



Investigating the Mediating Role of Operational Capabilities Between Organizational Capabilities and Organizational Performance of SMEs

Linli Pan¹

Alireza Mohammadi^{1,2}

Amer Hamzah Jantan³

City University Malaysia, Malaysia^{1,2&3}

Abstract

Small and Medium-sized Enterprises (SMEs) face market competition, high labour costs, talent shortages, and innovation barriers, impacting their performance and competitiveness. Previous studies suggest that human capital, IT, and knowledge integration affect SME performance. Still, few studies address the impact of operational capabilities on employee-owned SMEs, with some showing contradictory results. This study investigates how operational capabilities mediate the effects of human capital, IT infrastructure, and knowledge integration on SME performance, focusing on employee-owned SMEs in Jiangsu Province, China. This quantitative research uses a stratified random sampling technique to collect data from personnel working at SMEs in Jiangsu as senior managers. Descriptive and demographic statistics are performed using SPSS version 24. The reliability, validity, and path coefficients are assessed using the PLS-SEM method using SmartPLS4. Results show that operational capabilities enhance the impact of these resources on performance and partially mediate their relationships. These findings highlight the importance of resource optimization and capability development, offering insights into improving SME competitiveness and supporting RBV and DCT theories.

Keywords: Organizational Resources, Human Capital, IT Infrastructure, Knowledge Integration, Operational Capability, Organizational Performance, SMEs

DOI: <https://doi.org/10.37227/JIBM-2025-01-7016>

Introduction

In the dynamic field of business and management, the performance of organizations is significantly influenced by the competitive business climate, with market competition intensity, internal capabilities, and external environmental factors playing crucial roles (Hosseini et al., 2020). This study focuses on how these elements interact to shape organizational performance, particularly in the context of globalization and the rapid evolution of information and communication technology (ICT). The emergence of ICT has not only accelerated change but also necessitated a rethinking of traditional business tactics, making it a key area of interest for researchers and managers alike (Chege et al., 2020; Law et al., 2020). Previous studies (Chege et al., 2020; Law et al., 2020) have pointed out that networking sites that allow individuals to communicate via innovation have provided a new

way to develop modern employment, highlighting the importance of ICT in shaping business strategies and operations.

The competitive business environment has prompted the identification of new approaches to enhance organizational performance. Entrepreneurial innovation and the business environment are critical in mitigating the challenges posed by market competition (Carmona-Rivera et al., 2021; Yunis et al., 2018). ICT innovation, in particular, has been recognized as a gateway for new commercial ventures, providing a foundation for organizational growth and development (Chege et al., 2020; Dangwal & Lalima, 2017). The Kenyan government's initiative to establish an e-Citizen online portal and customer service center exemplifies the use of ICT as a driver of socioeconomic growth and development (Chege et al., 2020; Dangwal & Lalima, 2017). Despite the progress in the ICT industry, SMEs in developing countries face several problems, including decreasing growth and high failure rates, highlighting the need for further research into their unique challenges and potential solutions (Muo & Azeez, 2020).

Organizational competencies, resources, and other company-specific assets are vital for competitive success (Fareri et al., 2020; Karman, 2020). The concept of 'core competencies' and 'organizational skills' has been incorporated into strategic management terminology, reflecting the growing recognition of the importance of these intangible assets (Keller & Aaker, 1992; Lanvers et al., 2020). As a key component of organizational development, learning has been applied to various areas, including competitive strategy, organizational behavior, technology, and operations management (Hao, 2016; Rapanta et al., 2020; Yang et al., 2019). The competitive advantage derived from company-specific skills and abilities is now widely acknowledged, making exploring organizational learning and its impact on performance a critical area of study (Nonaka & Takeuchi, 1995). Schaefer, (2020) highlighted that companies differ greatly in quality and product development speed, underscoring the importance of organizational learning in achieving and sustaining a competitive edge.

The growth of a knowledge economy, fueled by a revolution in information technology, innovation, and telecommunications, necessitates that successful 21st-century firms recognize the value of intellectual capital as a source of long-term competitive advantage (Aminu & Ahmad, 2018; Chams & García-Blandón, 2019). Intellectual capital has progressed through two stages, with the first phase in the 1990s aiming to raise awareness and establish early conceptualizations (Das, 2014; Naz et al., 2020; Patel, 2013). Valuable, rare, and distinctive resources can boost a company's competitive advantage according to resource-based views (RBVs) (Herb & Schramm, 2021; Pop et al., 2020). Many academics have carried out a range of studies to identify characteristics that may have a favorable influence on an organization's success across various domains such as marketing, operational management, human resource management, strategic management, and information (Gates-Rector & Blanton, 2019; Ogunyomi & Bruning, 2016). The role of knowledge management (KM) in defining how to successfully govern, apply, and create knowledge, as well as how to generate and reuse it effectively, is crucial in this context (Damapanpour, F; Sabat, K.A.; & Evan, 1989; Jean et al., 2008; Sikos et al., 2009).

In conclusion, this study aims to investigate the effect of organizational resources on organizational performance, focusing on the mediating role of operational capabilities. By examining the interplay between human capital, IT infrastructure, knowledge integration, and organizational performance, this research seeks to contribute to the understanding of how strategic factors contribute to exceptional performance. The findings of this study will be particularly relevant to SMEs in China, offering insights into how these organizations can

leverage their resources and capabilities to enhance their performance in a competitive global marketplace (Matthew & Omobola, 2020; D. Mishra et al., 2019). This study is timely and significant as it addresses the growing interest among academics in the importance of organizational competencies, resources, and other company-specific assets for competitive success (Fareri et al., 2020; Karman, 2020). Through the effective management and utilization of these resources, organizations can hope to navigate the complexities of the modern business environment and achieve sustainable competitive advantage.

This study investigates the effect of organizational resources on organizational performance. Furthermore, it investigates the mediating role of operational capabilities in the relationship between organizational resources (human capital, IT infrastructure, knowledge integration) and organizational performance. This study aims to investigate:

1. The effect of organizational resources on the organizational performance of SMEs in China.
2. The effect of organizational resources on the operational capabilities of the SMEs of China.
3. The effect of operational capabilities on the organizational performance of the SMEs in China.
4. The mediating role of operational capabilities between organizational resources and organizational performance.

