantage and ensuring sustainable development. In the context of rapid technological advancements and global market dynamics, SMEs must continuously adapt and innovate to survive and thrive (Wang & Lin, 2013).

Human capital refers to the skills, knowledge, and experience possessed by individuals, which are essential for the innovation process in organizations (Becker, 1993). The development and effective utilization of human capital are critical for SMEs to enhance their innovation capabilities. Studies have shown that investment in human capital leads to improved innovation outcomes and organizational performance (Lepak & Snell, 1999; Becker, 1993). For instance, skilled and knowledgeable employees are better equipped to generate innovative ideas, solve complex problems, and implement innovative solutions (Barney, 1991).

The resource-based view (RBV) theory posits that human capital, being valuable, rare, inimitable, and non-substitutable, provides a sustained competitive advantage to firms (Barney, 1991). In SMEs, where resources are often limited, maximizing the potential of human capital becomes even more crucial. Previous research has

demonstrated that SMEs with higher levels of human capital are more likely to engage in innovative activities and achieve superior performance (Subramaniam & Youndt, 2005).

Organizational culture encompasses the shared values, beliefs, and practices within a company that shape employees' behaviors and attitudes (Schein, 2010). A supportive and innovative organizational culture is vital for fostering an environment where creativity and innovation can flourish (Cameron & Quinn, 2011). Studies have highlighted the significant impact of organizational culture on innovation performance, suggesting that a culture that encourages risk-taking, collaboration, and continuous learning is more conducive to innovation (Martins & Terblanche, 2003).

The Competing Values Framework (CVF) developed by Cameron and Quinn (2011) identifies different types of organizational cultures, such as clan, adhocracy, market, and hierarchy, each with distinct characteristics and implications for innovation. For example, an adhocracy culture, which emphasizes flexibility, adaptability, and creativity, is often associated with higher levels of innovation (Cameron & Quinn, 2011). Research has shown that SMEs with an innovative culture are better positioned to leverage their human capital and drive product innovation (Hogan & Coote, 2014).

Product innovation, defined as the introduction of new or significantly improved products or services, is a key driver of competitive advantage and growth in SMEs (OECD, 2005). Product innovation involves a series of activities, including idea generation, development, testing, and commercialization, which require significant investment in R&D and other resources (Schilling, 2013). The Oslo Manual (OECD, 2005) provides comprehensive guidelines for measuring and analyzing product innovation, emphasizing its importance for business performance.

Previous studies have demonstrated the positive impact of product innovation on organizational performance, including increased market share, profitability, and customer satisfaction (Calantone et al., 2002). SMEs that prioritize product innovation are more likely to respond effectively to changing market demands and technological advancements, thereby maintaining their competitive edge (Freel, 2000). However, the resource constraints faced by SMEs often pose challenges to their innovation efforts, highlighting the need for effective strategies to optimize their innovation processes (Nooteboom, 1994).

The interrelationships between human capital, organizational culture, and product innovation are complex and multifaceted. Human capital provides the necessary skills and knowledge to drive innovation, while organizational culture creates the environment that supports and nurtures innovative activities (Barney, 1991; Schein, 2010). Product innovation, in turn, benefits from the synergistic effects of a skilled workforce and a supportive culture, leading to enhanced organizational performance (Calantone et al., 2002).

Research has highlighted the mediating role of organizational culture in the relationship between human capital and innovation performance. For instance, a study by Subramaniam and Youndt (2005) found that the impact of human capital on innovation is significantly influenced by the organizational culture, suggesting that a culture that values and promotes innovation can amplify the positive effects of human capital on innovation outcomes. Similarly, Hogan and Coote (2014) demonstrated that the alignment of organizational culture with innovation goals is crucial for maximizing the potential of human capital and achieving successful product innovation.

SMEs in China, particularly in high-tech and labor-intensive sectors, face unique challenges and opportunities in their innovation efforts. The rapid pace of technological change, intense global competition, and regulatory constraints pose significant hurdles for these enterprises (Wang & Lin, 2013). However, China's supportive policy environment, growing investment in R&D, and increasing focus on innovation provide substantial opportunities for SMEs to enhance their innovation capabilities (Li & Atuahene-Gima, 2001).

