

Technological Innovation Improves SMEs Performance Through Knowledge Management Practices

Rahmawati^{1*}, Andi Aris Mattunruang¹, Yonas Ferdinand Riwu²

¹Universitas Patempo, Makassar, 90233, Indonesia

²Universitas Nusa Cendana, Kupang, 85228, Indonesia

ABSTRACT

Purpose – This study examines how technological innovation influences the performance of SMEs in South Sulawesi through the role of knowledge management. The topic is important as many SMEs are transitioning from traditional business practices to digital platforms, particularly e-commerce, supported by increasing government initiatives. Understanding this transformation provides insights into improving competitiveness and sustainability in emerging markets.

Design/methodology/approach – This research employs a quantitative approach using survey data collected from SMEs in South Sulawesi. The study integrates the technology acceptance model to analyze the relationship between innovation, trust, and interest in e-commerce adoption. Data were analyzed using least squares regression to measure the effect of technological innovation on SME performance, with knowledge management as a supporting construct.

Finding/Results – The results indicate that SMEs adopting technological innovation demonstrate significantly better performance compared to those that rely on traditional methods. Innovation, supported by effective knowledge management practices, enhances productivity and competitiveness.

Originality/Value – This study highlights the strategic role of integrating technological innovation and knowledge management in improving SME performance, offering practical implications for policymakers and business actors in accelerating digital transformation.

ARTICLE INFO

Keywords:

Knowledge Management, SMEs Performance, Technology Innovation

Article Information:

Received: 01/02/2026

Revise: 23/03/2026

Accepted: 25/03/2026

ISSN:

2985-3168 (Online)

2985-3222 (Print)

*Corresponding Author at:

Universitas Patempo, Jl. Inspeksi Kanal Citraland No. 10, Makassar, 90233, Indonesia.

E-mail address: rahmawati3866@gmail.com (Rahmawati)

The work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International \(CC BY-SA 4.0\)](https://creativecommons.org/licenses/by-sa/4.0/)



1. Introduction

The importance of digital transformation in integrating technology tools into SMEs business strategy practices internationally. The barriers faced in adopting new technologies can be leveraged by executives and managers at the highest levels to better understand how organizations can leverage digital tools if they want to internalize and implement them into the business (Pereira et al., 2022).

E-commerce is a strong global trend, driven by economic policies, changing consumer behavior, and improvements in logistics and technology. E-commerce skills are necessary but not enough to improve business performance. The duality of marketing is reflected in a market-based approach and is crucial to harnessing the power of online marketing opportunities (Tolstoy et al., 2022). Employers experience high trust and social support, but a lack of institutional trust. It has been noted that government initiatives and digitalization have reshaped entrepreneurship, providing more opportunities for economic activity. However, government institutions must be further developed to ensure successful and sustainable growth in the business environment (Hansen, 2019).

To cater to the global market, many SMEs, however, wish to grow their company by diversifying their offerings. Nonetheless, internationalization affects every facet of a business's business strategy. The development of digital technologies is crucial for the internationalization of resources and the creation of successful businesses, despite the numerous challenges that come with internationalization for business models. This innovation was started by flexible SMEs (Reim et al., 2022).

Globalization and digitalization together represent the current megatrend that is influencing the global business landscape and opening doors for new business models. Digitalization enables businesses to expand rapidly worldwide. Despite the fact that the early phenomenon of internationalization has drawn more attention in the last ten years in the field of international entrepreneurship, less attention has been paid to how digitization can facilitate internationalization at a faster rate (Y.-Y. Lee et al., 2019). In order to prevent adverse selection caused by asymmetric information in the future of international entrepreneurship, information asymmetry must be reduced by the development of information skills and the use of current emerging digital technologies, such as social media (Chakravarty et al., 2021).

Based on data from the Cooperatives and SMEs Office of South Sulawesi Province, in 2019 there were more than 940 thousand business units, then to around 1.2 million in 2020 and increased again to 1.3 million business units in 2021. In 2022, it will increase to 1.5 million SMEs units, and only 130 thousand have utilized digital technology in marketing their products. The number of SMEs in South Sulawesi is 1.2 million SMEs players and those who have utilized digital technology as much as 10 percent or approximately 120 thousand more SMEs players.

The growing significance of entrepreneurial firms in global markets has led to a recent focus in research on the role of digital technologies in start-up internationalization. Consequently, the majority of research to date has ignored the role that people play and their capacity to use technology in favor of examining the contextual framework that digital technology provides. The gap focuses on digital skills and examines their impact on intentions to engage in international entrepreneurship (von Arnim & Mrozewski, 2020).

Micro, small, and medium-sized businesses (SMEs) must look for expansion outside of their home markets, but there are plenty of opportunities for them to do so thanks to the global economy's growing digitization. However, because digitalization was not initially intended

for such a scale and because managing business models in an online environment can be challenging, many SMEs are unable to expand internationally. Online SMEs that want to grow globally through digitalization must invest in cyber resilience, information and communication resources, and partnerships. They also need to build skills in customer relations, business process management, and partnership building (Mika Westerlund, 2020). Depending on the opportunities and risks present in the business environment, companies must have the appropriate digital strategy. Furthermore, employers still know very little about cybersecurity, despite realizing how important it is to manage sensitive data and create information security plans in order to prevent data theft within the organization. All of the findings are in favor of developing a new digital model for sustainable entrepreneurship that is based on the company's strategic goals and entrepreneurial vision in order to help it stay competitive in a market that is both sustainable and expanding (Nicolau et al., 2022).

According to bricolage theory, digitalization is a value chain that permits the repurposing and combining of current resources to address problems, produce creative solutions, or open up new avenues for global expansion. In summary, the research adds to the body of knowledge in international business by examining the conduct of digitally native businesses in the context of their strategic internationalization initiatives (Vadana et al., 2021).

The QMS (Social Media Marketing) instrument makes a significant and positive contribution to the sustainable growth of SMEs in developing countries. In addition, the research also found that SMEs management teams play an important role in supporting the implementation of actual QMS tools to drive sustainable SMEs growth (Chatterjee et al., 2021). Theoretically, business model innovation and decision logic in international entrepreneurship are linked by proposition concepts that can be tested in the future with empirical data, as the literature reviews (Asemokha et al., 2021).

To attain a balanced state of digitalization, where sustainability and performance of digitalization are excellent at different strategic steps, organizations can be divided into two groups is Concerned, Inspired, and Indifferent Conservatives (Tick et al., 2022). The willingness to use artificial intelligence has a positive impact on the performance of international SMEs. In addition, we found that digitalization and sustainability are positively linked, but become competitive growth paths as companies go international (Denicolai et al., 2021).

The topic of digitalization is becoming more and more significant for businesses. But most businesses, especially SMEs, find it difficult to engage in a cogent global digital transformation process. The development of marketing opportunities is one of the many organizational strategies that are impacted by digitalization in an enterprise. One factor that has been found to be propelling SMEs' internationalization is digitalization. However, the incorporation of digital technologies necessitates financial investment as well as modifications to the organization's internal procedures through the addition of fresh resources and the development of specialized management skills. Subsequently, a cross-analysis was conducted to identify different theoretically identifiable effects between the SMEs export potential index and digital intermediaries found in the literature (Dethine et al., 2020).