Literature Review

Organizational performance is a key indicator to measure an organization's ability to achieve strategic objectives, which covers human capital, information technology infrastructure, knowledge integration, and other dimensions (Abualoush et al., 2018). Human capital, including employees' knowledge and skills, is crucial to improving organizational performance (Bontis et al., 2007). An organization's information technology infrastructure is the technical basis to support the operation process, and knowledge integration is related to the effective sharing and utilization of knowledge within the organization (Alrowwad et al., 2020). These factors have their unique contributions to performance, and their interaction significantly impacts performance (Chen et al., 2014). Especially the progress of information technology and the effectiveness of knowledge integration can enhance the influence of intellectual resources on performance (Yunis et al., 2018). Organizational performance is a key determinant of success in business environments, particularly for small and medium enterprises (SMEs) (Amoako-Gyampah et al., 2019).

SMEs are recognized as vital economic growth and innovation drivers worldwide, contributing significantly to GDP, employment, and industrial progress (Tseng & Lee, 2014). However, these enterprises face numerous challenges, including limited resource access, talent shortages, high labor costs, and regulatory burdens (Ogunyomi & Bruning, 2016). To remain competitive in dynamic and often volatile markets, SMEs must leverage their internal resources effectively while adapting to external pressures (Angst, 2018). This literature review examines the core factors influencing SME performance—human capital, IT infrastructure, and knowledge integration—and emphasizes the role of operational capabilities as mediators that translate these resources into sustainable growth and competitive advantage (Subramony et al., 2018).

As an important force in promoting economic development and social progress in China, small and medium-sized enterprises (SMEs) play a fundamental role in the economy by promoting employment and industrial innovation, and optimising their organizational performance is particularly critical (Zhao & Liu, 2020). By the end of 2022, the number of

small and medium-sized enterprises in China has exceeded 160 million, accounting for over 90% of all corporate entities, contributing 80% of enterprise employment and more than half of GDP (Zhao & Liu, 2020). Although small and medium-sized enterprises play a stable role in the job market, they face challenges such as market competition, high labor costs, talent shortage, and innovation and transformation. Market competition is a major issue, and 70% of the SMEs surveyed listed it as the main obstacle in 2024 (Amoako-Gyampah et al., 2019). High labour cost (62%) and talent shortage (45%) further restrict their growth (Ogunyomi & Bruning, 2016). Small and medium-sized enterprises are also struggling in innovation and transformation, and 43% of them think these are obstacles to success (Amoako-Gyampah et al., 2019). These challenges have hindered the growth and development of small and medium-sized enterprises, especially during the COVID-19 epidemic, and strict epidemic prevention measures have seriously affected the operation of small and medium-sized enterprises in Jiangsu (Bonadio et al., 2020). These challenges emphasize the importance of a sound organizational strategy to improve performance indicators such as financial stability, operational efficiency, and adaptability to external shocks (Mishra et al., 2019).

Human capital, defined as the knowledge, skills, and competencies of an organization's workforce, is a critical driver of performance (Bontis et al., 2007). Effective human capital management can enhance productivity, foster innovation, and improve employee satisfaction (Subramony et al., 2018). Research underscores the importance of aligning human resource practices with organizational goals to create a motivated and skilled workforce (Becker & Gerhart, 1996). Key tools such as performance management systems enable organizations to monitor and improve employee contributions, while human resource information systems (HRIS) streamline administrative tasks and support strategic decision-making (Dastagir et al., 2018). Moreover, empowering employees in decision-making enhances innovation and strengthens their commitment to organizational objectives (Alrowwad et al., 2020). For SMEs, investing in employee development and engagement is essential to building a resilient workforce capable of navigating complex business environments (Amoako-Gyampah et al., 2019).

Adopting modern technologies is integral to SMEs' operational efficiency and competitiveness (Zhu, 2004). Advances in automation, artificial intelligence, and data analytics have revolutionized business processes, enabling SMEs to reduce errors, accelerate decision-making, and improve customer responsiveness (Yates et al., 2020). Research highlights the importance of technology adoption in enhancing organizational capabilities and employee productivity (Chen et al., 2014). For example, process automation reduces manual errors and optimizes workflows, while digital communication tools facilitate seamless collaboration across teams (Zikmund et al., 2010). Furthermore, SMEs that embrace e-commerce platforms and customer relationship management systems gain a competitive edge by improving service delivery and market reach (Zikmund et al., 2003). These technologies' perceived ease of use and potential benefits often drive their adoption (Davis, 1989). However, limited access to financial resources and technical expertise remains a barrier for many SMEs, emphasizing the need for supportive policies and training initiatives (Ogunyomi & Bruning, 2016).

Knowledge integration, the process of combining and utilizing knowledge from diverse sources, is pivotal in fostering innovation and operational efficiency (Nonaka & Takeuchi, 1995). Effective knowledge integration allows organizations to leverage collective expertise, facilitating better decision-making and problem-solving (Alrowwad et al., 2020). This capability is particularly important for SMEs in addressing market demands and driving growth (Tseng & Lee, 2014). By fostering a culture of continuous learning and

collaboration, SMEs can enhance their adaptability and innovation capacity (Mishra et al., 2019). Advanced IT infrastructure supports knowledge integration by enabling seamless data sharing and real-time employee collaboration (Chen et al., 2014). This interconnectedness improves internal operations and enhances customer experiences and stakeholder engagement (Alrowwad et al., 2020). As SMEs increasingly operate in globalized and competitive markets, the ability to integrate and utilize knowledge effectively becomes a critical factor in sustaining long-term success (Yunis et al., 2018).

Operational capabilities bridge organizational resources and performance outcomes (Subramony et al., 2018). They enable SMEs to transform human capital, technology, and knowledge into tangible results such as increased profitability, market share, and customer satisfaction (Pradana et al., 2020). Studies emphasize the role of operational capabilities in resource allocation, process optimization, and strategic adaptation (Yu et al., 2018). For instance, SMEs that excel in demand forecasting and production planning can align their operations with market trends, reducing costs and improving efficiency (Mishra et al., 2019). Similarly, operational capabilities facilitate adopting sustainable practices such as green supply chain management and eco-friendly manufacturing, which enhance brand reputation and reduce environmental impact (Mishra et al., 2019). By prioritizing the development of these capabilities, SMEs can achieve greater resilience and agility in a rapidly changing business landscape (Subramony et al., 2018).