Studies have shown that Chinese SMEs with robust human capital and innovative cultures are better positioned to leverage these opportunities and achieve superior performance (Li et al., 2006). However, the extent to which these factors influence product innovation and entrepreneurial performance in the Chinese context remains underexplored, highlighting the need for further research in this area.

In conclusion, the literature underscores the critical importance of human capital, organizational culture, and product innovation in driving the performance of SMEs. While substantial progress has been made in understanding these factors individually, there is a need for comprehensive studies that examine their interplay and combined impact on SME performance, particularly in the context of China. This study aims to fill this gap by providing a holistic analysis of how these factors influence the entrepreneurial performance of e-commerce SMEs in China, offering valuable insights for both academic research and practical applications.

HYPOTHESES

The study aims to understand how human capital, organizational culture, and product innovation influence the entrepreneurial performance of e-commerce SMEs in China. The hypotheses are derived from the resource-based view (RBV) theory, which posits that valuable, rare, inimitable, and non-substitutable resources, such as human capital and organizational culture, are key to achieving sustained competitive advantage (Barney, 1991).

1. Human capital positively affects entrepreneurial performance in e-commerce SMEs.

2. Organizational culture positively impacts entrepreneurial performance in e-commerce SMEs.

3. Product innovation has a significant positive effect on entrepreneurial performance in e-commerce SMEs.

4. Employee performance mediates the relationship between human capital, organizational culture, product innovation, and entrepreneurial performance in e-commerce SMEs.

METHOD

The research design employs a quantitative approach to provide a comprehensive understanding of the factors influencing entrepreneurial performance in SMEs. The quantitative analysis uses Structural Equation Modeling (SEM) to test the hypothesized relationships and mediating effects, ensuring robust statistical validation of the findings. This method allows for the precise measurement of constructs and the examination of complex relationships among variables, providing a detailed understanding of the innovation landscape in Chinese SMEs.

By focusing on a rigorous quantitative approach, the study aims to offer actionable insights for SMEs seeking to enhance their innovation capabilities and export performance, ultimately contributing to the broader literature on SME innovation and competitiveness. This research not only advances theoretical understanding but also provides practical implications for improving the strategic management of human capital and organizational culture in high-tech, labor-intensive SMEs.

Participants

This study involved participants from small and medium-sized enterprises (SMEs) operating in high-tech and labor-intensive sectors across several prominent cities in China, including Shanghai, Chengdu, Chongqing, Hangzhou, Xi'an, Wuhan, Suzhou, Zhengzhou, Nanjing, and Tianjin. The total sample size for the quantitative component comprised approximately 375 entrepreneurs and staff members from various e-commerce SMEs in Shanghai. The age distribution of participants varied, with approximately 30% (113 participants) in their 20s, 40% (150 participants) in their 30s, 20% (75 participants) in their 40s, and 10% (37 participants) aged 50 and above. This diverse age range helped capture a broad spectrum of perspectives on innovation and business strategies. Gender representation included both male and female participants, with 55% (206 participants) being male and 45% (169 participants) being female, ensuring a comprehensive view of gender-specific challenges and advantages in innovation processes.

The study primarily focused on Han Chinese, the predominant ethnic group, who constituted 92% (345 participants) of the sample. Participants from minority ethnic groups made up 8% (30 participants) of the sample, providing a more inclusive perspective of the SME landscape. Socioeconomic status varied among participants, with 25% (94 participants) coming from lower-income backgrounds, 50% (188 participants) from middle-income backgrounds, and 25% (94 participants) from higher-income backgrounds. This variation allowed for an exploration of how socioeconomic factors influence innovation strategies and business

performance. Participants' professional backgrounds were diverse, including 40% (150 participants) as business owners, 35% (131 participants) as managers, and 25% (94 participants) as frontline staff. The average work experience among participants was around 10 years, with 60% (225 participants) having more than 10 years of experience and 40% (150 participants) having less than 10 years of experience.

Participants were selected using a systematic sampling plan to ensure a representative sample of SMEs. The sampling frame was derived from a comprehensive database of registered SMEs provided by local business associations and government agencies. From this list, every fifth SME was selected to participate in the study, ensuring a random and unbiased sample. Out of the 450 SMEs initially approached, 375 agreed to participate, resulting in an 83.3% response rate. This high participation rate was achieved through follow-up contacts and assurances of the confidentiality and importance of the study. The 375 participants included a diverse mix of entrepreneurs, managers, and staff members within these SMEs.

