



Research article

Technological innovation and sustainability of shared service: Insights from industry players

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ABSTRACT

Shared service centre is a transformative organizational approach that fuels operational efficiency, cost reduction, and elevated service delivery across diverse industries. Technological innovation is paramount for driving organizational success, fostering competitive advantage, and enabling sustainable growth in today's dynamic business landscape. The purpose of this research article is to investigate the impact of technological innovations on the sustainability performance of shared service centers. Semi-structured email interviews were conducted with eleven practitioners from multinational shared services in Malaysia. The data was analyzed using structural and pattern coding, and six phases of thematic analysis were applied. The results reveal several themes related to innovative technologies in shared services, including robotic process automation, efficiency in service delivery, remote access, cost-effectiveness, customer satisfaction, and paper waste reduction, that practitioners consider relevant for sustainable performance in shared services. The findings have theoretical and managerial implications, emphasizing the significance of technological innovation approaches and sustainable performance in supporting technologies. This study provides insights for SSCs to adopt innovative technologies for improving their sustainability performance and achieving business goals.

1. Introduction

Technological innovation refers to the development and adoption of new technologies, tools, and processes that lead to improved performance, efficiency, and sustainability in various industries. Technological innovation has become a key driver of growth and competitiveness for organizations across different sectors. Innovation evolves and transforms the industry and technologies over time [1]. It enables organizations to optimize their operations, enhance their products and services, and create new markets and opportunities. Technological innovation adoption has become a crucial factor for businesses globally to stay competitive and meet the changing demands of their customers. Policymakers have widely acknowledged the significance of innovation as a key catalyst for economic advancement and growth [2]. Organizations are investing heavily in new technologies to improve their operational efficiency, increase productivity, and enhance their products and services.

Shared service centers (SSCs) are a popular organizational model that enables companies to centralize and consolidate various administrative and support functions, such as human resources, finance, and information technology [3]. In recent years, technological

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innovation has transformed shared service from traditional back-office functions into strategic of excellence that provide value-added services to their internal customers. According to Schulman, Harmer [4] reports that shared service is centralized internal organizational service unit that provides support services to multiple business units within an organization. The goal is to streamline operations, reduce costs, and improve the quality of services provided [5]. By centralizing these functions, SSCs can reduce redundancies, streamline processes, and achieve economies of scale. The adoption of the SSC model has grown rapidly over the past few decades. Schulman, Harmer [4] mentioned that this business model is driven by the need for organizations to reduce costs, improve efficiency, and enhance the quality of services provided to internal customers. Specially in Malaysia, it is expected to grow from USD 1.3 billion in 2019 to USD 1.5 billion by the end of 2024 [6]. This sector's significance lies in its crucial contribution to driving the economic advancement of Malaysia.

The rapid advancement of technological innovation has ushered in a transformative era for organizations across various industries. In this context, SSCs have emerged as crucial hubs for optimizing processes, reducing costs, and enhancing service quality [6]. The integration of technological innovation within SSCs not only holds the potential to revolutionize their operational landscape but also to profoundly impact their overall sustainability and performance. However, despite its growing importance, there remains a distinct gap in the comprehensive understanding of the exact nature and extent of these impacts. This study is motivated by the need to delve into the intricate relationship between technological innovation and SSCs, with a specific focus on its ramifications for sustainability and performance. By examining the potential transformative opportunities presented by technological innovations like automation and digital transformation, this research seeks to provide valuable insights into the ways in which SSCs can harness technology to drive operational efficiency, environmental responsibility, and customer satisfaction.

This study endeavors to offer a nuanced understanding of the multifaceted impacts of technological innovation on SSCs through an in-depth exploration of real-world scenarios and empirical data. While Lakshmi, Sricharan [7] pointed out that there is a scarcity of scholarly research dedicated to SSCs, this gap is particularly pronounced when it comes to empirical investigations grounded in a robust theoretical framework. Ali, Maelah [8] further underscores the limited scope of existing research, characterizing it as nascent and constrained, lacking comprehensive exploration of the complex dynamics within SSCs. Sun [9] identifies a gap in studies examining the impact of technological innovation on corporate green technology performance, particularly in terms of the precise processes involved. Additionally, Avila [10] highlight to the challenges faced by SSCs in adapting to technological transformations, emphasizing the need for research into how leaders can foster technological literacy and ensure long-term sustainability. Addressing the gaps identified in previous studies, this research provides valuable empirical insights into an underexplored area within the scientific literature: the impact of technological innovation on SSCs. By focusing on this intersection, the current study significantly contributes to the existing body of knowledge, offering a fresh perspective on how technological advancements drive efficiency, sustainability, and operational improvements in SSCs—a subject that has not yet been extensively examined in prior research.