Regarding the definition of a digital company and the process of its internationalization, there is currently no agreement. In this regard, future research ought to advance. Further empirical research that examines the internationalization model of digitally native companies is imperative and crucial. In response, businesses in the digital space are building their digital business models around globalization (Piqueras, 2021). Micro, small, and medium enterprises

(SMEs) contribute significantly to the regional economy and job creation. and trade balance. Governments should support development-related service providers and encourage participation in international markets. In addition to the importance of promotion and participation in international.

According to research, SMEs find it difficult to get past obstacles to internationalization. A triadic approach, which demonstrates that there are more shared values among actors, can be used to accelerate the internationalization of SMEs and digital technology as a tool to do so. should take advantage of digital technologies as a platform since it speeds up their globalization. Service experience for SMEs facilitates compliance with strategic sustainability practices and has a bigger effect on business performance. A key factor in generating value for both SMEs and service providers is their symbiotic relationship (Mohamad et al., 2022). How market dynamics, strategic positioning, capacity building, and disruptive innovation can help facilitate the internationalization of SMEs through models of internationalization mechanisms that allow SMEs to coordinate digital activities related to disruptive innovation (Liu & Si, 2022).

Methods for managing knowledge that enhance the company's overall knowledge base. External knowledge acquisition is the term used to describe the environmental scanning process that yields knowledge from sources outside the organization (Zhou et al., 2021); (Flores López et al., 2023). The definition of internal knowledge sharing is the process by which member organizations exchange, distribute, and interpret knowledge (Mohajan, 2019); (Mustika et al., 2022); (Yaqub & Al-Sabban, 2023). Despite the fact that prior research on SMEs indicates a favorable correlation between knowledge management, practice, and innovation performance ; (García-Piqueres et al., 2019); (Durst et al., 2023). It's unclear exactly how KM practices translate into improved innovation performance at this point.

Despite the fact that current research frequently characterizes SMEs as employing less deliberate emerging innovation strategies. (Ajah & Pathranarakul, 2021); (Nurhayati et al., 2021) contends that deliberately innovative SMEs take a more innovative approach, where innovation performance is driven by innovation intentions. In order to improve innovation performance, we therefore suggest a purposeful path of innovation management model that strengthens the innovation intent through knowledge management (KM) practices. When a company says it is innovation-oriented, it means that it has made it a strategic goal to develop new products, services, or processes to update or improve its current offerings (Lawson & Samson, 2001a); (Zhou et al., 2021).

2. Literature Review & Hypothesis Development

2.1 Technology Innovation

As we perceive losses more than gains when faced with risk and uncertainty, prospect theory suggests that framing has a profound impact on human perceptions and decision-making (Kahneman & Tversky, 2018). (Levin et al., 1998) have distinguished between three categories of framing: goal framing, attribute framing, and risky choice framing. During goal framing, participants are asked to participate in an activity and explain the benefits or drawbacks of doing so. (Y. Y. Lee, 2019) assert that goal framing stresses achieving intrinsic (like autonomy, growth, and health) or extrinsic (like wealth, image, and fame) goals. Three experiments are used to illustrate the persuasion context, and the results have practical implications for message strategy and advertising. Another research by (Tangari et al., 2021) suggests that when creating a promotional claim, if a new cue is included (such as a health message) and it

is slightly in line with the cue connected to the product, then these numerous cues that are aligned can affect attitudes and intentions. (Akbari & Moradipour, 2021) claims that more creative SMEs take a more methodical approach, demonstrating how salesperson characteristics and company marketing initiatives greatly increase the effectiveness of B2B salespeople.

The framing effect has been studied from a variety of angles by researchers before (Jin & Han, 2014). Similar to this, research on message framing has shown that communications with a positive frame are more persuasive, while some claim that communications with a negative frame have a greater ability to enhance information processing, improve customer attitude, and increase PI (Van de Velde et al., 2010).

Several times, the concept of purpose has been applied to the area of food choice; additionally, it has been used to model the choice of organic foods (Gracia & de Magistris, 2008). According to a study done by (Misra & Singh, 2016), Consumers of organic food are primarily motivated by worries about food safety and health. However, assessing consumers' purchase intentions in developing nations like India has received relatively little attention (Bashir et al., 2022a).

The way information is presented to consumers can have an impact on their individual decision-making (Shan et al., 2020). By emphasizing the drawbacks and possible losses of not utilizing a competitor's brand or product, negatively framed messages imply that an alternative product is inferior. Positively framed messaging refers to communications that highlight the advantages that consumers will experience when utilizing a particular good or service. The subject of framing and how it influences decision-making has been the subject of numerous studies. The framing of advertising messages has a significant impact on customer attitudes and purchase intentions, so it (Goldsmith & Yimin, 2014). Nevertheless, no thorough analysis of the Framing effect's relevance and impact on Indian consumers' perceptions of organic food products has yet been carried out. In order to determine Through an examination of the "Framing Effect," work was done to investigate and comprehend the research gaps regarding whether a negatively framed (loss frame) or positively framed (gain frame) message can effectively increase the PI of consumers for organic food products. Examples of technological innovation include the use of contemporary software, digital platforms, or efficient production technologies. The creation and application of novel concepts, goods, or procedures that make use of cutting-edge information and technology to boost effectiveness, productivity, or add value is known as technological innovation. Why Technological Innovation Is Important for SMEs Improved performance and competitiveness of SMEs are directly related to technological innovation. This can include improving operational efficiency, expanding markets, and improving the quality of products or services (Avelar et al., 2024).

2.2 SMEs Performance

Performance appraisal is a method of evaluating the implementation of tasks either individually, in groups, or as parts of the company or company as a whole based on predetermined goals. Performance appraisal is carried out to ensure the level of achievement of company goals and see the extent to which policies or programs have been implemented properly for the company's development effectively and efficiently (Kiyabo & Isaga, 2020); (Farida & Setiawan, 2022). For this reason, performance appraisal is very important to be carried out by all organizations including SMEs.

Performance appraisal is needed by SMEs not only to find out the extent to which company goals have been achieved but also performance appraisal allows SMEs to take corrective

actions to improve (Aprilia et al., 2023). Organizational performance appraisal can be done in four ways (Kloot & Martin, 2000), namely: 1) assessing stakeholder performance in terms of satisfying their needs, such as those of shareholders, clients, and workers; 2) assessing effectiveness, or the degree to which the organization succeeds in reaching its objectives; 3) assessing efficiency, or the manner in which the organization manages its resources; and 4) assessing financial performance, or the manner in which the organization can finance long-term and short-term needs in terms of profit, investment etc. Furthermore, performance appraisals can be carried out based on external and internal factors. External factors such as satisfaction of suppliers, customers, governments, financial institutions, and other factors outside the organization. The internal factors include parts of the organization such as marketing, research and development, production and operations, human resources, and finance. Long-term growth is one of the most distinctive features of a family business. On the other hand, a long-term perspective can encourage family businesses to plan and secure their human capital, thus attracting and retaining a local workforce that desires stability for decades.