There was an element of self-selection, as participation was voluntary and some businesses or individuals may have opted out based on their interest or availability. However, the systematic sampling plan minimized the potential bias from self-selection. Data were collected from various locations where the SMEs were based, including their offices and business premises. Data collection occurred over a three-month period, from January to March 2023. Surveys were administered in-person by trained research assistants who visited each business location. This approach helped ensure high-quality data collection and allowed for immediate clarification of any participant queries regarding the survey items.

Participants were informed about the study's objectives, the voluntary nature of their participation, and their right to withdraw at any time without any consequences. To encourage participation, a small monetary compensation equivalent to $20 USD was provided to each participant. Additionally, participants were promised a summary report of the study findings, which they could use for their own business insights. The study was reviewed and approved by the Institutional Review Board (IRB) at Suan Sunandha Rajabhat University, Thailand. Ethical standards were strictly adhered to throughout the study. Participants provided informed consent before participation, ensuring they were fully aware of the study's purpose, procedures, and any potential risks or benefits. Confidentiality and anonymity were guaranteed, with all data being stored securely and accessible only to the research team.

Instrument

The study utilized several validated instruments to measure the key constructs: human capital, organizational culture, product innovation, employee performance, and entrepreneurial performance. These instruments were selected based on their established reliability and validity in previous research.

Human capital was measured using a scale adapted from Lepak and Snell's (1999) work, which assesses skills, knowledge, and abilities relevant to organizational performance. The scale includes items rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Previous studies have reported high internal consistency for this scale, with Cronbach's alpha values typically above .80.

Organizational culture was assessed using Cameron and Quinn's (2011) Organizational Culture Assessment Instrument (OCAI). This instrument evaluates six dimensions of organizational culture: dominant characteristics, organizational leadership, management of employees, organizational glue, strategic emphases, and criteria for success. The OCAI is widely used and has demonstrated good psychometric properties, with Cronbach's alpha values ranging from .70 to .85.

Product innovation was measured using a scale adapted from the Oslo Manual (OECD, 2005), which includes items related to the introduction of new or significantly improved products or services. Participants rated items on a 5-point Likert scale. The instrument has been validated in various studies, showing strong reliability and validity, with Cronbach's alpha values typically above .75.

Employee performance was assessed using a scale adapted from Williams and Anderson's (1991) measures of in-role and extra-role performance. This scale includes items that evaluate employees' performance in their

designated roles and their contributions beyond formal job requirements. The reliability of this scale is well-documented, with Cronbach's alpha values usually exceeding .80.

Entrepreneurial performance was measured using a scale developed by Lumpkin and Dess (1996), which includes items assessing growth, profitability, and market share. Participants rated each item on a 5-point Likert scale. The scale has demonstrated good reliability and validity in previous research, with Cronbach's alpha values typically above .80.

The reliability and validity of the instruments used in this study were assessed through pilot testing with a smaller sample of 50 participants from the target population. Internal consistency reliability was evaluated using Cronbach's alpha, with all scales showing values above the acceptable threshold of .70. Construct validity was assessed through confirmatory factor analysis (CFA), which confirmed the factor structure of each scale as reported in the literature.

Data Analysis

The quantitative data were analyzed using SEM with Partial Least Squares (PLS) to examine the relationships among the variables and test the hypothesized mediating effects of employee performance. The SEM-PLS approach was chosen for its ability to handle complex models and provide robust statistical validation of the findings. Overall, the quantitative approach provided a comprehensive view of the factors influencing entrepreneurial performance in e-commerce SMEs, offering valuable insights for both academic research and practical applications in the field of SME innovation and competitiveness.

RESULTS

Missing data were addressed by first identifying the frequency and percentage of missing values, which accounted for approximately 2% of the total dataset. The analysis for patterns using Little's MCAR test indicated that the data were missing completely at random (MCAR), with a $\chi^2(89) = 95.34$, $p = .32$. Given the MCAR status, missing data were handled using the Expectation-Maximization (EM) algorithm in SPSS to ensure unbiased parameter estimates.

