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The Scientometrics and Information Retrieval: Bridging Weak-Link Between Technology and Performance

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ABSTRACT

Studies over the past 20 years have shown that the alignment between technology utilization and business performance is a widespread and unexplored problem, especially in SMEs. While significant progress has been made to understand alignment, research on IT alignment is still plagued by several problems. This study aims to find patterns of the relationship between the role of technology and business performance through visual trends by identifying the keywords technology and business performance to find and identify related articles in the Scopus database that published from 2002 to 2022. The findings are visual trends increasing number of publications each year, authors, and subject area articles, keywords, and authorship networks. This literature review provides evidence that technology attracts academic researchers to make policy-relevant.

Keywords: Business Performance, Information, Scientometrics, Technology.

INTRODUCTION

SMEs business performance is a multidimensional variable that is influenced by many drivers. The available literature reveals that business performance is influenced by the integration of internal and external knowledge (Hameed, Nisar, & Wu, 2021), innovation performance (Byukusenge & Munene, 2017; Ferraris, Giachino, Ciampi, & Couturier, 2021), financial performance (Bendickson & Chandler, 2019), and market orientation (Mahmoud, Blankson, Owusu-Frimpong, Nwankwo, & Trang, 2016; Markovic & Bagherzadeh, 2018). From an individual perspective, business performance was influenced by innovative work behavior (Arsawan, Rajiani, Wirga, & Suryantini, 2020), satisfaction and employee turnover (Tuten & Neidermeyer, 2004) and high performance work system (Husin & Gungkang, 2017). Furthermore, from an external perspective, business performance is determined by supply chain collaboration (Liao, Hu, & Chen, 2021), and technology (Nandi, Nandi, Moya, & Kaynak, 2020).

In this 4.0 era, there is a huge opportunity for those who can discover the gap in business (Hendrayanti & Fauziyanti, 2021). Given that in the era of the industrial revolution 4.0, the role of technology is very important, studies discussing this construct are also increasing. Technological adaptation is one of the important triggers in the era of knowledge base economy which is considered to play an important role in improving operational performance (Suhartanto & Leo, 2018) because it is able to bring the organization to be more agile which ultimately leads to organizational effectiveness towards sustainable performance (Arsawan, Hariyanti, Atmaja, Suhartanto, & Koval, 2022). Technology adoption brings many changes, especially how organizations increase innovation in various contexts. In various literatures it is stated that the important role of technology is proven in helping to improve process and method innovation in routine organizational activities (Chen, Chang, & Chang, 2015). Technology also helps increase employee creativity (Chege & Wang, 2020) and encourage effectiveness (Sharma & Sharma, 2020; Singhry, 2015). However, in various literatures, the debate about the role of technology becomes a very important knowledge gap in conducting future research. Technology demands various changes and adaptations such as the need to improve employee understanding and skills so that it costs training, requires adaptation time and can increase employee learning time which has the potential to decrease productivity. As a result, time sufficiency and absorptive capacity are very important because of employee demographic differences (Arsawan, Sanjaya, Putra, & Sukarta, 2018). In the MSME sector, limited resources and financial conditions hinder technology adoption so that it has the potential to become resistant (Suhartanto & Leo, 2018). There is a paradox considering that SMEs must pay attention to sustainability to be able to compete in the dynamics and turbulence of the market (Knudsen, Lien, Timmermans, Belik, & Pandey, 2021; Reed, 2020).

On the other hand, although the topic of business performance is increasing from year to year, there are still many things that remain unanswered (Chan, Lai, & Kim, 2022; Davcik, Cardinali, Sharma, & Cedrola, 2020; Tran & Vo, 2020) because there are still many limitations, there is no consensus and it has mixed results in each type of industry (Arsawan, Koval, Rajiani, Rustiarini, Supartha, & Suryantini, 2022). Furthermore, business performance is also reported to be hampered by technology implementation so that it is not optimal in increasing productivity and various innovation projects (Arsawan, Hariyanti, et al., 2022; Audretsch & Belitski, 2022; Jin & Shao, 2022). So this literature gap has become a motivation for mapping bibliographic-based literature so that it can provide a broader perspective. Based on these reasons, this study aims to highlight research trends in business performance associated with the role of technology adoption. The results of the research can be used as guidance in increasing the number of researches and the potential to build expertise based on interdisciplinary collaboration. So far, the trend of technology adoption-based business performance research only