This research's findings are poised to equip practitioners, leaders, and decision-makers with actionable insights that can inform the strategic integration of advanced technologies within SSCs, thereby promoting sustainability and enhancing long-term performance. By focusing on the practical application of technological innovation from financial, process, and customer perspectives, this study seeks to deepen the discourse on how such innovations can reshape SSC operations. The anticipated contributions are twofold: advancing the academic understanding of SSCs and offering concrete recommendations for improving organizational effectiveness through technology. As such, this investigation seeks to address the following research question (RQ), thereby reinforcing its relevance to both academia and practice.

RQ. How does technological innovation contribute significantly to enhancing sustainable performance within shared services?

The paper is structured into several sections, beginning with a theoretical foundation on technological innovation in section 2, followed by an outline of the research materials and methodologies in section 3. The interview findings are detailed in section 4, while section 5 delves into discussions. Section 6 explores the implications of the study, and the conclusions are presented in section 7.

2. Theoretical background

2.1. Sustainability in the context of shared service centre

Integrating sustainability into shared service operations is a strategic decision that supports long-term success, allowing organizations to achieve economic, environmental, operational, and intangible advantages in a competitive market. Moreover, the implementation of green technology innovations can help businesses tackle environmental sustainability challenges while simultaneously driving economic and operational growth, and enhancing their corporate reputation [11]. Shared Service Centers (SSCs) are responsible for providing critical support functions to an organization, and their operations can have a significant impact on the environment and society. The aspect of sustainability being studied is primarily focused on the sustainability of the SSCs. This sustainability pertains to the long-term viability, efficiency, and performance of SSCs through technological innovation and integration. Specifically, it highlights how innovations like AI, RPA, and other technologies improve operational efficiency, reduce costs, streamline processes, and enhance service quality, which contribute to the overall sustainability of SSC operations.

This type of sustainability refers to the ability of SSCs to maintain their competitive edge, continue delivering high-quality services, and adapt to changing technological and business environments. It ensures that SSCs remain relevant and viable over the long term by adopting efficient technologies, optimizing resources, and responding to evolving market demands. The emphasis on reducing errors, improving decision-making, and cost efficiencies further reinforces this operational and economic aspect of sustainability.

The sustainability being studied in this context is the operational and economic sustainability of SSCs, which is achieved through

technological innovation and continuous process improvements. Bernow and Nuttall [12] described the sustainability link to the shared service environment as below.

1. Reducing environmental waste by transitioning from paper-based processes to digital processes is an important step in reducing an organization's carbon footprint. It can save resources and minimize the environmental impact of paper production, transportation, and disposal. Digital processes can be implemented across various functions, such as accounting, HR, and procurement, reducing paper usage and increasing efficiency.
2. Global process harmonization involves standardizing policies and process controls across an organization's operations, enabling better governance of its assets, both tangible and intangible. This approach can improve operational efficiency, reduce risks, and increase transparency. It can also facilitate regulatory compliance and support the SSC's sustainability initiatives.
3. End-to-end customer, supplier, and employee journeys, coupled with sustainability (Environmental, Social, and Economical) risk management, can provide valuable insights into the impact of SSC's operations on its stakeholders and the environment. Process mining can be used to analyze data and identify inefficiencies, bottlenecks, and opportunities for improvement. It can also help identify sustainability risks and provide early warnings of potential risks across regions and businesses.
4. Migrating core service management automation to cloud-based solutions can optimize and leverage shared computing resources, reducing costs, and improving efficiency. Cloud-based solutions such as workflow, process mining, RPA (Robotic Process Automation), and AI (Artificial Intelligence) can automate routine tasks, improve decision-making, and provide real-time insights into an organization's operations. This approach can help organizations stay competitive, meet customer expectations, and achieve their sustainability goals.