The correlations among the primary variables were human capital and organizational culture ($r = .48$), human capital and product innovation ($r = .42$), organizational culture and product innovation ($r = .45$), human capital and employee performance ($r = .52$), organizational culture and employee performance ($r = .50$), product innovation and employee performance ($r = .51$), and employee performance and entrepreneurial performance ($r = .57$).

The primary outcomes of the study included human capital, organizational culture, product innovation, employee performance, and entrepreneurial performance. Descriptive statistics for these variables showed that the mean for human capital was 4.12 (SD = .56), organizational culture had a mean of 4.05 (SD = 0.59), product innovation had a mean of 4.18 (SD = 0.62), employee performance had a mean of 4.20 (SD = 0.58), and entrepreneurial performance had a mean of 4.23 (SD = 0.61). Each of these primary outcomes was measured on a 5-point Likert scale. Subgroup analyses based on gender, age, and role within the organization were conducted, but no significant differences were found, allowing for the aggregation of data.

For the primary hypotheses, human capital was found to significantly affect entrepreneurial performance, with a path coefficient of 0.32, t value of 4.65, and p value less than 0.001. The effect size for this relationship was 0.10, with a 95% confidence interval (CI) between 0.06 and 0.18. Organizational culture also showed a significant impact on entrepreneurial performance, with a path coefficient of 0.28, t value of 4.03, and p value less than 0.001, and an effect size of 0.09 (95% CI [0.05, 0.17]). Product innovation similarly had a significant positive effect on entrepreneurial performance, with a path coefficient of 0.30, t value of 4.25, and p value less than 0.001, and an effect size of 0.09 (95% CI [0.05, 0.18]).

The secondary hypothesis examined employee performance as a mediator. The indirect effects for human capital to entrepreneurial performance through employee performance were 0.14 with a t value of 3.58 and a p value less than 0.001. For organizational culture to entrepreneurial performance through employee

performance, the indirect effect was 0.12 with a t value of 3.30 and a p value of 0.001. For product innovation to entrepreneurial performance through employee performance, the indirect effect was 0.13 with a t value of 3.45 and a p value less than 0.001.

Measurement Model

The measurement model was evaluated to ensure the reliability and validity of the constructs used in the study. This evaluation involved several steps, including assessing composite reliability, convergent validity, and discriminant validity. Each of these steps is crucial to ensure that the constructs accurately measure what they are intended to measure and that the results of the study are robust and reliable.

Reliability refers to the consistency of the measurement items. Composite reliability (CR) and Cronbach's alpha were used to assess the internal consistency of the constructs. All constructs had composite reliability values above the threshold of .70, indicating adequate internal consistency. Specifically, the composite reliability values ranged from .82 to .91. Cronbach's alpha values also exceeded the acceptable threshold of .70, further confirming the reliability of the measurement items. The specific Cronbach's alpha values for human capital, organizational culture, product innovation, employee performance, and entrepreneurial performance were .85, .83, .87, .88, and .89 respectively.

Convergent validity refers to the extent to which indicators of a construct converge or share a high proportion of variance. Average Variance Extracted (AVE) was used to assess convergent validity, with an AVE value of .50 or higher indicating adequate convergent validity. In this study, all constructs had AVE values above the threshold, with values ranging from .55 to .69. These results demonstrate that the indicators for each construct shared a high proportion of variance and were thus valid measures of the constructs they were intended to represent.

Discriminant validity assesses the extent to which a construct is truly distinct from other constructs. The Fornell-Larcker criterion and the cross-loadings of the indicators were used to evaluate discriminant validity. According to the Fornell-Larcker criterion, the square root of the AVE for each construct should be greater than the correlations between the construct and any other construct. In this study, the square roots of the AVE for all constructs were greater than the inter-construct correlations, indicating good discriminant validity. Additionally, the cross-loadings of the indicators showed that each indicator loaded more highly on its corresponding construct than on any other construct, further supporting discriminant validity.

To ensure that the measurement model was invariant across different groups (e.g., gender, age, professional background), multi-group analysis was conducted. The results indicated no significant differences in the measurement model across these groups, suggesting that the constructs were measured equivalently across different subgroups of the sample.

Confirmatory Factor Analysis was conducted to further validate the measurement model. The CFA results showed that the model fit the data well, with fit indices such as the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) meeting the recommended thresholds. Specifically, the CFI was .94, the TLI was .92, and the RMSEA was .05, indicating a good fit of the measurement model to the data.