focuses mainly on related fields, is carried out on single case studies, or literature reviews without visualization. To the best of our knowledge, there are no studies that provide a comprehensive picture in the form of visualization of articles in reputable journals. This research is focused on the SME sector with several considerations. First, SMEs are the backbone of the economy which has the potential to increase GDP, economic growth, absorb labor and become a trend of employment in the future (Surya et al., 2021). Second, SMEs are one of the business lines that really need technology adoption to keep growing, increasing productivity and competitiveness (Davcik et al., 2020; Kumar, Singh, & Dwivedi, 2020). Third, although known to have limited resources, SMEs are organizations that have the potential to have high social capital because they were formed with toughness and courage (Khan, Majid, & Yasir, 2020; Yeşil & Doğan, 2019). Thus, mapping the literature on the role of technology in building business performance is a necessity. The results of the study provide a complete picture of future research opportunities and provide empirical evidence that the two constructs are related.

LITERATURE REVIEW

In the perspective of resource based view ideas Barney, (1991) explained that the organization has performance and competitiveness by utilizing tangible and intangible resources (Barney, 2001). To achieve this, the organization must build superior performance (Ferraris et al., 2021) with the allocation of all available resources (Kafetzopoulos, Gotzamani, & Skalkos, 2019). With technology adoption as the foundation for building collaborative knowledge, it is expected to be a driver of innovation (Arsawan, Hariyanti, et al., 2022) which ultimately makes the organization have sustainable business performance and competitiveness (Cappiello, Giordani, & Visentin, 2020; Connell & Voola, 2013; Shmygol, Galtsova, Solovyov, Koval, & Arsawan, 2020). So by utilizing the intangible assets owned, business entities, especially SMEs can become more agile, flexible and able to survive in every business landscape scenario and its dynamics (Anning-Dorson & Nyamekye, 2020; Gorondutse, Arshad, & Alshuaibi, 2020; Koçyiğit & Akkaya, 2020; Miroshnychenko, Strobl, Matzler, & de Massis, 2021). By paying attention to dynamic capabilities, organizations will have resilience to face various challenges and shocks (Arsawan, Hariyanti, et al., 2022) and prepare various scenarios that can bring SMEs to remain competitive in a sustainable manner (Haseeb, Hussain, Kot, Androniceanu, & Jermsittiparsert, 2019; Krishnan, 2021).

RESEARCH METHOD

To achieve the research objectives, we use the VOS Viewers software as a tool to analyze the data (van Eck & Waltman, 2010; Xie, Chen, Wang, Zheng, & Jiang, 2020). Data is taken from the Scopus bibliography by taking articles that have passed the peer review process. By identifying the keywords “business performance” and “technology”. As a result, we obtained 181 selected papers which were then downloaded in the form of a research information system *ris which was then fed to the Mendeley software. The data was downloaded for two months in June-July 2022 considering the many sources that must be selected to suit the research objectives. VOS Viewer is used considering its function in making data visualizations in the form of images of publication maps, countries, citations, and keywords (Jalilvand, Shahin, & Vosta, 2014; van Eck & Waltman, 2010; Xie et al., 2020). In addition, VOS Viewer is software that can help researchers for data mining, database mapping and doing article grouping.