While SMEs have the potential to drive economic development and innovation, they face significant challenges in accessing resources and navigating regulatory frameworks (Ogunyomi & Bruning, 2016). Limited access to financing often hinders their ability to invest in advanced technologies and employee development (Ozili, 2021). Additionally, complex and outdated government regulations create barriers to entry and expansion for many SMEs. However, there are opportunities for improvement through proactive government support and strategic partnerships. Initiatives such as financial subsidies, training programs, and infrastructure development can empower SMEs to overcome their challenges and thrive in competitive markets (Tingfeng et al., 2022; A. Yao et al., 2024). Furthermore, fostering collaboration between SMEs and larger enterprises or research institutions can enhance innovation and technology transfer, creating synergies that benefit the broader economy (Alrowwad et al., 2020).

This review underscores the critical role of SMEs in economic and industrial development while highlighting the challenges they face in sustaining performance (Amoako-Gyampah et al., 2019). Human capital, IT infrastructure, and knowledge integration are identified as key resources that when effectively managed and mediated by operational capabilities, drive organizational success (Subramony et al., 2018). Policymakers and SME leaders must prioritize resource optimization, technological advancement, and capacity building to enhance competitiveness and resilience (Pan et al., 2023; Song et al., 2023; G. Yao et al., 2024). By addressing these interconnected factors, SMEs can better navigate global challenges and contribute to long-term economic stability and growth (Amoako-Gyampah et al., 2019). The findings of this review offer valuable insights for researchers, practitioners, and policymakers seeking to support the sustainable development of SMEs in increasingly complex business environments (Alrowwad et al., 2020).

The study's general ideas are resource-based representation (RBV) and dynamic capabilities theory which are the foundations that guide the current investigation are effective use of an organization's resources.

Methodology

This study adopted a quantitative methodology to investigate the relationships among human capital, IT infrastructure, organizational learning, operational capabilities, and organizational performance within SMEs in Jiangsu, China. Using a stratified random sampling method, data were collected from 532 senior managers through a structured questionnaire. The questionnaire included sections on demographic details, independent variables such as human capital and IT infrastructure, dependent variables measuring organizational performance, and mediating factors like operational capabilities. A five-point Likert scale was used to ensure consistent and precise measurement of variables. A pilot study confirmed the questionnaire's reliability, with Cronbach's alpha values exceeding 0.70 for all variables.

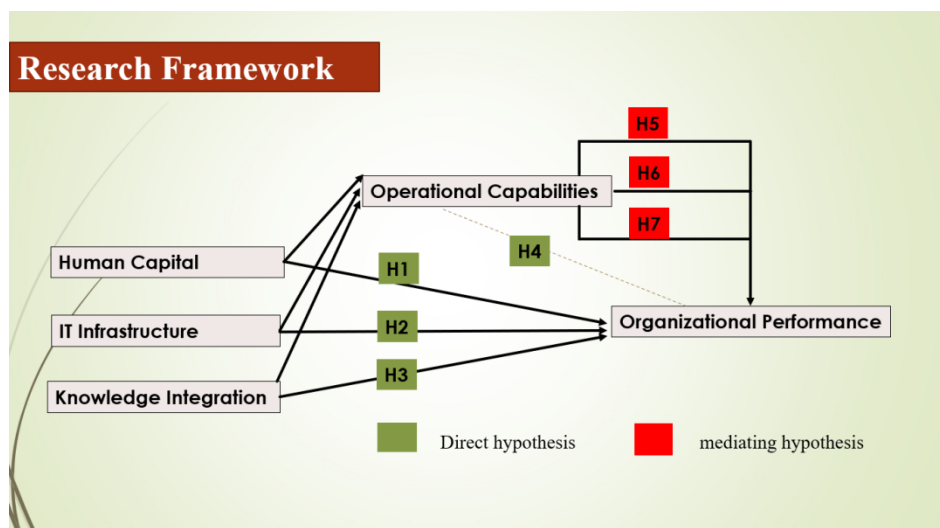
Data were analyzed using SPSS 24.0 for descriptive statistics and preliminary assessments, followed by Smart PLS 4.0 for structural equation modeling (SEM). This dual approach facilitated robust hypothesis testing, examining both direct and mediated effects between variables. The research adhered to strict ethical standards, ensuring participant consent, confidentiality, and anonymity.

Grounded in the Resource-Based View (RBV), the study proposed hypotheses exploring how resources and capabilities influence organizational performance directly and through mediating effects. David Teece's Dynamic Capabilities Theory emphasizes the importance of an organization's ability to integrate and reconfigure internal and external competencies to maintain competitive advantage. The theory also emphasizes the critical role of flexibility and continuous learning.

RBV theory supports the examination of the relationship between Human capital, IT infrastructure, Knowledge integration, and organizational performance, and dynamic capabilities theory supports the examination of the relationship between Operational capabilities and organizational performance.

The research framework presented in Figure 1 is based on the literature and theories addressed previously.

Figure 1: Research Framework



This is the research framework of this study, which contains seven hypotheses.

H1: There is a significant relationship between Human capital and organizational performance in Jiangsu, China.

H2: There is a significant relationship between IT infrastructure and organizational performance in Jiangsu, China.

H3: There is a significant relationship between Knowledge Integration and organizational performance in Jiangsu, China.

H4: There is a significant relationship between Operational capabilities and organizational performance in Jiangsu, China.

H5: Mediating effect of operational capabilities on the relationship between human capital and organizational performance of SMEs in Jiangsu, China.

H6: Mediating effect of operational capabilities on the relationship between IT infrastructure and organizational performance of SMEs in Jiangsu, China.

H7: Mediating effect of operational capabilities on the relationship between knowledge integration and organizational performance of SMEs in Jiangsu, China.

H1-H4 are direct hypotheses about the effects of leadership human capital, IT infrastructure, knowledge integration, and operational capabilities on organizational performance.

H5-H7 are mediating hypotheses, which are the mediating effects of operational capabilities between organizational resources and organizational performance.

Data Analysis and Result

Demographics

The demographic parameters in the current study included age, employment, type of SMEs, size of SMEs, age of SMEs, and Classification of SMEs. In this investigation, 532 valid samples were subjected to simple and multiline tests.