The standardized loadings of the indicators on their respective constructs were all significant ($p < .001$) and exceeded the recommended threshold of .50, with most loadings above .70. This indicates that the indicators were good measures of their respective constructs. For example, the standardized loadings for human capital indicators ranged from .68 to .85, for organizational culture indicators from .65 to .82, for product innovation indicators from .70 to .86, for employee performance indicators from .72 to .88, and for entrepreneurial performance indicators from .74 to .87.

Overall, the measurement model demonstrated strong reliability, convergent validity, and discriminant validity. The constructs used in this study were measured accurately and consistently, providing a solid foundation for the subsequent structural model analysis. The results of the confirmatory factor analysis and the high loadings

of the indicators further validated the robustness of the measurement model, ensuring the reliability and validity of the findings in the context of e-commerce SMEs in China.

Structural Model

The structural model was evaluated to understand the relationships among human capital, organizational culture, product innovation, employee performance, and entrepreneurial performance in e-commerce SMEs. The analysis used SEM with Partial Least Squares (PLS), a robust approach suitable for complex models and small to medium sample sizes.

Human capital significantly affected entrepreneurial performance, indicated by a path coefficient of .32, a t value of 4.65, and a p value of less than .001. This suggests a strong positive relationship between human capital and entrepreneurial performance, indicating that investments in skills, knowledge, and abilities of employees significantly enhance the overall performance of SMEs. Similarly, organizational culture had a significant impact on entrepreneurial performance, with a path coefficient of .28, a t value of 4.03, and a p value of less than .001. This confirms that a supportive and innovative organizational culture positively impacts entrepreneurial performance, fostering an environment conducive to growth and innovation. Product innovation also showed a significant positive effect on entrepreneurial performance, with a path coefficient of .30, a t value of 4.25, and a p value of less than .001. This highlights the critical role of product innovation in improving SME performance, emphasizing the importance of introducing new or significantly improved products and services.

Human capital had a path coefficient of .52, a t value of 6.20, and a p value of less than .001, indicating a direct enhancement of employee performance, which in turn drives overall entrepreneurial success. Organizational culture, with a path coefficient of .50, a t value of 5.89, and a p value of less than .001, significantly boosts employee performance by creating a supportive work environment. Product innovation, indicated by a path coefficient of .51, a t value of 6.03, and a p value of less than .001, also enhances employee performance. Improved employee performance, shown by a path coefficient of .57, a t value of 7.10, and a p value of less than .001, significantly contributes to better entrepreneurial performance.

The indirect effects were significant, confirming the mediating role of employee performance. Human capital to entrepreneurial performance through employee performance had an indirect effect of .14, with a t value of 3.58 and a p value of less than .001. This mediation suggests that human capital enhances entrepreneurial performance partly by improving employee performance. Organizational culture to entrepreneurial performance through employee performance showed an indirect effect of .12, with a t value of 3.30 and a p value of .001, indicating that organizational culture boosts entrepreneurial performance by positively influencing employee performance. Product innovation to entrepreneurial performance through employee performance demonstrated an indirect effect of .13, with a t value of 3.45 and a p value of less than .001, showing that product innovation contributes to entrepreneurial success via enhanced employee performance.

The model fit indices indicated good fit for the structural model. The R^2 value for entrepreneurial performance was .54, suggesting that 54% of the variance in entrepreneurial performance is explained by human capital, organizational culture, and product innovation. This is a substantial portion, indicating the strong explanatory power of the model. For employee performance, the R^2 value was .47, indicating that 47% of the variance in employee performance is explained by the same factors. The Standardized Root Mean Square Residual (SRMR) was .054, below the threshold of .08, indicating a good fit between the model and the observed data. The Normed Fit Index (NFI) was .91, above the acceptable threshold of .90, suggesting a good model fit.

The structural model results underscore the importance of human capital, organizational culture, and product innovation in driving entrepreneurial performance. The significant mediating role of employee performance highlights the need for SMEs to invest in their workforce, fostering a culture that supports innovation and continuous improvement. These findings provide actionable insights for SME leaders and policymakers, emphasizing strategic investments in human capital development, creating supportive organizational environments, and encouraging ongoing innovation to achieve sustained competitive advantage in the e-commerce sector.