Today, SSCs are widely used across different industries, including healthcare, finance, manufacturing, and retail. SSCs have proven to be an effective way for organizations to improve their operational performance and support their core business objectives. However, the adoption of SSCs also comes with some challenges, particularly in the area of sustainability [13]. SSCs can have a significant impact on the environment, given their size and scope of operations. Technological innovation plays a crucial role in promoting sustainability, enabling organizations to enhancing economic framework, boosting productivity, optimizing resource allocation efficiency, and fostering upward social mobility [14]. Therefore, it is essential for SSCs to adopt sustainable practices and technologies to harmonize economic, environmental, and social concerns, provide benefits to stakeholders and mitigate adverse effects on both the planet and society.

2.2. Technological innovation in the shared service centre

Technological advances have transformed the world of business. The traditional performance management system involves both operational and financial aspects. In today's environment, deploying technology to innovate products and services is essential for boosting financial results and sustainability. Sharabati, Ali [15] argues that technological innovation plays a transformative role in boosting organizational effectiveness and promoting sustainability. By integrating advanced technologies, organizations can enhance both management and operational efficiencies, which are critical for long-term development. Existing research consistently points to a positive link between technological innovation and improved organizational performance, identifying strategic planning and marketing capabilities as crucial enablers of this relationship. The study further emphasizes that prioritizing investments in technological resources is essential for driving superior performance outcomes and maintaining a competitive edge in today's fast-evolving business environment.

The transition towards sustainability within organizations extends beyond internal advantages, such as improved efficiency and cost savings, to contribute meaningfully to global environmental conservation efforts. By adopting sustainable practices, firms are not merely aligning with regulatory or market trends, but are actively participating in reducing environmental degradation [16]. This shift signifies a broader corporate responsibility where companies acknowledge their role in mitigating ecological damage. The ripple effect of these efforts, particularly within SSCs, can drive industry-wide changes that accelerate sustainability on a larger scale, benefiting both businesses and the environment.

In SSCs, technological innovation is a critical driver of operational efficiency and cost reduction. The integration of innovative technologies within SSCs improves service delivery and organizational efficiency. Technological advancements have enabled the unbundling of financial and business services, allowing front office, back office, and data centers to be globally distributed [17]. This has promoted remote work, offering cost savings and access to a global talent pool. Other benefits include standardization of processes, improved service quality, better access to specialized expertise, and increased focus on core business activities [10,18].

Technologies such as AI, machine learning (ML), robotic process automation (RPA), and process mining have revolutionized shared services by automating repetitive tasks, streamlining workflows, and reducing errors. These innovations have improved cost efficiency, allowing SSCs to deliver superior service quality [7]. For instance, AI and advanced data analytics provide real-time insights that enable better decision-making and optimize resource allocation [19]. These innovations allow SSCs to enhance service delivery and minimize geographical limitations, which further improves customer satisfaction.

As technology evolves, SSCs must adopt emerging technologies like cloud computing, blockchain, and AI to remain competitive. By continuously innovating, organizations can improve efficiency, reduce costs, increase productivity, and enhance their market position. This can lead to sustained growth and profitability. However, the implementation of these innovations in SSCs presents challenges, with leaders facing the task of promoting the required technological innovations to ensure that the transition occurs in a sustainable, positive, and beneficial manner for all stakeholders over the long term [10]. Thus, the current study aims to fill this gap by

providing empirical findings on shared services, a topic not extensively covered in scientific literature.

3. Materials and methods

In social sciences, research methodologies are commonly divided into two broad categories: quantitative and qualitative approaches. Bryman [20] delineates these strategies, noting that quantitative research typically follows a deductive process aimed at testing existing theories, while qualitative research is more inductive, seeking to generate or refine theory from data collected during the research process. According to Saunders, Lewis [21], quantitative methodologies are often aligned with hypothesis testing and the examination of relationships between variables, as Creswell and Creswell [22] emphasize, whereas qualitative methods focus on uncovering deeper, contextual insights rather than testing pre-established hypotheses.