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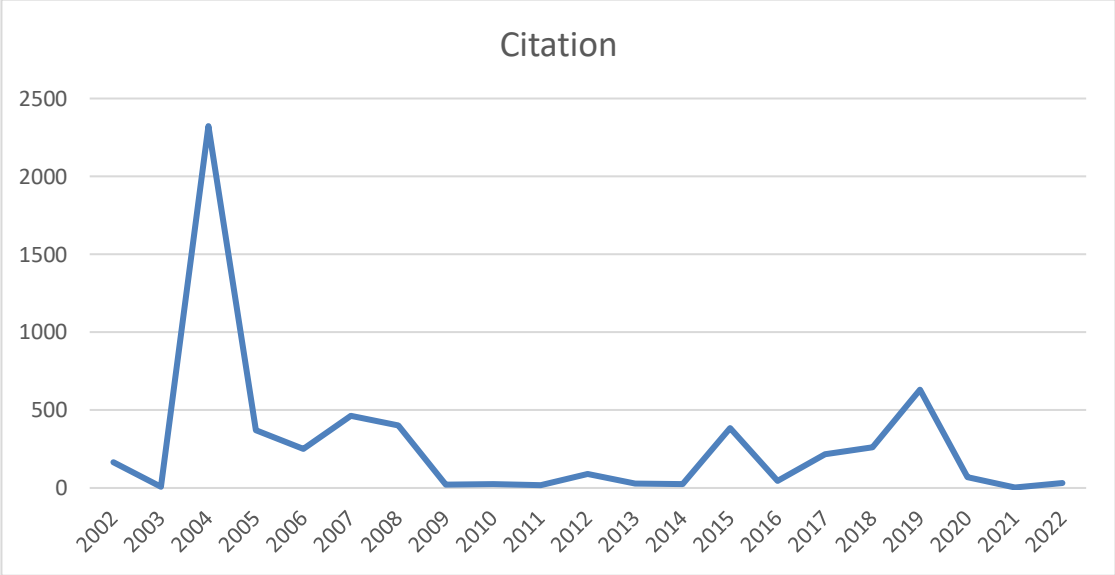
RESULTS

To achieve the research objectives, we use VoSViewer to process data and produce some important findings related to technology adoption and business performance. This study conducted a review analysis in two stages, namely: first, we conducted a search of reputable articles in the Scopus database with Publish or Perish software to calculate citation metrics, and performed authors search, journal search, and general citation search queries. Second, perform network analysis, density, and overlay visualization with VosViewer software for mapping data based on text data. The search results for articles in the Scopus database were carried out in a span of twenty years, namely articles published from 2002 to 2022 with the keywords technology and business performance, resulting in 181 articles.

Figure 1. Citation diagram (PoP source)



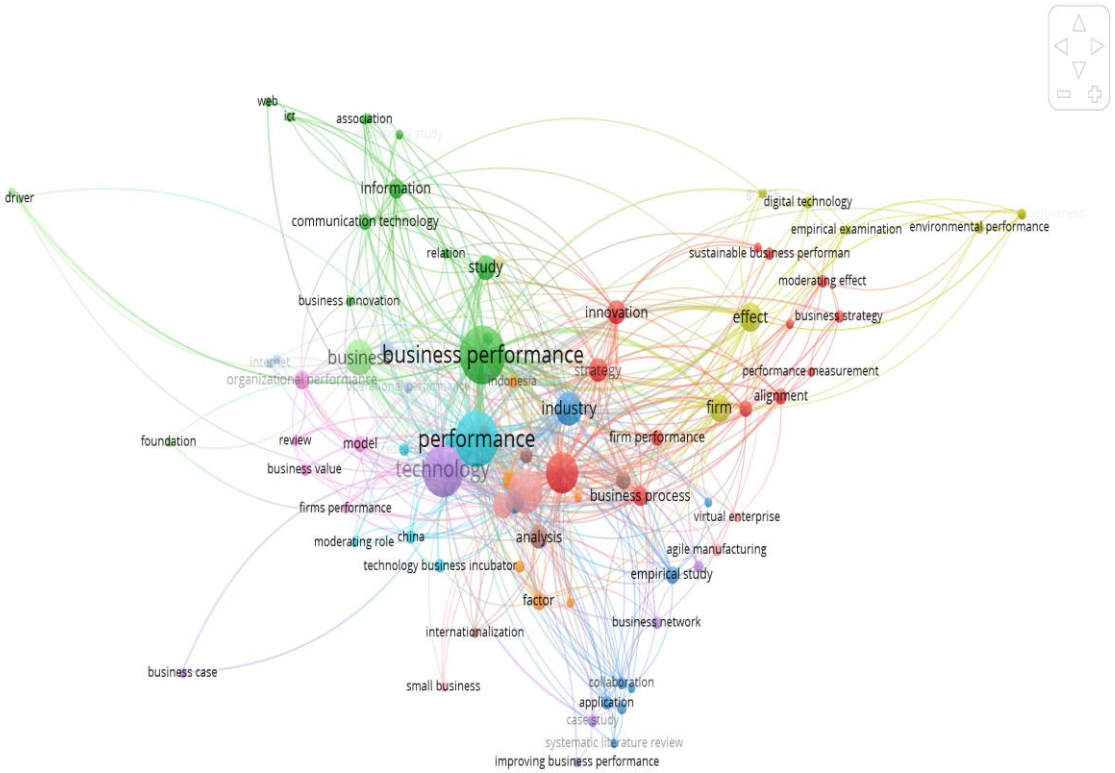
Furthermore, from the 181 articles, there were a total of 5,833 citations (see Figure 1). The highest citation occurred in 2004, followed by fluctuations in citations indicating that this theme experienced dynamics following the trend in a certain year. Furthermore, Figure 1 presents the movement of citations from the topic of technology and business performance where the highest citations were in 2004 and started to climb in 2019 but not too significant. Citation fluctuations indicate that the topic of technology adoption and business performance has been built based on the expertise of each author. Researchers think that citation fluctuations indicate that the two constructs have not become a major topic in the last decade. The possible reason is that this research only focuses on the SME sector, while technology adoption is mostly carried out by technology-based companies.