DISCUSSION

The results of this study provide strong support for all primary hypotheses. Human capital significantly affected entrepreneurial performance, as indicated by a path coefficient of .32, a t value of 4.65, and a p value of less than .001. This supports the hypothesis that human capital positively influences entrepreneurial performance in e-commerce SMEs. Similarly, organizational culture had a significant impact on entrepreneurial performance, with a path coefficient of .28, a t value of 4.03, and a p value of less than .001, confirming the hypothesis that a positive organizational culture enhances entrepreneurial performance. Product innovation also showed a significant positive effect on entrepreneurial performance, with a path coefficient of .30, a t value of 4.25, and a p value of less than .001.

The secondary hypothesis, which proposed that employee performance mediates the relationship between human capital, organizational culture, product innovation, and entrepreneurial performance, was also supported. The indirect effect of human capital on entrepreneurial performance through employee performance was .14, with a t value of 3.58 and a p value of less than .001. The indirect effect of organizational culture on entrepreneurial performance through employee performance was .12, with a t value of 3.30 and a p value of .001. Similarly, the indirect effect of product innovation on entrepreneurial performance through employee performance was .13, with a t value of 3.45 and a p value of less than .001.

The findings of this study are consistent with previous research that highlights the importance of human capital, organizational culture, and product innovation in enhancing organizational performance. Becker (1993) and Lepak and Snell (1999) have previously identified human capital as a critical driver of innovation and performance in SMEs, aligning with the current study's results. Similarly, the significant impact of organizational culture on performance is supported by the work of Schein (2010) and Cameron and Quinn (2011), who emphasize the role of a supportive and innovative culture in organizational success. The positive influence of product innovation on entrepreneurial performance corroborates findings from studies using the Oslo Manual (OECD, 2005), which has been widely validated in various contexts.

The results should be interpreted with consideration of potential sources of bias and threats to validity. One potential bias could be self-selection bias, as participation was voluntary, which might influence the generalizability of the results. However, the systematic sampling plan minimized this risk by ensuring a random and representative sample. Measurement imprecision could also affect results, though validated instruments were used to enhance reliability and validity. The high number of tests and their overlap necessitated careful statistical control to avoid Type I errors. The sample size was adequate, providing robust data for SEM-PLS analysis, and the strong model fit indices and significant path coefficients support the internal and statistical validity of the findings.

The findings of this study can be generalized to the broader population of SMEs in high-tech and labor-intensive sectors in China, given the diverse and representative sample from prominent cities. The study's ecological validity is supported by data collection from actual business environments and a timeframe that reflects current economic conditions. However, caution should be exercised when generalizing to SMEs outside China or in different sectors, as contextual factors such as regulatory environment, cultural influences, and market dynamics may differ. Future studies should consider replicating this research in different geographic regions and sectors to validate and extend the findings.

IMPLICATIONS

The study has several implications for future research, programs, and policy. Future research should explore the longitudinal impacts of human capital, organizational culture, and product innovation on performance to understand their long-term effects. Additionally, research should investigate other potential mediating and moderating variables that could influence these relationships, such as leadership styles, organizational structure, and market conditions. Programs aimed at enhancing SME performance should focus on developing human capital through training and professional development initiatives, fostering a supportive organizational culture that encourages innovation, and promoting continuous product innovation.

Policymakers should consider creating environments that support these elements, such as providing financial incentives for R&D activities, offering tax breaks for innovation investments, and establishing industry collaborations and partnerships. Additionally, the findings suggest that employee performance plays a critical mediating role, highlighting the importance of employee engagement, motivation, and development in achieving organizational success. Policies and programs that promote employee well-being, job satisfaction, and career advancement opportunities can significantly contribute to enhancing SME performance (Jia et al., 2024).

In conclusion, this study underscores the vital role of human capital, organizational culture, and product innovation in driving entrepreneurial performance in e-commerce SMEs. By addressing these areas, businesses can enhance their competitiveness and sustainability in the rapidly evolving marketplace. The findings provide valuable insights for business leaders, policymakers, and researchers, emphasizing the need for strategic management practices that prioritize human capital development, foster a positive organizational culture, and encourage continuous innovation to achieve long-term success.

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