Descriptive Statistics for Constructs

The descriptive statistics of the research variables are shown in Table 1 below, and the minimum, maximum score, standard deviation and average value of the research variables used in this study are given. The questionnaire used in this study was designed on a Likert-5 scale, ranging from 1 to 5. The mean scores of the study variables are 3.593 to 3.696, and the standard deviation value for the study variables ranges from 0.660 to 0.778. In the present study 'mean scores of less than 3.00 have been categorized as low, mean scores between 3.00 and 5.00 are categorized as average and mean scores higher than five were categorized as high.

Table 1: Descriptive Statistics

Variable	N	mean	median	standard deviation	min	max
OP	532	3.6086	3.7500	.72670	1.50	5.00
HC	532	3.592857	3.600000	.6595280	1.2000	5.0000
IT	532	3.5977	3.7500	.77817	1.00	5.00
KI	532	3.696241	3.800000	.7171198	1.0000	5.0000
OC	532	3.6283	3.7500	.71017	1.50	5.00

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=sample size.

Assessment of measurement model

In this study, as shown in Table 2, the measurement model demonstrated strong reliability, with Cronbach's alpha values exceeding 0.8. Additionally, all constructs exhibited high reliability, with AVE values surpassing the 0.50 threshold, indicating that the measurement model is both reliable and valid.

Table 2: Construct Reliability, Cronbach's Alpha, Composite Reliability, and AVE

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
HC	0.823	0.827	0.876	0.585
IT	0.872	0.873	0.912	0.723
KI	0.854	0.860	0.896	0.633
OC	0.779	0.783	0.857	0.600
OP	0.828	0.830	0.886	0.660

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Discriminant Validity

Table 3 shows the HTMT values between the variables, which ranged from 0.691 to 0.873, without any value exceeding 0.9 or even 0.85, which also shows the existence of discriminant validity between the variables.

Table 3: Heterotrait-Monotrait Ratio (HTMT) – Matrix

Variable	HC	IT	KI	OC	OP
HC					
IT	0.691				
KI	0.741	0.735			
OC	0.818	0.724	0.873		
OP	0.819	0.702	0.787	0.804	

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Collinearity Statistics (VIF)

The results, shown in Tables 4 and 5, confirm that multi-collinearity was not a significant problem. It is crucial to ensure that the correlation between independent predictor variables is not too high, as high correlation can make it difficult to independently predict the dependent variable. Additionally, multi-collinearity can reduce the statistical significance of the regression model, making predictions unreliable. Since all VIF values were below 5, multi-collinearity did not pose a significant issue in this study.

Table 4: Inner Model

Variable	HC	IT	KI	OC	OP
HC				1.850	2.067
IT				1.874	1.927
KI				2.015	2.504
OC					2.501
OP					

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Table 5: Outer Model

Variable	VIF
HC1	1.570
HC2	1.617
HC3	1.752
HC4	1.725
HC5	1.827
IT1	2.041
IT2	2.390
IT3	2.433
IT4	2.050
KI1	1.860
KI2	1.969
KI3	2.104
KI4	2.035
KI5	1.456
OC1	1.435
OC2	1.569
OC3	1.561
OC4	1.576
OP1	1.695
OP2	1.991
OP3	1.634
OP4	1.843

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Significance and Relevance of the Structural Model Relationships

The statistical significance of the path coefficients was determined using bootstrapping techniques, which involved generating 10,000 subsamples and conducting a two-tailed test, as J. Hair et al. (2021) recommended. The resulting path coefficients and their corresponding significance (p-values) are shown in Figure 2. Importantly, all the path coefficients were found to be statistically significant.

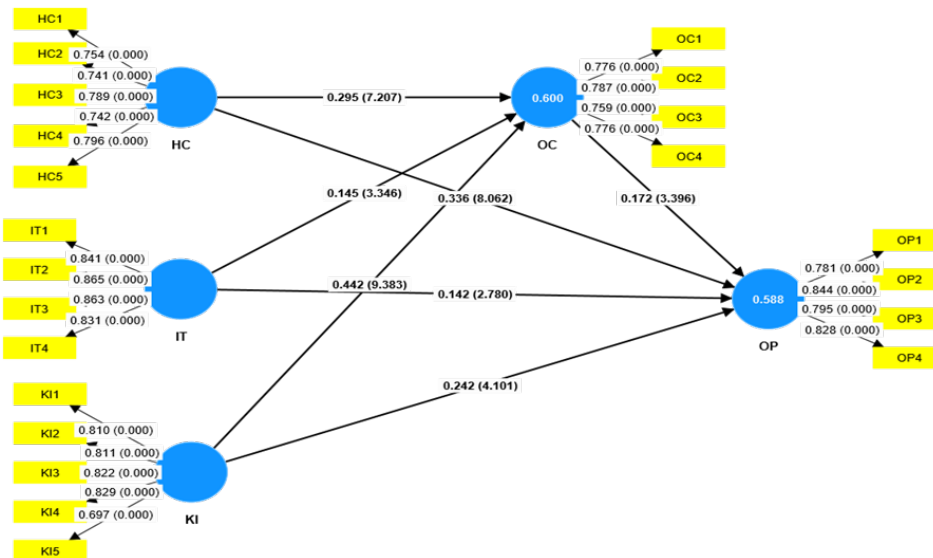


Figure 2: Structural Model of Two-Tail Test Results Showing the Relationships' Strength and Significance

The results presented in Table 6 show the P-values and T-values for each path coefficient in the structural model. The path coefficients are standardized estimates of the hypothesized relationships between the constructs. The analysis indicates that the path coefficient between HC and OC is 0.295 (T = 7.207, P < 0.05), demonstrating a positive and statistically significant relationship. Similarly, the path coefficient between HC and OP is 0.336 (T = 8.062, P < 0.05), which also reveals a significant relationship. The path coefficient between IT and OC is 0.145 (T = 3.346, P < 0.05), indicating a significant relationship, as does the path coefficient between IT and OP, which is 0.142 (T = 2.780, P < 0.05). Furthermore, the path coefficient between KI and OC is 0.442 (T = 9.383, P < 0.05), suggesting a significant relationship, as well as the path coefficient between KI and OP 0.242 (T = 4.101, P < 0.05), which is also significant. Lastly, the path coefficient between OC and OP is 0.172 (T = 3.396, P < 0.05), indicating a significant relationship.