The next stage, the articles will be mapped based on text data to find out the mapping from research that has been carried out over a period of 20 years, where the data is processed in the form of a research information system using VoSViewer. Then extracted based on the title field, with a full counting method, the minimum number of occurrence of term 2, from 568 terms so as to find 86 the threshold. Of the 86 terms detected in accordance with the relevant terms. The results of the analysis show that there are 13 clusters where the first cluster consists of 13 items, the second cluster consists of 12 items, cluster 3 consists of 9 items, cluster 4 consists of 9 items, cluster 5 consists of 6 items, cluster 6 consists of 6 items, and cluster 5 consists of 6 items. 7 consists of 6 items, cluster 8 consists of 5 items, cluster 9 consists of 5 items, cluster 10

consists of 5 items, cluster 11 consists of 4 items, cluster 12 consists of 4 items, and cluster 13 consists of 1 item.

The items in the clusters include: Cluster 1: alignment, business model design, business process, business strategy, firm performance, innovation, innovation performance, strategy, sustainable business performance, technology firm. Cluster 2: association, business innovation, business performance, communication technology, competitive advantage, ICT (internet and communication technology), web. Cluster 3: collaboration, e-business technology, supply chain performance. Cluster 4: business competitiveness, digital technology, environmental performance, environmental corporation, green information technology. Cluster 5: business network , improving business performance, new technology, technology. Cluster 6: performance, technology business innovation. Cluster 7: business alignment, efficient technology, technology business innovation. Cluster 8: internationalization, medium enterprise, SMEs, Cluster 9: business value, firms performance, organizational performance, Cluster 10: agile manufacturing, information technology, relationship, small business, virtual enterprise, Cluster 11: business driver, information technology, Cluster 12 : adoption, internet, operational performance, small business performance, Cluster 13: mediating role. In full, we present the output of VoS Viewer in the form of network, overlay, and density visualization.

Figure 2. Network Visualization



Based on the results of the network visualization (Figure 2), the network between terms visualized from the 13 clusters obtained. The biggest item is business performance, it can be seen that many studies relate to technology. Topics that currently have the opportunity to become topics in future research that are connected with technology are improving business performance, small business, technology business incubator, and internationalization. The related business performance topics are performance, business innovation, business innovation, sustainable business performance, organizational performance, firm performance, innovation, strategy, operational performance. From Figure 2 it can be seen that there are still many research opportunities that can be carried

out related to technology and business performance which raises several new variables that are not directly related such as virtual enterprise, business network, internet, agile manufacturing, business process, digital technology, environmental performance, business strategy, web, and ICT (internet and communication technology). Next, we perform an analysis with overlay visualization.