Conversely, low staff turnover may hinder innovation, which is essential for both competition and long-term survival. Nonetheless, a lot of family-run businesses are regarded as both excellent employers and creative thinkers. How can a family-run business that is focused on the long term enhance its workforce while pursuing innovation? distinctive traits of family businesses include their loyalty, solidarity, and credibility. These qualities foster a special positive feedback loop that strengthens the compromise between cutting-edge HRM and creative practices, ultimately benefiting both the family business and its employees (Rondi, E, 2022). SMEs may face budget constraints to adopt new technologies that may require significant investment. Development of business models that consider small-scale costs or seek more affordable technology solutions. Limitations in technical expertise can be an obstacle in implementing high technology. Training and education for employees, as well as collaboration with technology service providers. SMEs may be reluctant to adopt new technologies due to uncertainty regarding their feasibility and benefits. SMEs can take advantage of digitalization to optimize business processes, reduce operational costs, and increase efficiency. Implementation of ERP (Enterprise Resource Planning) solutions or cloud platforms to support business process integration. The use of AI can help SMEs in more sophisticated data analysis, service personalization, and improved operational intelligence. Collaborate with AI providers or adopt AI solutions that suit business needs. SMEs can expand their market reach by leveraging e-commerce and digital platforms. Development of e-commerce websites, presence on leading digital platforms, and implementation of online marketing strategies (Su et al., 2022).

2.3 Knowledge Management Practices

It is currently unclear how precisely knowledge management techniques translate into improved innovation performance. Despite the fact that current research frequently depicts SMEs as employing newer, less deliberate innovation techniques. (Zhou et al., 2021) contends that deliberately innovative SMEs take a more innovative approach, where innovation performance is driven by innovation intentions. Consequently, by encouraging the intention to innovate (also known as innovation orientation), KM practices can enhance innovation performance through the purposeful path of our intentional innovation management model. When a company says it is innovation-oriented, it means that it has made it a strategic goal to develop new products, services, or processes to update or improve its current offerings

(Lawson & Samson, 2001); (Han et al., 2022). By bringing management and literary strategy's logic of cognition-action together, we create a purposeful innovation management model for SMEs (García-Piqueres et al., 2019) and the logic of intention-action from the perspective of "deliberate" strategy. A business can reduce uncertainty and improve its ability to solve problems by seeking out new information in its environment and internally processing or interpreting it, according to the logic of cognition-action (Wei & Wang, 2011)

Our research suggests that while internal knowledge sharing, or interpretation, strengthens SMEs' capacity to process and convert external knowledge into innovations, external knowledge acquisition practices, or scanning, raise SMEs' awareness of new technologies and other knowledge outside the company. Our second point is the intentional strategy acts logic, which states that "wanted" strategies lead to "realized" strategies (Wei & Wang, 2011). Parallel to this, we assume that innovation orientation that is, the intended innovation strategy—determines innovation performance, or the execution of innovation strategies. We present a purposeful innovation management model for SMEs by merging these two logics into the general cognition-intention-action logic.

In order to improve innovation performance, we assume in this model that KM practices cause SMEs to become more innovative. Export growth for SMEs is contingent upon one organization as well as the success of technological innovation. Marketing innovation in SMEs is driven by product innovation. Financial limitations also support organizational innovation's beneficial impact on product innovation. Geographic diversification increases the benefit of marketing innovation for exporting SMEs (Bodlaj et al., 2020). Companies are trying to change business models to "self-adaptive" models in today's digital era, companies are increasingly agile, adaptable, and dichotomous in driving innovation in the era of disruption. These days, intelligent enterprises and Industry 4.0 pioneers are closely associated with "digital innovation". While multinational corporations have embraced progress in various industries, small and medium-sized businesses (SMEs) have predominantly implemented it in the manufacturing sector thus far (Del Giudice et al., 2021). Only in the tenth quantile do technological advancements and economic risks significantly reduce global CO₂ emissions; in the other quantile, they actually increase CO₂ emissions (Zhao et al., 2021).

Knowledge management practices commonly used by SMEs, include the collection, dissemination, and application of knowledge across the organization. optimize SME business and operational processes, increase efficiency through knowledge exchange and integration. Knowledge management practices encourage innovation by facilitating collaboration, sharing ideas, and leveraging collective knowledge to create new solutions. SMEs that are effective in knowledge management can be more adaptive to market changes and have a competitive advantage through the utilization of their knowledge. Implement systems to collect and organize relevant internal and external knowledge. Encourage a culture of knowledge sharing through team collaboration, training, and communication platforms. Ensure that the knowledge gathered is used effectively in decision making and process improvement (Tiwari, 2022). In this study, knowledge management is conceptualized not merely as an organizational capability but as a mediating mechanism that explains how technological innovation affects SME performance. It serves as the process through which information generated by technological adoption is transformed into actionable knowledge, enabling firms to enhance learning, coordination, and strategic responsiveness. This positioning provides a clearer

theoretical contribution by distinguishing knowledge management as a causal pathway rather than a parallel predictor.

2.4 Technological innovation on financial performance

Technological innovation has a positive impact on the owner's environment and the company's bottom line. Businesses that are successful in the long run are those that give to social and environmental projects in addition to their financial obligations. A company's performance and reputation among stakeholders can be enhanced by innovative management and staff participation in environmental conservation initiatives (Chege & Wang, 2020). Increased research strategy efforts facing Industry-specific and Inter-Industrial Radical Competitive Innovation; managerial perspectives on the introduction and diffusion of radical innovation; application of portfolio theory and real options theory to radical innovation research; and individual, group, organizational, and inter-organizational skills necessary for radical innovation (Tiberius et al., 2021). This is especially crucial since it is unclear how much decision-makers and entrepreneurs are spearheading the digitization process. In accordance with the planned behavior theory (Jafari-Sadeghi et al., 2023) the connection between innovation and value generation, delivery, sustainability, and retention (Bashir et al., 2022b). An integrated framework is helpful for enhancing comprehension of recently published work and offering a crucial direction for upcoming studies on the globalization of SMEs (Zahoor et al., 2023).

For SMEs, operational efficiency can be enhanced by technological innovation and knowledge management, resulting in higher productivity and lower costs. The integration of innovation and knowledge management can support the development of higher quality products or services, improve customer satisfaction and brand reputation. SMEs that implement innovation and knowledge management well can be attractive workplaces for talent, as well as increase employee retention due to recognition of their contributions. Technological innovation enables SMEs to access global markets through digital and e-commerce platforms, while knowledge management supports adaptation to global market needs. Knowledge management practices can facilitate international collaboration, open up opportunities for strategic partnerships and cross-border knowledge exchange. SMEs focused on innovation and knowledge management can build a global image as a leader in their field, increasing competitiveness in the international market (Chiu & Lin, 2022).