Table 6: Size and Significance of the Path Coefficients

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (IO/STDEV)	P values
HC -> OC	0.295	0.295	0.041	7.207	0.000
HC -> OP	0.336	0.337	0.042	8.062	0.000
IT -> OC	0.145	0.145	0.043	3.346	0.001
IT -> OP	0.142	0.142	0.051	2.780	0.005
KI -> OC	0.442	0.442	0.047	9.383	0.000
KI -> OP	0.242	0.242	0.059	4.101	0.000
OC -> OP	0.172	0.172	0.051	3.396	0.001

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Model's Explanatory Power

Table 7 presents the variance of the variables in the model explained. For example, an R^2 value of 0.600 for OC indicates a moderate direct effect of the other variables on OC. In contrast, an R^2 value of 0.588 for OP suggests a strong direct effect of the other variables on OP. In conclusion, evaluating the explanatory power of a structural model is crucial for understanding the strength of relationships between the constructs. The R^2 value and f^2 effect size provides useful measures for quantifying the variance explained by the exogenous constructs and their relationships with the endogenous constructs. Interpreting these measures should always consider the study's context and the model's complexity.

Table 7 Explained Variance (R^2)

Variable	R-square	R-square adjusted
OC	0.600	0.598
OP	0.588	0.585

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

The effect size (f^2) measures the strength of the relationship between variables at the structural level. Values of 0.02, 0.15, and 0.35 indicate low, medium, and significant effects of predictor variables (Lorah, 2018; Selya et al., 2012). f^2 effect size shows the extent to which exogenous latent variables contribute to the R^2 values of endogenous latent variables (Jürkenbeck et al., 2019). The results of the effect size f^2 values in Table 8 show that the effect size from HC to OC is 0.117; from HC to OP is 0.132; from IT to OC is 0.028; and from IT to OP is 0.025; The effect size from KI to OC is 0.243; the effect size from KI to OP is 0.057; the effect size from OC to OP is 0.029.

Table 8 Effect Size (f^2)

Variable	HC	IT	KI	OC	OP
HC				0.117	0.132
IT				0.028	0.025
KI				0.243	0.057
OC					0.029
OP					

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Model's Predictive Power

Shmueli et al. (2019) recommended using the Q^2 predict value to assess the predictive power of PLS-SEM analysis. Table 9 shows that all Q^2 predict values are greater than zero, demonstrating that PLS-SEM exhibits predictive power exceeding the naive benchmark for all indicators. Additionally, the study compared PLS-SEM_RMSE with LM_RMSE, as the errors were highly symmetric. The model displayed strong predictive power for all OP indicators, as the errors were smaller than those of LM_RMSE.

Table 9 PLS-predict Summary of Items to Show Comparison of the Error Measurement in the Predictive Power

Variable	Q ² predict	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE
OP1	0.293	0.854	0.630	0.851	0.633
OP2	0.396	0.669	0.514	0.677	0.517
OP3	0.413	0.645	0.504	0.641	0.499
OP4	0.388	0.677	0.520	0.681	0.521

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Assessment of the Mediating Effect

The mediation analysis was conducted using SmartPLS 4.0, with 10,000 resamples, and the results showed significant t-values (Joseph F. et al., 2021; Mohammadi, 2019). Table 10 presents the direct effects of the independent variables (HC, IT, KI) on the dependent variable (OP), including path coefficients, t-values, and p-values. Table 11 shows the indirect effects of the independent variables on the mediating variable (OC) and the mediating variable's effects on the dependent variable. Additionally, Table 4.20 provides the total effects of the independent variables on the dependent variable.

The findings were obtained using SmartPLS 4.0, with a 10,000- resample bootstrap method, which indicate that all independent variables (HC, IT, KI) have significant direct effect path coefficients on the dependent variable (OP). The direct effect path coefficients of the independent variables (HC, IT, KI) on the mediating variable (OC) are also significant, and the mediating variable (OC) has significant direct effects on the dependent variable (OP). This suggests a partially mediated relationship between human capital, IT infrastructure, knowledge integration, and organizational performance through operational capability (OC) (Mohammadi et al., 2017, 2021).

Table 10 Direct Effect

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
HC -> OC	0.295	0.295	0.041	7.207	0.000
HC -> OP	0.336	0.337	0.042	8.062	0.000
IT -> OC	0.145	0.146	0.043	3.346	0.001
IT -> OP	0.142	0.143	0.051	2.780	0.005
KI -> OC	0.442	0.442	0.047	9.383	0.000
KI -> OP	0.242	0.240	0.059	4.101	0.000
OC -> OP	0.172	0.170	0.051	3.396	0.001

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Table 11 Specific Indirect Effect

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (IO/STDEV)	P values
HC -> OC -> OP	0.051	0.050	0.016	3.079	0.002
IT -> OC -> OP	0.025	0.025	0.011	2.281	0.023
KI -> OC -> OP	0.076	0.075	0.024	3.190	0.001

Note. OP=organizational performance; HC=human capital; IT=IT infrastructure; KI=knowledge integration; OC=operational capabilities. N=532.

Findings

The findings aim to provide actionable insights for SMEs to enhance performance by leveraging strategic resource integration and operational excellence. The findings of this study emphasize the significant relationships among organizational resources, operational capabilities (OC), and SMEs performance (OP). Rigorous data cleaning and screening ensured a high-quality dataset, with 532 valid responses out of 683 initial questionnaires. Outliers were eliminated, and normality tests confirmed data distribution suitability. The demographic analysis provided a comprehensive sample profile, revealing that most respondents were managers or supervisors in SMEs aged 5–15 years, with sizes ranging from fewer than 50 to over 300 employees. This demographic analysis is consistent with previous studies on SMEs and their management practices (Jie et al., 2023; Q. Li et al., 2024; Qi et al., 2023).

Descriptive statistics indicated consistent evaluations of key variables, with mean scores ranging from 3.59 to 3.70 and standard deviations below 0.8. Measurement model assessments validated the reliability and validity of constructs. Cronbach's alpha values exceeded 0.8 across variables, and average variance extracted (AVE) values surpassed 0.5, ensuring construct consistency and accuracy. Discriminant validity was confirmed using the Fornell-Larcker criterion and Heterotrait-Monotrait ratio, indicating that constructs were distinct and well-measured. These findings align with the work of Tseng and Lee (2014), who also emphasized the importance of construct validity in management research.