Figure 3. Overlay Visualization

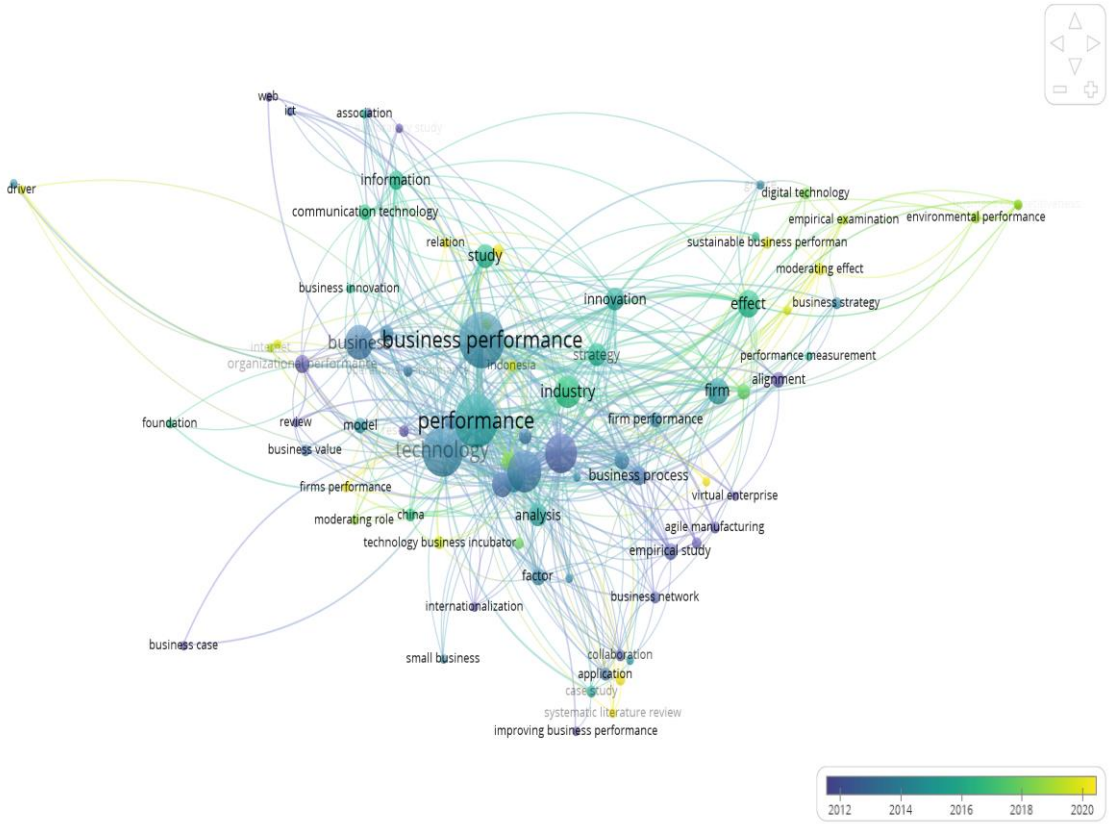


Figure 3 shows the historical traces of research related to technology and business performance. From the color it can be seen that research connecting the two topics has been done for a long time, but it can still be done at this time because it is connected with several new topics that show green and yellow colors studied from 2016 to 2020 which are connected with technology and business performance. After 2016, topics related to technology and business performance are communication technology and business innovation. After 2018, topics related to technology and business performance are environmental performance and digital technology. After 2020, topics that are related to technology and business performance and are still an opportunity to become future research are the internet, firm performance, and sustainable business performance, technology business incubator, and drivers. The movement of research trends from 2012 to 2020 has provided a new perspective that the two constructs can be tested with different constructs. This provides evidence that business performance is a multidimensional construct that can be influenced by various drivers both internal and external to the organization. Furthermore, in the SME sector, the 2020 trend highlights the importance of conducting research in the context of business strategy and technology which is the main objective of this study. Both constructs are proven to be important triggers in building sustainability and competitiveness.