Quantitative research tends to limit respondents to predefined answers, which can obscure underlying attitudes or emotional factors [23]. This limitation, as Bryman and Bell [24] suggest, arises because quantitative research is often conducted in controlled, regulated environments, which may restrict the discovery of emergent or unexpected insights. In contrast, qualitative research prioritizes the subjective experiences of both researchers and participants. Potter [25] describes this approach as one that seeks to understand the unique dynamics of specific situations, focusing on the richness of participant interactions rather than the predictability of outcomes.

The choice of a qualitative research method for this study was driven by the need to explore the intricate and multifaceted impacts of technological innovation on SSCs. Qualitative research is particularly suited for examining complex phenomena where contextual understanding and in-depth insights are paramount. In this case, the primary aim was to capture the perspectives of SSC leadership regarding how technological innovations influence key areas such as service delivery efficiency, cost-effectiveness, and customer satisfaction.

Quantitative approaches would have potentially yielded generalizable results. However, the main limitation of quantitative surveys lies in their rigidity; predefined response categories may constrain participants' ability to provide detailed explanations or discuss nuances in how technological innovations impact SSC operations. Surveys tend to capture the "what" but often fall short in explaining the "how" and "why" behind complex phenomena like technology-driven organizational change [26]. As suggested by Padgett [27] and Creswell and Creswell [22], qualitative methods are particularly useful when key variables are unclear, when the subject is novel, and when it has not been examined in the same context before. The strength of qualitative research in this setting lies in its ability to provide in-depth insights into the complexities of SSC operations.

Moreover, qualitative methods align well with recent trends in SSC and technology studies. Research by Figueiredo and Pinto [28], and Fernandez and Aman [29] emphasized the value of qualitative inquiry when investigating technological transformations, particularly when the goal is to understand leadership perspectives and strategic decision-making processes. These studies highlight that qualitative research can uncover subtleties in organizational behavior and the lived experiences of decision-makers, which are critical for comprehending the practical and strategic implications of adopting new technologies. This choice aligns with contemporary research trends, recognizing the importance of qualitative data in shedding light on emerging technological dynamics within organizations.

3.1. Sample and data collection

The study involved eleven leaders from various shared service organizations in Malaysia. To collect empirical data for this research, email interviews were conducted with practitioners from multinational shared service organizations based in Selangor and Kuala Lumpur. The rationale for focusing on respondents from the Selangor and Kuala Lumpur area is due to their significance as the primary location for shared service industry investment. This region has witnessed substantial investment and development in the shared service sector, making it a crucial hub for this industry. By concentrating on respondents from this area, the study can gain insights and perspectives that are representative of the key players and dynamics within the shared service industry in Malaysia.

In qualitative studies, sampling is aimed at identifying a sufficient number of participants or observations capable of offering comprehensive and detailed data to grasp the phenomenon being studied [22]. The participant count in qualitative studies can vary, often encompassing between six to twenty individuals, although the range can extend from as few as one to three participants, with no rigid guidelines [30]. The emphasis should be on participant quality over quantity, and it is advised that researchers take into account the most critical individuals in their field when determining the suitable sample size. The primary goal should be to accumulate sufficient data to construct a compelling argument [31]. This choice served as a basis when sending out invitations for participation in this research study to the respondents within the SSCs.

To achieve a thorough insight into the studied shared service organization, this research concentrated on a participant spectrum encompassing top managerial tiers like directors and general managers, as well as functional or process managers. Invitations were sent to individual practitioners through LinkedIn, resulting in 11 successful responses from the targeted 97 leaders who met the research criteria for multinational SSCs. Throughout the data collection phase, participants were offered the option of face-to-face, online, and email interviews. Ultimately, respondents chose to partake in the research through email interviews.

The study focused on interviewing SSC's leadership team, who are typically very busy. The research was invited to the participants with multiple options of face-to-face interviews, online interviews, and email interviews due to the pandemic situation and its inaccessibility. All respondents agreed to participate in the email interviews and completed the data collection portion of the study. Although the study gained its solid position to answer the all-research question, with this limitation it could not triangulate to replace traditional face-to-face interviews.