The structural equation modeling (PLS-SEM) analysis revealed critical relationships. Human capital (HC), IT infrastructure (IT), and knowledge integration (KI) significantly influenced organizational performance (OP). HC had the strongest direct effect ($\beta=0.336$, $p<0.001$), followed by KI ($\beta=0.242$, $p<0.001$) and IT ($\beta=0.142$, $p<0.005$). Additionally, operational capabilities ($\beta=0.172$, $p<0.001$) played a vital role in enhancing OP, directly and indirectly. The significance of IT infrastructure in influencing organizational performance is further supported by the work of Zhu (2004), who found a complementarity between IT infrastructure and e-commerce capability.

The mediation analysis highlighted OC's significant role as a mediator. It enhanced the relationships between HC ($\beta=0.051$, $p=0.002$), IT ($\beta=0.025$, $p=0.023$), and KI ($\beta=0.076$, $p=0.001$) with OP. This indicates that operational capabilities amplify the impact of organizational resources on performance, underscoring the importance of focusing on operational excellence. This mediation effect aligns with the findings of Yunis, Tarhini, and Kassar (2018), who discussed the catalysing effect of corporate entrepreneurship in enhancing organizational performance through ICT and innovation.

Explanatory power analysis demonstrated that the model could explain 60% ($R^2=0.60$) of the variance in OC and 59% ($R^2=0.59$) in OP. These results indicate moderate to substantial explanatory capabilities, highlighting the robustness of the proposed framework. Predictive power was also assessed using Q^2 values, which exceeded zero for all constructs, demonstrating the model's strong predictive accuracy. The strong explanatory power of the model is consistent with the findings of Bonanno, Galea, Bucciarelli, and Vlahov (2006), who emphasized the importance of psychological resilience in disaster aftermath.

The study supports all proposed hypotheses. HC, IT, and KI significantly enhance OP directly and indirectly through OC. The findings validate the critical role of strategic resource integration, with OC serving as a bridge that transforms resources into improved organizational outcomes. This emphasizes the importance of fostering operational capabilities to maximize the impact of human, technological, and knowledge resources. The role of operational capabilities in enhancing performance is further supported by the work of Alrowwad, Abualoush, and Masa'deh (2020), who found innovation and intellectual capital as intermediary variables among leadership styles and organizational performance.

These results provide actionable insights for SMEs aiming to improve performance. Focusing on talent management, IT infrastructure upgrades, and effective knowledge integration can significantly enhance operational capabilities, leading to better organizational outcomes. By strategically aligning these resources, SMEs can achieve sustainable competitive advantages and adapt to evolving market demands. Teng, Lu, Huang, and Fang (2020) also highlight the importance of talent management in SMEs in their study of the ethical work climate in the hospitality industry.

This study establishes a comprehensive framework linking organizational resources, operational capabilities, and performance, validated through robust statistical analysis. The findings offer a roadmap for researchers and practitioners, highlighting how SMEs can optimize their resources for superior performance. The comprehensive framework proposed in this study is supported by a wide range of literature, including the work of Aboalouesh, Obeidat, Tarhini, Masa'deh, and Al-Badi (2018) on the role of employees' empowerment in enhancing performance through knowledge management and information systems.

Discussion & Implications

This study underscores the significant roles of human capital, IT infrastructure, and knowledge integration in enhancing organizational performance, particularly in SMEs within Jiangsu, China. Operational capabilities were found to mediate these relationships effectively. Empirical evidence supports the positive impact of these organizational resources on performance, aligning with the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT). The study highlights that operational capabilities enable the efficient utilization of resources, fostering competitive advantage through continuous improvement in processes, flexibility, and innovation.

The findings also address critical gaps in literature by integrating operational capabilities as a mediator rather than a standalone predictor. This approach enriches understanding how resources like human capital and IT infrastructure translate into performance outcomes. By emphasizing knowledge integration, the research sheds light on how new information enhances existing organizational knowledge bases, promoting adaptability and strategic growth.

The study offers actionable insights for SME policymakers and managers. First, enhancing operational capabilities through targeted investments in human capital

development, IT infrastructure, and knowledge integration can significantly improve organizational performance. SMEs are advised to adopt advanced technologies and e-commerce platforms to optimize resource use and improve interaction with business partners. Moreover, fostering a culture of continuous learning and adaptability is essential to sustain performance in the dynamic business environment. The findings suggest that supportive policies, including talent incentives, digital transformation subsidies, and resource integration initiatives, can strengthen SME performance at the governmental level. These measures bolster SMEs' competitiveness and contribute to broader economic development by promoting sustainable growth and innovation in the sector (Chen et al., 2024; Y. Li et al., 2024; Yong et al., 2024).

While the study provides valuable insights, it recognizes limitations, such as focusing on SMEs in Jiangsu and relying on cross-sectional data. Future research should explore longitudinal designs to capture performance trends over time. Expanding the geographical scope to include diverse cultural and regulatory environments would enhance the generalizability of the findings. Additionally, exploring other mediators like dynamic capabilities and external business environments could provide a more nuanced understanding of the resource-performance link. This research also opens avenues for investigating additional organizational factors, such as leadership styles, cultural integration, and knowledge management strategies, to further advance the field.

Limitations and Future Study Recommendations

This empirical research integrated Operational and Organizational capabilities with Organizational Performance in a unique framework, aiming to benefit SMEs. However, several limitations merit attention. Firstly, the study employed a quantitative survey approach, limiting its perspective. Future research could adopt a qualitative, in-depth interview method focused on a specific SME industry to uncover new insights. Additionally, considering multiple respondents per organization would provide a more comprehensive view. Secondly, the sample was limited to SMEs in Jiangsu, China. While the study population is relatively homogeneous, broader generalization requires a larger sample size encompassing SMEs nationwide. International research is also needed to validate findings across different regulatory environments. Thirdly, focusing on Jiangsu SMEs restricted the study's applicability to other sectors or countries. It is essential to apply this model to other industries, such as services, and test it in various countries. Fourthly, the study identified three key resources (human capital, IT infrastructure, and knowledge integration) and operational capabilities influencing organizational performance. However, other resources and their effects on mediation need exploration. The external business environment's role in this relationship also warrants investigation. Lastly, combining quantitative and qualitative methods, a mixed-method approach could offer a richer understanding of Chinese organizational performance. Future studies should include larger surveys, case studies, and international comparisons to validate findings and address biases. Encouraging more participants and discussing organizational performance issues with those who decline can further enrich research. While this study offers valuable insights, future research should address its limitations through broader samples, mixed methodologies, and international comparisons to validate and generalize its findings.