Figure 4. Density Visualization

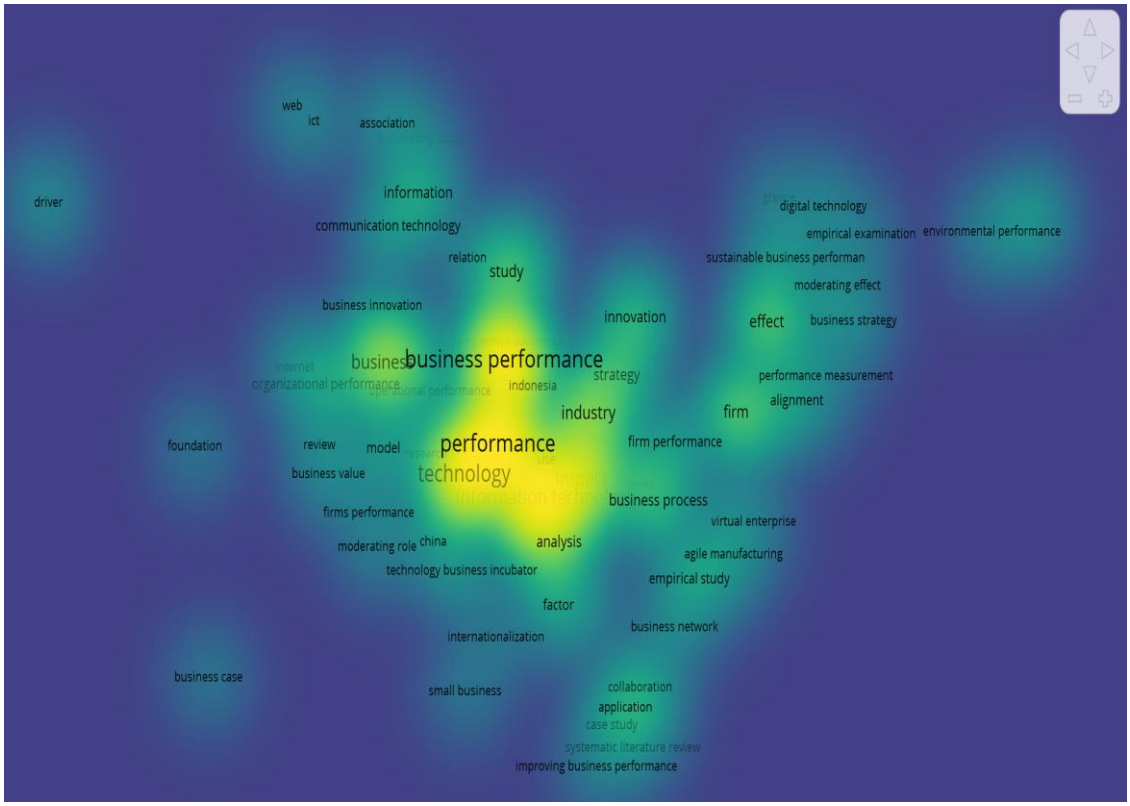


Figure 4 shows the results of the density visualization analysis which shows the emphasis of research on a research group. From the picture, it can be seen that technology and business performance are located in bright colors, thus identifying that research on the two optics is often carried out, but many items have dim colors and even are located in dark areas, which indicates that currently there are a lot of new variables. That can relate to both topics. Variables that can be used as the next topic related to technology and business performance. And there are still few who research, namely improving business performance, small business, internationalization, web, ICT, digital technology, environmental performance, sustainable business performance, virtual enterprise, agile manufacturing, business network, technology business incubator, firm performance, business value, and business innovation, communication technology, and the internet. The results of the analysis conclude that the two topics namely technology and business performance are the two constructs that need attention in future studies. In the SME sector, both constructs are worth researching because they can help SMEs in building sustainability, creating agility and resilience (Ali et al., 2021; Iborra, Safón, & Dolz, 2020). Finally, the development of SMEs because they have business performance is expected to become an alternative economic force in a country, especially developing countries.