H1: Knowledge Innovation has a positive effect on SMEs Performance

2.5 Technological Innovation Improves SMEs Performance through Knowledge Management Practices

Technological innovation has a significant influence in improving the performance of Micro, Small, and Medium Enterprises (SMEs) through knowledge innovation practices. This is especially true in the digital age and globalization, where information and communication technology has become a key component in business operations and growth strategies. Here are some of the main influences of technological innovation on performance through knowledge innovation practices. By combining technological innovation and knowledge innovation practices, SMEs can become more competitive, develop their markets, and improve their overall business performance.

However, it is important to remember that technology adoption must be in line with business needs and sustainable, as well as pay attention to relevant data security and legal compliance factors. Technological innovation has great potential in improving the performance of Micro, Small, and Medium Enterprises (SMEs) through knowledge innovation practices. SMEs are an

important sector in a country's economy, and the application of technology and knowledge innovation can help SMEs overcome challenges and achieve better growth. Here are some ways in which the influence of technological innovation improves the performance of SMEs through knowledge innovation practices.

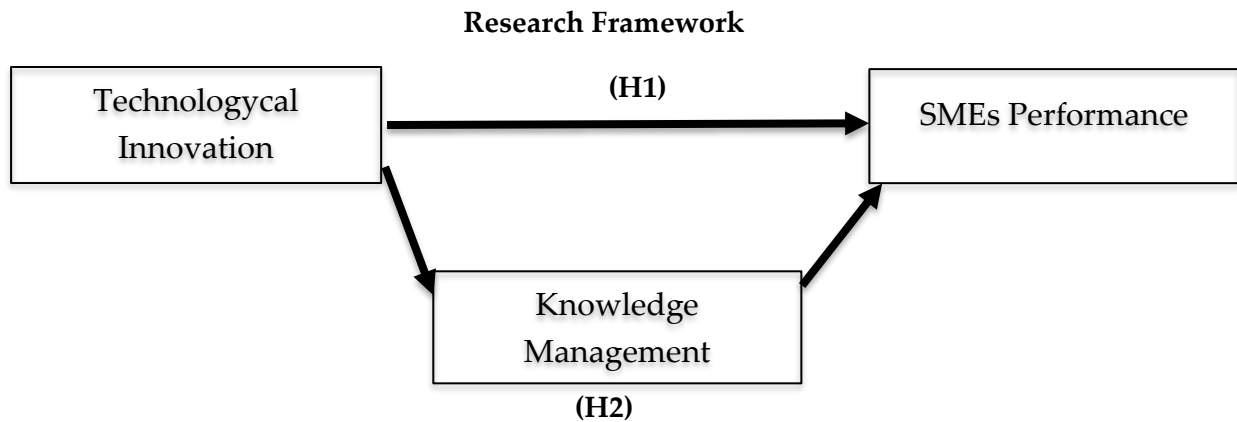
By combining technological innovation and knowledge innovation practices, SMEs can achieve sustainable growth and improve their performance in an increasingly competitive market. SMEs need to continue to learn and adapt to technological and market changes to make the best use of opportunities. Design thinking is used as a strategy to adopt innovation management, which allows the absolute innovation management framework to link the company's business strategy with the innovation ecosystem. Economic growth is strengthened while satisfying IoT and industry-fulfilled era 5.0 demands by making innovation more user-centric, what customers want, more business-ready and technically feasible, business value, and corporate and entrepreneurial efforts to achieve a competitive advantage (Aslam et al., 2020).

For small businesses to survive over the long term in the new economy, digitalization is crucial. The acceleration of global digitalization necessitates Malaysia's micro, small, and medium-sized enterprises (SMEs) to leverage the digital economy in order to enhance economic expansion. Technology adoption improves skills and abilities to increase competitiveness and innovation, which helps close the productivity gap between SMEs and large companies (Abu Hasan et al., 2022). Customer relationships and partner behavior are very important in the digitalization and leadership of SMEs, especially those that implement digital entrepreneurship. These studies help demonstrate the importance of digital entrepreneurship in the management of SMEs and the importance of the future success of this type of business (Franco et al., 2021).

Merging technological innovation with knowledge management practices can improve the operational efficiency and business processes of SMEs. The role of information systems and technology in supporting knowledge management practices. Technological innovation requires effective knowledge management. The integration of knowledge from multiple sources can enhance an organization's ability to design and implement innovative solutions. Technologies such as knowledge management systems and collaborative platforms can improve the process of sharing, storing, and managing knowledge across organizations, supporting innovation. Technological innovation can improve an organization's ability to implement knowledge-based decision-making systems, where the knowledge contained in the data can be used to support strategic decisions. The integration of technological innovation with knowledge management practices can facilitate further integration of various business processes, reduce redundancy, and increase efficiency. The application of automation technology in business processes, supported by good knowledge management, can improve operational efficiency and reduce human error. The integration of technology in knowledge management can help in optimizing supply chains, enabling better coordination between suppliers, manufacturers, and distributors. Information Systems can be used as a tool to manage knowledge across organizations, facilitating the search, dissemination, and effective utilization of knowledge. Information Systems analytics can help organizations analyze data to gain valuable insights, which can be used in decision-making processes and continuous improvement. Collaborative Information Systems platforms can support team collaboration, facilitate knowledge sharing, and improve internal communication (Urban & Matela, 2022).

H2: Technological Innovation has a positive effect on SMEs Performance through Knowledge Management Practices

Figure 1. Research Model



3. Methodology

The questionnaire survey used in this study was on SMEs actors in South Sulawesi, to investigate how innovation affects the performance of SMEs with a sample of 30 – 500 (Resceo, 1975). Purposive sampling is a technique used to ensure sample quality including years of operation, sample size, and sample location. We used two dimensions of innovation technology: Inbound and Outbound, with two and three questions respectively using a Likert scale with 5 points, where 1 represents strongly disagree and 5 agrees (Cheng & Huizingh, 2014). Then SMEs performance using four dimensions: financial, non-financial, environmental, and social performance with two questions each (Cheng & Huizingh, 2014); (Purnomo, 2020) and Knowledge Management using three measurement indicators (Dickel & Moura, 2016). Literacy messages sent to SMEs owners via social media received 128 responses. The level of success and development of small companies is a measure of performance. In addition, performance can also be measured through return on investment, growth, volume, profit, and employment (Eriksson & Li, 2012). Economic and financial indicators are also used to measure the company's performance broadly in order to assess the impact of innovation on the company's success (Handrich et al., 2015). In this study, owners are asked to assess the performance of their SMEs against their performance in the past year and with the financial and non-financial performance of their competitors, such as sales growth, profit growth, productivity growth, and success in new business. Product, increase market opportunity, increase market satisfaction, increase delivery time, increase method and work process, and waste reduction (Cheng & Huizingh, 2014).