Conclusion

The study concludes by emphasizing the critical role of human capital, IT infrastructure, knowledge integration, and operational capabilities in enhancing the performance of SMEs

in Jiangsu, China. The empirical findings indicate that these factors significantly impact organizational success, with operational capabilities serving as a key mediator in this process. Bridging the gap between these resources through effective integration can improve organizational efficiency, innovation, and competitiveness. By focusing on developing human capital, adopting advanced IT solutions, and fostering a culture of knowledge sharing, SMEs can enhance their operational capabilities and better adapt to dynamic market conditions. The results of this study provide valuable insights for both practitioners and policymakers, contributing to the long-term growth and resilience of SMEs in China. Ultimately, these improvements support not only the success of individual businesses but also the broader economic development and competitiveness of the SME sector, strengthening the foundation for sustainable economic growth.

References

- Aboalouesh, S. H., Obeidat, A. M., Tarhini, A., Masa'deh, R., & Al-Badi, A. (2018). The role of employees' empowerment as an intermediary variable between knowledge management and information systems on employees' performance. *VINE Journal of Information and Knowledge Management Systems*, 48(2).
- Abdurofi, I., Ismail, M. M., Kamal, H. A. W., & Gabdo, B. H. (2017). Economic analysis of broiler production in Peninsular Malaysia. *International Food Research Journal*, 24(2), 761.
- Alrowwad, A., Abualoush, S. H., & Masa'deh, R. (2020). Innovation and intellectual capital as intermediary variables among transformational leadership, transactional leadership, and organizational performance. *Journal of Management Development*.
- Aminu, S. G., & Ahmad, N. (2018). An Evaluation of the Effects of Brand Equity on Consumer Willingness to Pay Price Premium. *International Journal of Marketing Research Innovation*, 2(1).
- Amoako-Gyampah, K., Boakye, K. G., Adaku, E., & Famiyeh, S. (2019). Supplier relationship management and firm performance in developing economies: A moderated mediation analysis of flexibility capability and ownership structure. *International Journal of Production Economics*, 208.
- Angst, U. M. (2018). Challenges and opportunities in corrosion of steel in concrete. *Materials and Structures/Materiaux et Constructions*, 51(1).
- Becker, B., & Gerhart, B. (1996). The impact of human resource management on organizational performance: Progress and prospects. *Academy of Management Journal*, 39(4).
- Bonanno, G. A., Galea, S., Bucciarelli, A., & Vlahov, D. (2006). Psychological resilience after disaster: New York City in the aftermath of the September 11th terrorist attack. *Psychological Science*, 17(3), 181–186.
- Bontis, N., Seleim, A., & Ashour, A. (2007). Human capital and organizational performance: A study of Egyptian software companies. *Management Decision*, 45(4), 789–801.
- Carmona-Rivera, C., O'Neil, L. J., Patino-Martinez, E., Shipman, W. D., Zhu, C., Li, Q.-Z., Kerns, M. L., Barnes, L. A., Caffrey, J. A., & Kang, S. (2021). Autoantibodies Present in Hidradenitis Suppurativa Correlate with Disease Severity and Promote the Release of Proinflammatory Cytokines in Macrophages. *Journal of Investigative Dermatology* 26(2).
- Chege, S. M., Wang, D., & Suntu, S. L. (2020). Impact of information technology innovation on firm performance in Kenya. *Information Technology for Development*, 26(2).

- Chen, M., Mohammadi, A., Li, Q., Jantan, A. H., & Sun, H. (2024). Role of Business Environment and Size Between Company Capabilities and Crisis Management for Catering Enterprises. *Journal of International Business and Management*, 7(3), 1–14. <https://doi.org/10.37227/JIBM-2024-02-6412/2>
- Chen, Y., Wang, Y., Nevo, S., Jin, J., Wang, L., & Chow, W. S. (2014). IT capability and organizational performance: The roles of business process agility and environmental factors. *European Journal of Information Systems*, 23(3). <https://doi.org/10.1057/ejis.2013.4>
- Dangwal, K. L., & Lalima. (2017). Blended Learning : An Innovative Approach. *Universal Journal of Educational Research*, 5(1), 129–136.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.
- Fareri, S., Fantoni, G., Chiarello, F., Coli, E., & Binda, A. (2020). Estimating Industry 4.0 impact on job profiles and skills using text mining. *Computers in Industry*, 118, 103222.
- Hao, Y. (2016). Exploring undergraduates’ perspectives and flipped learning readiness in their flipped classrooms. *Computers in Human Behavior*, 59.
- Herb, M., & Schramm, M. (2021). Functions of ros in macrophages and antimicrobial immunity. *In Antioxidants* (Vol. 10, Issue 2).
- Jie, J., Mohammadi, A., Jantan, A. H., Goyal, S. B., & He, S. (2023). The Moderating Influence of Big Data Analytics Capabilities on the Relationship Between Organizational Culture and Management Effectiveness at Higher Education Institutions in Sichuan, China. *Lecture Notes in Networks and Systems*, 726, LNNS, 1–11. https://doi.org/10.1007/978-981-99-3716-5_1
- Joseph F., H. Jr., G. Tomas, M. H., Christian M., R., & Marko, S. (2021). Primer on Partial Least Squares Structural Equation Modeling.
- Karman, A. (2020). Understanding sustainable human resource management-organizational value linkages: The strength of the SHRM system. *Human Systems Management*, 39(1).
- Lanvers, U., Lambrechts, A. A., & Crosswaite, M. (2020). ‘I’ve got a gut feeling that I’d regret not choosing Spanish’. A critical discourse analysis of language option choice discussions on Mumsnet and Studentroom. *Language Learning Journal*, 48(5).
- Li, Q., Mohammadi, A., Chen, M., Song, Y., & Jantan, A. H. (2024). Intervening Role of Emotional Exhaustion and Perceived Organizational Support between Customer Mistreatment and Employee Turnover Intention in Star-Rated Hotels. *Journal of International Business and Management*. <https://doi.org/10.37227/JIBM-2024-02-6411>
- Li, Y., Mohammadi, A., He, S., & Amer, H. J. (2024). Factors Influencing Green Food Purchase Intentions: The Intervening Role of Customer Satisfaction and Advertising. *Journal of International Business and Management*, 6(7), 1. <https://doi.org/10.37227/jibm-2024-06-6512>
- Matthew, I. A., & Omobola, J. (2020). Assessment of the Functionality of Parent-Teacher Association in Public Secondary Schools in Ondo State, Nigeria. *South Asian Journal of Social Studies and Economics*.
- Mishra, D., Luo, Z., Hazen, B., Hassini, E., & Foropon, C. (2019). Organizational capabilities that enable big data and predictive analytics diffusion and organizational performance: A resource-based perspective. *Management Decision*.