DISCUSSION

Based on the results of the analysis with VoSViewer, there are several important discussions in this study. First, there are still many research opportunities that can be done with technology and business performance which raises several new variables that are not directly related, such as virtual enterprises (Luo, Lan, Luo, & Li, 2021; Subawa, Widhiasthini, Astawa, Dwiatmadja, & Permatasari, 2021), business network (Jin & Shao, 2022), internet, agile manufacturing (Onu & Mbohwa, 2021; Theyel & Hofmann, 2020; Yadav et al., 2020), business process, digital technology, environmental performance (Darvishmotevali & Altinay, 2022; Nassani, Yousaf, Radulescu, & Haffar, 2022),

business strategy, web, dan ICT (internet and communication technology). Second, considering that the output overlay visualization shows opportunities for new research trends, the results of this study can add to these opportunities by using topics related to technology and business performance and still an opportunity for future research is the internet (Birkel & Hartmann, 2020), firm performance, dan sustainable business performance (Gupta, Kumar, & Wasan, 2021), technology business incubator, and driver (Vashishth, Chakraborty, Gouda, & Gajanand, 2021; Zhang, Oo, & Lim, 2019). Third, based on density visualization analysis, the variables that can be used as the next topic are improving business performance, small business, internationalization, web, ICT, digital technology, environmental performance, sustainable business performance, virtual enterprise, agile manufacturing, business network, technology business incubator, firm performance, business value, and business innovation, communication technology, and the internet. So these opportunities provide an overview and guidance on topics that might be explored in the future. Thus, in the SME sector, it is still necessary to consolidate technology to build sustainable innovation in order to build sustainable business performance. Finally, the research results provide a complete picture of how technology plays an important role in improving business performance. Although empirical research states that business performance is influenced by many drivers, the role of technology is very important, especially in increasing innovation which ultimately sharpens organizational dynamic capabilities (Fosso Wamba, Queiroz, & Trinchera, 2020; Viswanathan & Telukdarie, 2021). This finding sharpens the resource based view (Barney, 1991) that intangible power is one of the formation of competitive advantage. Furthermore, intangible assets are an important driver in increasing employee and organizational knowledge in gathering useful ideas for knowledge creation. Finally, collaborative knowledge becomes the strength of an organization's social capital in dealing with various scenarios to remain agile and resilient (Sharma & Sharma, 2020; Teixeira & Werther, 2013; van Aswegen & Retief, 2020).

CONCLUSION

This study aims to map the pattern of research for two decades with the topic of technology and business performance. Existing research provides an opportunity for future researchers to close gaps and information retrieval so as to enrich the body of knowledge. This study produces three main conclusions, first, the research trend leads to the increasing use of technology to achieve business performance. Evidently, from year to year the number of studies and citations tends to increase. Second, the unexplored variables can be used as the basis for conducting future research such as (1) improving business performance, (2) small business, (3) internationalization, (4) web, (5) ICT, (6) environmental performance, (7) sustainable business performance, (8) virtual enterprise, (10) agile manufacturing, (11) business network, (12) technology business incubator, (13) business value, and (14) business innovation, (15) communication technology, and (16) internet. Third, this study provides a strategic pattern regarding constructs that will be tested in various empirical studies that are able to provide managerial insights in the management of SMEs. Evidently, the role of technology is an important driver of SME business performance to build a sustainable competitive advantage (Liu & Jiang, 2016).

LIMITATION

Considering that this research is a systematic literature review, this research has several limitations. First, the research results cannot be justified because it is still in the early stages, for that it is necessary to conduct field testing regarding the relationship between constructs. Second, the literature notes that technology adoption is closely related to business performance which has not been widely studied in the SME sector, for that reason, further research can examine the relationship between the two constructs to obtain a valid relationship. Finally, this study bridges the role of technology and business

performance only in the SME sector, whereas all organizations need technology adoption to remain competitive in an uncertain market. Future research could reexamine the two constructs in different sectors. So, conducting a comparative study between SMEs and technology-based organizations is an attractive option.

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DECLARATION OF CONFLICTING INTERESTS
The author states that there is no conflict of interest.

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