The literature has explained several alternatives to measure models that are adopted by companies for channel innovation, such as in research conducted (Ramirez-Portilla et al., 2017) measure model technology innovation as a component or both through two-dimensional variations: inbound and outbound. For inbound and outbound practices, follow (Bianchi et al., 2010); (Cheng & Huizingh, 2014); (Ilić, 2022).

4. Result and Discussion

Of the total 128 respondents, as many as 40 respondents were male, followed by 88 female respondents, with an entrepreneurial age range of 26-35 years. 76% are SMEs (businesses with less than five employees). Then, 82% are dominated by SMEs aged 10 years or younger, and in 68% of cases, the level of entrepreneurship education is dominated by undergraduates. A

total of 53 respondents were micro business owners; 63 respondents were small business owners; and 12 respondents were medium-sized business owners.

Table 1. List of measurement items and measurement assessment results.

No	Dimension	Load	A
<i>Technological innovation</i>			
1.	Inbound	0.733	0.766
2.	Outbound	0.706	
<i>SMEs performance</i>			
1.	Financial	0.747	0.771
2.	Nonfinancial	0.741	
3.	Environment performance	0.759	
4.	Social performance	0.740	
<i>Knowledge Management</i>			
1.	Individual Acceptance	0.908	0.924
2.	Organizational Culture	0.914	
3.	Information Technology	0.913	

Table 2. Sample profile and demographic characteristics.

Demographic variable	N	%	Demographic variable	n	%
Level of education			Number of Employees		
Primary – Senior high school	66	51.6	<5 employees	112	87.5
Bachelor/Master	62	48.4	6-10 employees	13	10.2
			>10 employees	3	2.3
Business Age			Income level		
<10 year	19	14.8	10 – 300 million	89	69.5
10-16 year	81	63.3	300 million – 2.5 billion	24	18.8
>16 year	7	16.4	>2.5 billion	15	11.7
Respondent Age			Business sector		
19-25 year	9	11.5	Advertising	16	12
26-35 year	54	69.1	Automotive	7	2
36-45 year	36	46.1	Architecture	9	5
>46 year	29	37.2	Craft	6	6
Gender			Culinary	53	43
Female	40	31.3	Electronic	2	2
Male	88	68.7	Fashion	25	10
			Service	10	9
			Photography	7	6

Before analyzing the data, reliability and validity analysis is performed. Items that do not meet the cutoff value (i.e., Cronbach alpha above 0.6 for reliability; r-count correlation value > r-table for validity) (Hair et al., 2006). Descriptive statistics and correlations between variables are presented in Table 3. Correlation Values (r-count and r-table) for Validity with validity analysis are performed to ensure that the measuring instrument or instruments used to measure the variable in question. In this case, you mentioned the correlation values of r-count and r-table. Typically, studies compare correlations between established measuring instruments and variables (referred to as "criteria") with expected correlation values (r-tables). If the correlation value between the measuring instrument and the criterion (r-count) is greater than the expected correlation value (r-table), then the measuring instrument is considered valid.

Table 3. Relationships variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Description
	B	Std. Error	Beta			
(Constant)	16.092	2.129		5.638	.000	
1 Technology Innovation-SMEs performance	.959	.151	.668	6.343	.000	Supported (H1)
2 Knowledge Management-SMEs performance	.522	.098	.424	3.229	.003	Supported (H2)

5. Dependent Variable: SMEs_Performance_a

A simple regression analysis shows that the t-count of open innovation is $6.343 \geq t\text{-table} = t (/2); n - k - 1 = t (0.005; 98) = 2.62693$, with a significance level of $0.000 \leq 0.05$ and a regression coefficient of 0.959. Therefore, H1 is supported. According to the findings of your basic linear regression analysis, technological innovation and the performance of SMEs are significantly positively correlated. This indicates that a rise in technological innovation has a beneficial impact on the performance of SMEs.

The findings of this study move beyond merely confirming statistical relationships by offering a deeper explanation of how technological innovation translates into improved SME performance. In the context of emerging markets, technological innovation is not inherently value-creating unless it is effectively embedded within organizational processes. This explains why some SMEs adopting digital technologies fail to achieve performance gains: technology alone is insufficient without the capability to manage, interpret, and utilize knowledge derived from such innovation.

A critical insight from this study is that knowledge management plays a central explanatory role in this relationship. Rather than acting as a passive supporting variable, knowledge management functions as an active mechanism through which technological innovation is transformed into organizational value. SMEs that are able to capture, share, and apply knowledge generated from digital tools are more capable of improving decision-making,

operational efficiency, and market responsiveness. This highlights that the effectiveness of technological innovation depends on how well knowledge flows within the organization.

Furthermore, in emerging market environments characterized by resource constraints and high uncertainty, knowledge management becomes even more essential. SMEs often face limitations in financial capital and technological infrastructure, making knowledge a strategic asset that compensates for these constraints. Therefore, the integration of technological innovation and knowledge management should be understood as a complementary system rather than independent factors influencing performance (Chicco et al., 2021).

From a theoretical perspective, this study contributes to the literature by integrating technological innovation and knowledge management into a unified explanatory framework that emphasizes process-based mechanisms rather than direct effects. It advances prior research by demonstrating that knowledge management is not only a complementary capability but also a key mechanism through which innovation generates performance outcomes.

From a practical perspective, the findings suggest that SME managers should not focus solely on adopting new technologies, but must also invest in developing internal knowledge management practices, such as knowledge sharing systems, organizational learning processes, and employee training. Without these supporting mechanisms, technological investments may fail to deliver expected performance improvements.

From a policy perspective, the results highlight the need for government and development agencies to design digital transformation programs that go beyond technology provision. Policies should incorporate training, knowledge transfer, and capacity-building initiatives to ensure that SMEs can effectively utilize digital technologies in enhancing their competitiveness, particularly in emerging market contexts. This study therefore shifts the perspective from technology adoption as an end goal to knowledge-enabled innovation as the true driver of SME performance.

6. Conclusion and Suggestion

This study confirms that technological innovation plays a crucial role in improving SMEs performance, particularly in the context of digital and e-commerce-based business activities. The findings provide strong empirical evidence that SMEs adopting technological innovation achieve higher levels of efficiency, competitiveness, and overall performance. In addition, knowledge management significantly strengthens this relationship by enabling firms to effectively acquire, share, and utilize knowledge to support.

From a theoretical perspective, this study contributes to the literature by integrating technological innovation and knowledge management within the SMEs performance framework, highlighting their complementary roles. Empirically, the study enriches evidence from emerging economies, particularly South Sulawesi, where digital transformation among SMEs is still evolving. Economically, the results imply that strengthening digital capabilities and knowledge practices can enhance SMEs' sustainability and growth.

7. Limitations and Future Research

This study has several limitations. First, the sample is limited to SMEs engaged in digital transactions, which may restrict generalizability. Second, the study relies on self-reported

data, which may introduce bias. Third, the model only explains part of SMEs performance, indicating the presence of other influencing variables. Future research is recommended to expand the sample scope, incorporate additional variables such as trust and digital capability, and apply more advanced analytical methods to provide deeper insights into SMEs digital transformation.