The qualitative study employed a focused interview methodology, conducted in English, designed to capture in-depth insights from leadership-level participants within SSCs. The data collection process took place towards the end of 2022, spanning approximately one month. During this period, a single researcher was responsible for managing the entire interview process. This approach, while logistically streamlined, presented certain challenges but also allowed for a consistent and uniform data collection technique across all participants.

Given the seniority and demanding schedules of the interviewees, the researcher opted for email interviews to facilitate participation while respecting time constraints. Although this method lacks the immediacy and depth of face-to-face interactions, it provided respondents with the flexibility to offer considered, detailed responses at their convenience. The extended time frame of one month was crucial for accommodating participants' availability, thereby ensuring robust and reflective engagement with the research questions.

Throughout the process, the researcher carefully curated the interview questions to align with the study's core focus on technological innovation in SSCs, ensuring the elicitation of data relevant to themes such as service efficiency, cost-effectiveness, and stakeholder satisfaction. The use of a single researcher enhanced the consistency of the data collection process but also underscored a limitation in terms of the breadth of interpretation that might have been achieved with a multi-researcher approach. Despite this, the study produced a comprehensive dataset, enabling a nuanced exploration of the impact of technological innovations on SSC operations.

The respondents provided general background information such as their name, email, location, shared service operating model, position, and years of experience in the shared service industry. Using email interviews allowed participants to express their experiences in a comfortable and flexible environment [32]. All the participants had experience in different shared service operating models, with the finance shared service operating model being the common all of them. Whereas three of the participants have experience in a multiple shared service operating model. Their years of experience in shared service industry range from 8 to 25 years, and they have experience in various shared service operating models such as Finance, Information Technology, Human Resource, and Marketing. The below Fig. 1 illustrating the respondents as per shared service operating model.

To maintain confidentiality, all participants in the study were given pseudonyms to use instead of their real names. These pseudonyms were designated as R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, and R11. This participants information is presented in Table 1.

3.2. Data processing

Qualitative data analysis involves the use of first cycle coding methods and second-cycle coding methods to analyze the data. In this study, the first cycle coding methods applied include the elemental structural coding method, while the pattern coding method is used in the second cycle due to its ability to classify, prioritize, integrate, abstract, and conceptualize the data set. As Saldaña [33] describes, the structural coding method is appropriate for interview transcripts and semi-structured standardized data, while the pattern coding method is applied after initial coding to develop meta-codes that present category labels with meaningful attributes. The purpose of these coding methods is to harmonize with the study's conceptual framework and paradigm and enable analysis to answer the research questions directly [33]. Fig. 2 represent the summary of data and analysis process for structural and pattern coding.

3.3. Thematic analysis

This research used the thematic analysis approach for analyzing the data collected through semi-structured interviews. Thematic analysis was chosen for its flexibility and applicability, as well as its ability to avoid confirmation bias. This approach involves identifying themes and patterns in the data that are significant and answer the research question. Braun and Clarke [34] proposed six phases of thematic analysis that were used in the study to guide the analysis process. The thematic analysis process of this study involved six phases. In phase one, the researchers familiarized themselves with the data by reading each transcript multiple times. In phase two, they generated initial codes by organizing the data into smaller, meaningful chunks. These codes included both phrases and individual words mentioned by the respondents. In phase three, the researchers searched for themes by grouping related codes into

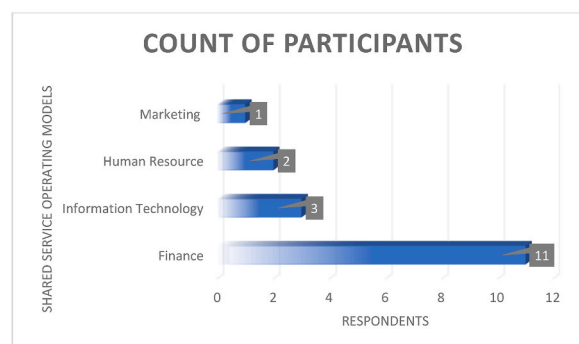


Fig. 1. Shared service operating models of respondents.

Table 1
Participants information.