- Mohammadi, A. (2019). Intervening role of loyalty reward programs and E-word-of-mouth on smartphone brand loyalty in Malaysia. ProQuest Dissertations Publishing. <https://doi.org/10.13140/RG.2.2.11783.16801>
- Mohammadi, A., Saeedikondori, A., & Ali, N. A. (2017). Factors Influencing Cloud Computing Adoption in Malaysian Information Technology Companies. *Governance and Sustainability of Global Business Economics*, 14–15. www.econ.upm.edu.my
- Mohammadi, A., Saeedikondori, A., Nezakati, H., Sabermajidi, N., & Jantan, A. H. (2021). An investigation on cloud computing adoption within information technology companies. *Handbook of Research on Future Opportunities for Technology Management Education*, 266–287. <https://doi.org/10.4018/978-1-7998-8327-2.ch016>
- Muo, I., & Azeez, A. A. (2020). Green Entrepreneurship: Literature Review and Agenda for Future Research. *International Journal of Entrepreneurial Knowledge* 26(2).
- Nonaka, I., & Takeuchi, H. (1995). The knowledge-creating company: How Japanese companies create the dynamics of innovation. Oxford University Press 26(2).
- Mishra, A. R., Luo, Z., Hazen, B., Hassini, E., & Foropon, C. (2019). Organizational capabilities that enable big data and predictive analytics diffusion and organizational performance: A resource-based perspective. *Management Decision* 26(2).
- Nonaka, I., & Takeuchi, H. (1995). The knowledge-creating company: How Japanese companies create the dynamics of innovation. Oxford University Press.
- Ogunyomi, P., & Bruning, N. S. (2016). Human resource management and organizational performance of small and medium enterprises (SMEs) in Nigeria. *International Journal of Human Resource Management*, 27(6).
- Pan, L., Mohammadi, A., Jantan, A. H., & Sun, H. (2023). The Effect of Organizational Resources and Capabilities on Organisational Performance of Large-Scale Manufacturing Sector in Jiangsu Province, China. *Journal of International Business and Management*, 6(2), 1–12. <https://doi.org/10.37227/jibm-2022-11-5592>
- Pradana, M., Pérez-Luño, A., & Fuentes-Blasco, M. (2020). Innovation as the key to gain performance from absorptive capacity and human capital. *Technology Analysis and Strategic Management*, 32(7).
- Qi, Y., Mohammadi, A., Fei, Y., Jantan, A. H., & Sun, H. (2023). The Mediating Role of Workers' Migration and Income Redistribution Between Rural Social Security and Rural Consumer Purchase Behaviour in Anhui Province, China. *Journal of International Business and Management*, 6(1), 1–14. <https://doi.org/10.37227/jibm-2022-11-5593>
- Song, S., Ahmad, B., Meng, N., & Mohammadi, A. (2023). Role of Value Co-Creation between Information Interaction Capabilities and Competitive Advantage in SMEs, Henan Province, China. *Journal of International Business and Management*. <https://doi.org/10.37227/jibm-2023-05-5991>
- Subramony, M., Segers, J., Chadwick, C., & Shyamsunder, A. (2018). Leadership development practice bundles and organizational performance: The mediating role of human capital and social capital. *Journal of Business Research*, 83.
- Teng, C.-C., Lu, A. C. C., Huang, Z.-Y., & Fang, C.-H. (2020). Ethical work climate, organizational identification, leader-member-exchange (LMX) and organizational citizenship behavior (OCB): a study of three star hotels in Taiwan. *International Journal of Contemporary Hospitality Management*.

- Tingfeng, Z., Mohammadi, A., Jantan, A. H., Nezakati, H., & Irfan, M. (2022). The Intervening Role of Communication Satisfaction and Trust in Leader on the relationship between Leadership Communication and Employee Turnover Intention in Sichuan, China. *Journal of International Business and Management*, 5(12), 1–20. <https://doi.org/10.37227/jibm-2022-11-5588>
- Tseng, S.-M., & Lee, P.-S. (2014). The effect of knowledge management capability and dynamic capability on organizational performance. *Journal of Enterprise Information Management*, 27(2), 158–179.
- Yates, A. D., Achuthan, P., Akanni, W., Allen, J., Allen, J., Alvarez-Jarreta, J., Amode, M. R., Armean, I. M., Azov, A. G., & Bennett, R. (2020). Ensembl 2020. *Nucleic Acids Research*, 48(D1), D682–D688.
- Yao, A., Mohammadi, A., Lan, W., & Tingfeng, Z. (2024). Effect of Individual-Oriented Transformational Leadership on Teachers' Work Performance, Mediated by Intrinsic Motivation in Training Schools. *Journal of International Business and Management*, 7(7), 1–15. <https://doi.org/10.37227/jibm-2024-06-6521>
- Yao, G., Mohammadi, A., Hamzah, J. A., & Sun, H. (2024). The Mediating Role of Consumer Social Presence and Satisfaction between E-Commerce Live Streaming Characteristics and Repurchase Intention of Agricultural Products. *Journal of International Business and Management*. <https://doi.org/10.37227/jibm-2023-12-6322>
- Yong, W., Mohammadi, A., Sabermajidi, N., & Amer, H. J. (2024). The Mediating Role of Organizational Cynicism between Occupational Fatigue and Organizational Learning Culture in the Private Security Firms. *Journal of International Business and Management*. <https://doi.org/10.37227/JIBM-2024-08-6592>
- Yunis, M., Tarhini, A., & Kassar, A. (2018). The role of ICT and innovation in enhancing organizational performance: The catalysing effect of corporate entrepreneurship. *Journal of Business Research*, 88.
- Zhao, Y., & Liu, B. (2020). The evolution and new trends of China's tourism industry. *National Accounting Review*, 2(4), 337–353.
- Zhu, K. (2004). The complementarity of information technology infrastructure and E-commerce capability: A Resource-based assessment of their business value. *Journal of Management Information Systems*, 21(1).