Reference

- Abu Hasan, N., Abd Rahim, M., & Hamizah Ahmad, S. (2022). Digitization of Business for Small And Medium-Sized Enterprises (SMEs). *Environment-Behaviour Proceedings Journal*, 7(19), 11–16. <https://doi.org/10.21834/EBPJ.V7I19.3270>
- Ajah, S. N., & Pathranarakul, P. (2021). Roles of Managers and Stakeholders Perception on Solar Technology Adoption Intention: A Case of Micro, Small and Medium Enterprises (MSMEs) in Lagos State, Nigeria. *Journal of Sustainable Development*, 15(1), 29. <https://doi.org/10.5539/jsd.v15n1p29>
- Akbari, M., & Moradipour, S. (2021). Horses for courses: B2B salesperson performance: the role of their characteristics and promotion efforts. *Middle East J. of Management*, 8(4), 297. <https://doi.org/10.1504/MEJM.2021.116440>
- Aprilia, P. W., Wijayanti, R., & Waluyowati, N. P. (2023). *The Effect of Commitment and Knowledge on Operational Performance with Halal Standard Implementation as a Mediator in Food MSME Industries*. 5(2), 33–46.
- Asemokha, A., Musona, J., Ahi, A., Torkkeli, L., & Saarenketo, S. (2021). Business model innovation in the internationalization of SMEs: The role of causation and effectuation. *Proceedings of the Annual Hawaii International Conference on System Sciences, 2020-Janua*, 5059–5068. <https://doi.org/10.24251/hicss.2021.616>
- Aslam, F., Aimin, W., Li, M., & Rehman, K. U. (2020). Innovation in the Era of IoT and Industry 5.0: Absolute Innovation Management (AIM) Framework. *Information 2020, Vol. 11, Page 124*, 11(2), 124. <https://doi.org/10.3390/INFO11020124>
- Avelar, S., Borges-Tiago, T., Almeida, A., & Tiago, F. (2024). Confluence of sustainable entrepreneurship, innovation, and digitalization in SMEs. *Journal of Business Research*, 170, 114346. <https://doi.org/10.1016/J.JBUSRES.2023.114346>
- Bashir, M., Alfalih, A., & Pradhan, S. (2022a). Sustainable business model innovation: Scale development, validation and proof of performance. *Journal of Innovation and Knowledge*, 7(4), 100243. <https://doi.org/10.1016/j.jik.2022.100243>
- Bashir, M., Alfalih, A., & Pradhan, S. (2022b). Sustainable business model innovation: Scale development, validation and proof of performance. *Journal of Innovation and Knowledge*, 7(4). <https://doi.org/10.1016/J.JIK.2022.100243>
- Bianchi, M., Campodall'Orto, S., Frattini, F., & Vercesi, P. (2010). Enabling open innovation in small- and medium-sized enterprises: How to find alternative applications for your technologies. *R and D Management*, 40(4), 414–431. <https://doi.org/10.1111/J.1467-9310.2010.00613.X>
- Bodlaj, M., Kadic-Maglajlic, S., & Vida, I. (2020). Disentangling the impact of different innovation types, financial constraints and geographic diversification on SMEs' export

- growth. *Journal of Business Research*, 108(November 2017), 466–475. <https://doi.org/10.1016/j.jbusres.2018.10.043>
- Chakravarty, S., Cumming, D. J., Murtinu, S., Scalera, V. G., & Schwens, C. (2021). Exploring the next generation of international entrepreneurship. *Journal of World Business*, 56(5). <https://doi.org/10.1016/j.jwb.2021.101229>
- Chatterjee, S., Chaudhuri, R., Sakka, G., Grandhi, B., Galati, A., Siachou, E., & Vrontis, D. (2021). Adoption of social media marketing for sustainable business growth of smes in emerging economies: The moderating role of leadership support. *Sustainability (Switzerland)*, 13(21). <https://doi.org/10.3390/su132112134>
- Chege, S. M., & Wang, D. (2020). The influence of technology innovation on SME performance through environmental sustainability practices in Kenya. *Technology in Society*, 60. <https://doi.org/10.1016/J.TECHSOC.2019.101210>
- Cheng, C. C. J., & Huizingh, E. K. R. E. (2014). When is open innovation beneficial? The role of strategic orientation. *Journal of Product Innovation Management*, 31(6), 1235–1253. <https://doi.org/10.1111/JPIM.12148>
- Chicco, D., Warrens, M. J., & Jurman, G. (2021). The coefficient of determination R-squared is more informative than SMAPE, MAE, MAPE, MSE and RMSE in regression analysis evaluation. *PeerJ Computer Science*, 7, 1–24. <https://doi.org/10.7717/PEERJ-CS.623/SUPP-1>
- Chiu, M., & Lin, C. (2022). Relationships among knowledge-oriented leadership, customer knowledge management, innovation quality and firm performance in SMEs. *Journal of Innovation & Knowledge*, 7(4), 100264. <https://doi.org/10.1016/j.jik.2022.100264>
- Del Giudice, M., Scuotto, V., Papa, A., Tarba, S. Y., Bresciani, S., & Warkentin, M. (2021). A Self-Tuning Model for Smart Manufacturing SMEs: Effects on Digital Innovation. *Journal of Product Innovation Management*, 38(1), 68–89. <https://doi.org/10.1111/JPIM.12560>
- Denicolai, S., Zucchella, A., & Magnani, G. (2021). Internationalization, digitalization, and sustainability: Are SMEs ready? A survey on synergies and substituting effects among growth paths. *Technological Forecasting and Social Change*, 166(January), 120650. <https://doi.org/10.1016/j.techfore.2021.120650>
- Dethine, B., Enjolras, M., & Monticolo, D. (2020). Digitalization and SMEs' export management: Impacts on resources and capabilities. *Technology Innovation Management Review*, 10(4), 18–34. <https://doi.org/10.22215/TIMREVIEW/1344>
- Dickel, D. G., & Moura, G. L. de. (2016). Organizational performance evaluation in intangible criteria: a model based on knowledge management and innovation management. *RAI Revista de Administração e Inovação*, 13(3), 211–220. <https://doi.org/10.1016/J.RAI.2016.06.005>
- Durst, S., Edvardsson, I. R., & Foli, S. (2023). Knowledge management in SMEs: a follow-up literature review. *Journal of Knowledge Management*, 27(11), 25–58. <https://doi.org/10.1108/JKM-04-2022-0325/FULL/PDF>
- Eriksson, J., & Li, M. (2012). Success factors of entrepreneurial small and medium sized enterprises in the Gnosjö municipality. *Malardalen University Sweden*.