Participants Code	Position	Experience in Shared service	Shared Service Operating Model
R1	Finance Operational Risk Manager	16 Years	Finance and Information Technology
R2	Order to Cash Manager	18 Years	Finance
R3	Shared Service Senior Manager	18 Years	Finance
R4	Director Global Business Services	09 Years	Finance, Human Resource, and Information Technology
R5	Order to Cash Manager	13 Years	Finance
R6	Shared Service Process Manager	14 Years	Finance
R7	General Manager	25 Years	Finance
R8	Financial Reporting Manager	09 Years	Finance
R9	General Manager	08 Years	Finance, Information Technology, and Marketing
R10	Regional Finance Manager	08 Years	Finance
R11	Order to Cash Manager	12 Years	Finance

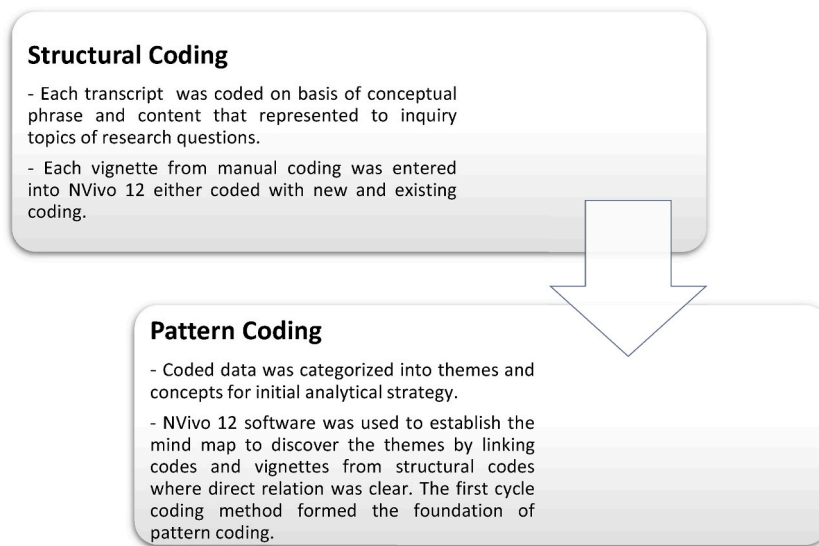


Fig. 2. Data analysis process.

categories that addressed the research questions. In phase four, they reviewed, altered, and merged the themes as necessary to ensure they accurately reflected the data set. In phase five, the researchers defined and named the final themes that captured the essence of the research question. Finally, in phase six, they produced a thematic analysis report on the findings. Fig. 3 illustrates the different phases and their corresponding names.

The study utilized NVivo 12 software for qualitative data analysis in order to organize, analyze, and gain insights into the semi-structured interview data. The software is popular among academic researchers due to its ability to handle complex data and provide quick access. Using NVivo 12 saved time on manual tasks and allowed for more time to be spent on developing final themes and conclusions [35]. In this study, NVivo 12 software is used to enhance data analysis, and each transcription is coded manually using the software for consistency [36]. The analysis of coded data turns into categorization to understand the segments in terms of similarity

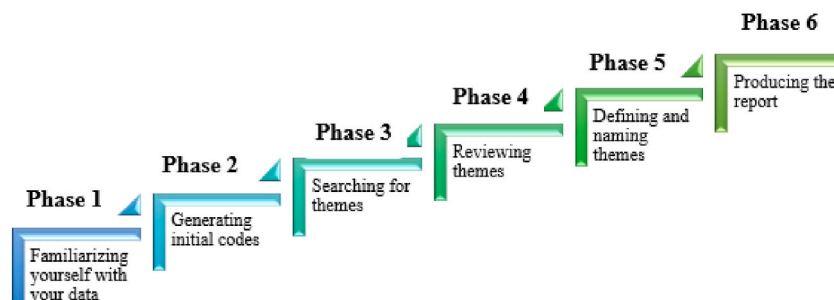


Fig. 3. Six phases of data analysis method adapted from Braun & Clarke (2006).

and differences, and all segments are summarized into themes and concepts [37]. This analysis process approach required paying close attention to the data and identifying themes and patterns amongst the details. The goal was to interpret the data and identify meaningful ideas and concepts.

3.4. Conceptual model for the study

This model shows that technology innovations have the potential to impact shared service in various ways. A conceptual model was created for observing the learning and growth impacting the other three perspective of balanced scorecard model which are financial perspective, customer perspective, internal business perspective, and innovation, learning, and growth perspective. Learning and growth perspective result in continuous learning and innovation, leading to the development of practices and new technology that aligns with principles on sustainability, this perspective is included into the model [38]. Specially, this model illustrates the impact of technological innovations on shared service in most evident in the area of finance, process and customer. This could mean that the study is interested in exploring how technological innovations are affecting the financial performance of shared service organizations, how they are changing the processes involved in shared services, and how they are impacting customer satisfaction. By focusing on these three areas, the study aims to provide a comprehensive understanding of the impact of technological innovation on shared services. The conceptual model of this study shown in Fig. 4.

4. Findings

The findings from the qualitative analysis of this study provide a comprehensive understanding of how technological innovations influence various aspects of SSCs. The interviews conducted with respondents have revealed six critical themes: Robotic Process Automation (RPA), Efficiency in Service Delivery, Cost-effectiveness, Customer Satisfaction, Remote Access, and Paper Waste Reduction. Each theme has been emphasized and supported by multiple responses, as illustrated in the hierarchical chart.

4.1. Theme 01: Robotic process automation (RPA)

This theme emerged as one of the most prominent in the discussions. Respondents consistently highlighted the transformative impact of RPA in automating processes, reducing human intervention, and improving overall efficiency. As R6 noted, *“When dealing with transactional volume & standard processes; technology & innovation is key in enabling automation. We have shorten the processing lead time, increasing accuracy”*. Similarly, R9 emphasized that automation is a key area of focus in SSCs, stating, *“Technology is a key enabler of SSC. automation are key focus areas”*. R5 reinforced this by explaining the dramatic reduction in manpower required due to automation, saying, *“If previously 10 people is tasked to do one process, now, with AI and tech, we only need 2 people to do it”*. These statements collectively emphasize the centrality of RPA in driving efficiency and cost savings.

4.2. Theme 02: Efficiency in service delivery

Technological innovation was also noted for significantly improving efficiency in service delivery. Respondents shared their insights on how technology enables faster processing, higher productivity, and reduced operational costs. R1 observed, *“improves efficiency (faster processing, higher productivity, lower costs, etc.)”*. R9 echoed this sentiment, emphasizing that operational excellence is achievable through technological advancements. R9 stated, *“Operational excellence”*. The respondents' experiences collectively point to how SSCs can achieve greater operational efficiency, allowing them to better allocate resources and streamline workflows.

4.3. Theme 03: Cost-effectiveness

Cost reduction emerged as another important theme. Participants noted that the implementation of technological solutions enables organizations to reduce their overall functional costs in the long term. R1 stated, *“On long-term, it is more cost effective”* while R8 further elaborated, *“Technology able to reduce the overall functional cost”*. These insights highlight how the adoption of innovative technologies

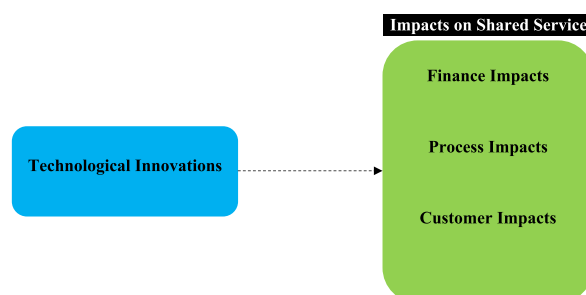


Fig. 4. Conceptual illustration of the study in respect of model.

allows organizations to realize substantial cost savings while maintaining operational efficiency, which is crucial for the sustainability of SSCs.

4.4. Theme 04: Customer satisfaction

Several respondents highlighted the role of technology in enhancing customer satisfaction, noting that stable, user-friendly digital platforms can improve the customer experience. R1 remarked, *“and provides better customer experience provided the digital platform is stable in its performance and user friendly, and have good customer service to support users”*. This statement reflects the broader consensus that technological innovations enable organizations to better meet customer needs, thereby fostering customer loyalty and satisfaction.