- Farida, I., & Setiawan, D. (2022). Business Strategies and Competitive Advantage: The Role of Performance and Innovation. *Journal of Open Innovation: Technology, Market, and Complexity* 2022, Vol. 8, Page 163, 8(3), 163. <https://doi.org/10.3390/JOITMC8030163>
- Flores López, J. G., Jacobo Hernández, C. A., Leyva Osuna, B. A., & Limón Valencia, L. A. (2023). The Effect of the Knowledge Management Processes Capability on Innovation Activities in the Mexican Industry. *Administrative Sciences* 2023, Vol. 13, Page 21, 13(1), 21. <https://doi.org/10.3390/ADMSCI13010021>
- Franco, M., Godinho, L., & Rodrigues, M. (2021). Exploring the influence of digital entrepreneurship on SME digitalization and management. *Small Enterprise Research*, 28(3), 269–292. <https://doi.org/10.1080/13215906.2021.1938651>
- García-Fernández, M. (2015). How to measure knowledge management: Dimensions and model. *VINE*, 45(1), 107–125. <https://doi.org/10.1108/VINE-10-2013-0063>
- García-Piqueres, G., Serrano-Bedia, A. M., & Pérez-Pérez, M. (2019). Knowledge Management Practices and Innovation Outcomes: The Moderating Role of Risk-Taking and Proactiveness. *Administrative Sciences* 2019, Vol. 9, Page 75, 9(4), 75. <https://doi.org/10.3390/ADMSCI9040075>
- Goldsmith, R. E., & Yimin, Z. (2014). The Influences of Brand-Consumer and Cause-Congruence on Consumer Responses to Cause Related Marketing. *Journal of Applied Marketing Theory*, 5(2). <https://doi.org/10.20429/JAMT.2014.050205>
- Gracia, A., & de Magistris, T. (2008). The demand for organic foods in the South of Italy: A discrete choice model. *Food Policy*, 33(5), 386–396. <https://doi.org/10.1016/J.FOODPOL.2007.12.002>
- Han, W., Zhou, Y., & Lu, R. (2022). Strategic orientation, business model innovation and corporate performance—Evidence from construction industry. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/FPSYG.2022.971654>
- Handrich, M., Handrich, F., & Heidenreich, S. (2015). Firm Innovativeness - The Sufficient Condition for Business Success? Examining Antecedents of Firm Innovativeness and How It Affects Business Success. *International Journal of Innovation Management*, 19(5). <https://doi.org/10.1142/S136391961550053X>
- Hansen, B. (2019). The digital revolution—digital entrepreneurship and transformation in Beijing. *Small Enterprise Research*, 26(1), 36–54. <https://doi.org/10.1080/13215906.2019.1570321>
- Ilić, M. P. (2022). Challenging Novelties within the Circular Economy Concept under the Digital Transformation of Society. *Sustainability (Switzerland)*, 14(2). <https://doi.org/10.3390/su14020702>
- Jafari-Sadeghi, V., Amoozad Mahdiraji, H., Alam, G. M., & Mazzoleni, A. (2023). Entrepreneurs as strategic transformation managers: Exploring micro-foundations of digital transformation in small and medium internationalisers. *Journal of Business Research*, 154(January 2023), 113287. <https://doi.org/10.1016/j.jbusres.2022.08.051>
- Jin, H. J., & Han, D. H. (2014). Interaction between message framing and consumers' prior subjective knowledge regarding food safety issues. *Food Policy*, 44, 95–102. <https://doi.org/10.1016/j.foodpol.2013.10.007>

- Kahneman, D., & Tversky, A. (2018). Prospect theory: An analysis of decision under risk. *Experiments in Environmental Economics*, 1, 143–172. <https://doi.org/10.2307/1914185>
- Ketata, I., Sofka, W., & Grimpe, C. (2015). The role of internal capabilities and firms' environment for sustainable innovation: Evidence for Germany. *R and D Management*, 45(1), 60–75. <https://doi.org/10.1111/RADM.12052>
- Kiyabo, K., & Isaga, N. (2020). Entrepreneurial orientation, competitive advantage, and SMEs' performance: application of firm growth and personal wealth measures. *Journal of Innovation and Entrepreneurship*, 9(1), 1–15. <https://doi.org/10.1186/S13731-020-00123-7/TABLES/4>
- Kloot, L., & Martin, J. (2000). Strategic performance management: A balanced approach to performance management issues in local government. *Management Accounting Research*, 11(2), 231–251. <https://doi.org/10.1006/MARE.2000.0130>
- Lawson, B., & Samson, D. (2001a). Developing Innovation Capability In Organisations: A Dynamic Capabilities Approach. *International Journal of Innovation Management*, 05(03), 377–400. <https://doi.org/10.1142/S1363919601000427>
- Lawson, B., & Samson, D. (2001b). Developing Innovation Capability in Organisations: A Dynamic Capability Approach. *International Journal of Innovation Management*, 05(03), 377–400. <https://doi.org/10.1142/S1363919601000427>
- Lee, Y.-Y., Falahat, M., & Sia, B.-K. (2019). Impact of Digitalization on the Speed of Internationalization. *International Business Research*, 12(4), 1. <https://doi.org/10.5539/ibr.v12n4p1>
- Lee, Y. Y. (2019). The impact of digitalization and resources on gaining competitive advantage in international markets: The mediating role of marketing, innovation and learning capabilities. In *Technology Innovation Management Review* (Vol. 9, Issue 11, pp. 26–38). <https://doi.org/10.22215/TIMREVIEW/1281>
- Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects. *Organizational Behavior and Human Decision Processes*, 76(2), 149–188. <https://doi.org/10.1006/OBHD.1998.2804>
- Liu, W., & Si, S. (2022). Disruptive Innovation in the Context of Retailing: Digital Trends and the Internationalization of the Yiwu Commodity Market. *Sustainability (Switzerland)*, 14(13). <https://doi.org/10.3390/SU14137559>
- Mika Westerlund. (2020). Digitalization, Internationalization and Scaling of Online SMEs. *Technology Innovation Management Review*, 10(4), 48–57.
- Misra, R., & Singh, D. (2016). Preference for naturalness of European organic consumers: First evidence of an attitude-liking gap. *British Food Journal*, 118, 2218–2233. <https://doi.org/10.1108/BFJ-02-2016-0080>
- Mohajan, H. K. (2019). Knowledge Sharing among Employees in Organizations. *Journal of Economic Development, Environment and People*, 8(1), 52. <https://doi.org/10.26458/JEDEP.V8I1.612>
- Mohamad, A., Mohd Rizal, A., Kamarudin, S., & Sahimi, M. (2022). Exploring the Co-Creation of Small and Medium Enterprises, and Service Providers Enabled by Digital Interactive

- Platforms for Internationalization: A Case Study in Malaysia. *Sustainability (Switzerland)*, 14(23). <https://doi.org/10.3390/su142316119>
- Mustika, H., Eliyana, A., Agustina, T. S., & Anwar, A. (2022). Testing the Determining Factors of Knowledge Sharing Behavior. *SAGE Open*, 12(1). https://doi.org/10.1177/21582440221078012/ASSET/IMAGES/LARGE/10.1177_21582440221078012-FIG4.JPEG
- Nicolau, C., Nichifor, E., Munteanu, D., & Bărbulescu, O. (2022). Decoding Business Potential for Digital Sustainable Entrepreneurship: What Romanian Entrepreneurs Think and Do for the Future. *Sustainability (Switzerland)*, 14(20). <https://doi.org/10.3390/su142013636>
- Nurhayati, B. D., Kusmantini, T., & Wahyuningsih, T. (2021). Antecedents and Implications of Innovation Capability: Empirical Study of Bakpia Msmes in Yogyakarta. *Journal of Indonesian Economy and Business*, 36(2), 179–203. <https://doi.org/10.22146/jieb.v36i2.1399>
- Pereira, C. S., Durão, N., Moreira, F., & Veloso, B. (2022). The Importance of Digital Transformation in International Business. *Sustainability (Switzerland)*, 14(2), 1–26. <https://doi.org/10.3390/su14020834>
- Piqueras, S. (2021). DIGITAL INTERNATIONALIZING FIRMS (DIF'S): A SYSTEMATIC LITERATURE REVIEW AND FUTURE RESEARCH AGENDA. *Rivista Piccola Impresa/Small Business*, 21–60. <https://doi.org/10.14596/pisb.2841>
- Purnomo, A. (2020). A study of digital entrepreneurship through bibliometric visualizing from 1993 to 2019. In *Proceedings of 2020 International Conference on Information Management and Technology, ICIMTech 2020* (pp. 911–915). <https://doi.org/10.1109/ICIMTech50083.2020.9211270>
- Ramirez-Portilla, A., Cagno, E., & Brown, T. E. (2017). Open innovation in specialized SMEs: the case of supercars. *Business Process Management Journal*, 23(6), 1167–1195. <https://doi.org/10.1108/BPMJ-10-2016-0211/FULL/HTML>
- Reim, W., Yli-Viitala, P., Arrasvuori, J., & Parida, V. (2022). Tackling business model challenges in SME internationalization through digitalization. *Journal of Innovation and Knowledge*, 7(3), 100199. <https://doi.org/10.1016/j.jik.2022.100199>
- Riffenburgh, R. H. (2012). Tests on Variability and Distributions. *Statistics in Medicine*, 299–323. <https://doi.org/10.1016/B978-0-12-384864-2.00014-7>
- Rondi, E. R. Ü. (2022). One for all, all for one: A mutual gains perspective on HRM and innovation management practices in family firms. *Elsevier*. <https://www.sciencedirect.com/science/article/pii/S1877858520301212>
- Shan, L., Diao, H., & Wu, L. (2020). Influence of the Framing Effect, Anchoring Effect, and Knowledge on Consumers' Attitude and Purchase Intention of Organic Food. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/FPSYG.2020.02022>
- Su, C. W., Yuan, X., Umar, M., & Lobont, O. R. (2022). Does technological innovation bring destruction or creation to the labor market? *Technology in Society*, 68, 101905. <https://doi.org/10.1016/J.TECHSOC.2022.101905>
- Tangari, G., Ikram, M., Ijaz, K., Kaafar, M. A., & Berkovsky, S. (2021). Mobile health and privacy: cross sectional study. *BMJ*, 373. <https://doi.org/10.1136/BMJ.N1248>

- Tiberius, V., Schwarzer, H., & Roig-Dobón, S. (2021). Radical innovations: Between established knowledge and future research opportunities. *Journal of Innovation and Knowledge*, 6(3), 145–153. <https://doi.org/10.1016/J.JIK.2020.09.001>
- Tick, A., Saáry, R., & Kárpáti-Daróczi, J. (2022). CONSCIOUS OR INDIFFERENT - CONCERNS ON DIGITALISATION AND SUSTAINABILITY AMONG SMEs IN INDUSTRY 4.0. *Serbian Journal of Management*, 17(1), 145–160. <https://doi.org/10.5937/sjm17-36412>
- Tiwari, S. P. (2022). Services for Science and Education-United Kingdom Organizational Competitiveness and Digital Governance Challenges. *Archives of Business Research*, 10(3). <http://dx.doi.org/10.14738/abr.103.12016>
- Tolstoy, D., Nordman, E. R., & Vu, U. (2022). The indirect effect of online marketing capabilities on the international performance of e-commerce SMEs. *International Business Review*, 31(3). <https://doi.org/10.1016/J.IBUSREV.2021.101946>
- Urban, B., & Matela, L. (2022). The nexus between innovativeness and knowledge management: A focus on firm performance in the hospitality sector. *International Journal of Innovation Studies*, 6(1), 26–34. <https://doi.org/10.1016/j.ijis.2021.12.002>
- Vadana, I. I., Kuivalainen, O., Torkkeli, L., & Saarenketo, S. (2021). The role of digitalization on the internationalization strategy of born-digital companies. *Sustainability (Switzerland)*, 13(24), 1–18. <https://doi.org/10.3390/su132414002>
- Van de Velde, L., Verbeke, W., Popp, M., Van Huylenbroeck, G., Van de Velde, L., Verbeke, W., Popp, M., & Van Huylenbroeck, G. (2010). The importance of message framing for providing information about sustainability and environmental aspects of energy. *Energy Policy*, 38(10), 5541–5549. <https://econpapers.repec.org/RePEc:eee:enepol:v:38:y:2010:i:10:p:5541-5549>
- von Arnim, L., & Mrozewski, M. (2020). Entrepreneurship in an increasingly digital and global world. Evaluating the role of digital capabilities on international entrepreneurial intention. *Sustainability (Switzerland)*, 12(19), 1–18. <https://doi.org/10.3390/su12197984>
- Wei, Y. S., & Wang, Q. (2011). Making sense of a market information system for superior performance: The roles of organizational responsiveness and innovation strategy. *Industrial Marketing Management*, 40(2), 267–277. <https://doi.org/10.1016/J.INDMARMAN.2010.06.039>
- Yaqub, M. Z., & Al-Sabban, A. S. (2023). Knowledge Sharing through Social Media Platforms in the Silicon Age. *Sustainability 2023, Vol. 15, Page 6765*, 15(8), 6765. <https://doi.org/10.3390/SU15086765>
- Zahoor, N., Khan, Z., Meyer, M., & Laker, B. (2023). International entrepreneurial behavior of internationalizing African SMEs – Towards a new research agenda. *Journal of Business Research*, 154. <https://doi.org/10.1016/J.JBUSRES.2022.113367>
- Zhao, J., Shahbaz, M., Dong, X., & Dong, K. (2021). How does financial risk affect global CO2 emissions? The role of technological innovation. *Technological Forecasting and Social Change*, 168. <https://doi.org/10.1016/J.TECHFORE.2021.120751>

Zhou, H., Uhlener, L. M., & Jungst, M. (2021). Knowledge management practices and innovation: A deliberate innovation management model for SMEs. *Journal of Small Business Management*. <https://doi.org/10.1080/00472778.2021.1888383>