4.5. Theme 05: Remote access

Remote access capabilities, facilitated by technological advancements, were also discussed by the respondents. They emphasized the increased flexibility that remote access provides, enabling employees to work from anywhere and improving resilience in business operations. R1 noted that technology *“and provides better accessibility/mobility (more resilience i.e. jobs can be performed anytime anywhere)”*. R4 further elaborated on how real-time data availability enhances decision-making processes in remote work settings. R4 stated *“- Real time data availability to make decisions”*. These insights highlight how remote access technologies have become crucial enablers of flexibility and efficiency in modern SSCs.

4.6. Theme 06: Paper waste reduction

Lastly, respondents discussed how technological innovations have led to significant reductions in paper usage, contributing to environmental sustainability. R1 observed, *“Digitisation reduces use of paper (lesser waste)”* while R4 added, *“- move from paper based to electronic invoices”* as a concrete example of how SSCs are transitioning to more sustainable practices. These comments demonstrate that technological advancements not only drive efficiency and cost savings but also promote eco-friendly practices within SSCs.

The findings of the study, as represented in the hierarchical chart, underscore the multifaceted impact of technological innovations on SSCs. These charts display information using rectangles of different sizes to represent themes as in Fig. 5. The sizes of the rectangles are determined by the amount of data associated with each theme. Themes with more data are represented by larger rectangles, while themes with less data are represented by smaller rectangles. The space occupied by each theme on the chart is determined by the size of

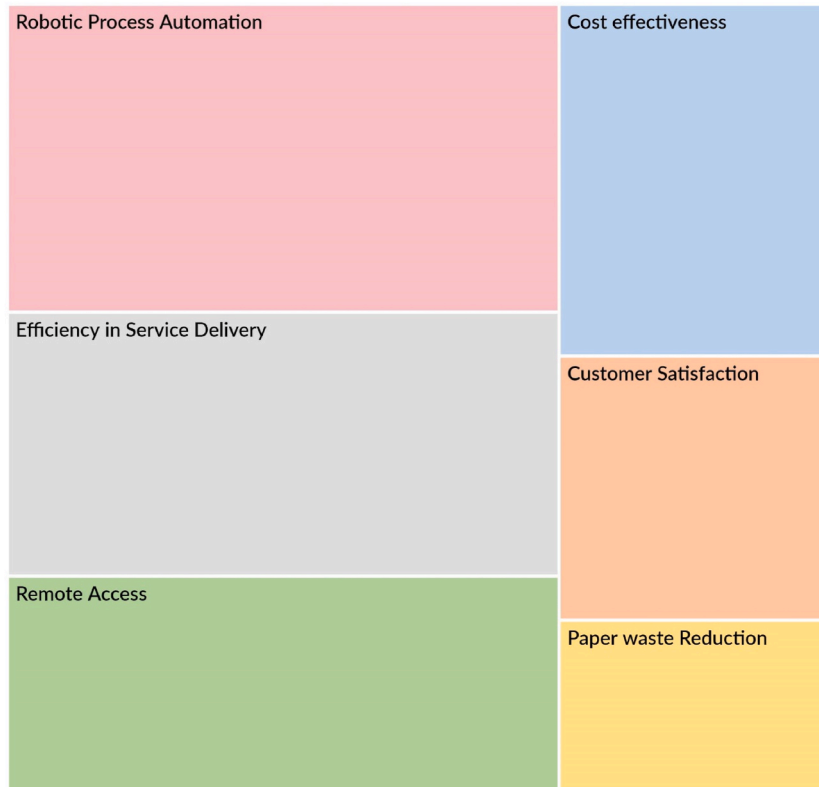


Fig. 5. Hierarchy chart for findings of the study.

its rectangle. Robotic Process Automation (RPA) and efficiency in service delivery were highlighted as the most significant themes, reflecting their profound effect on enhancing operational processes. At the same time, technological advancements in remote access, cost-effectiveness, customer satisfaction, and paper waste reduction also play key roles in shaping the future of SSCs. These findings provide critical insights into how technology is driving efficiency, sustainability, and performance improvement in shared service environments. The key themes identified in this study are presented in a hierarchical chart, as shown in Fig. 5, which visually organizes and highlights the relationships among the central concepts explored in the research.

Similarly, the interview findings are represented through a word cloud, providing a visual depiction of the most frequently mentioned terms and themes identified during discussions with SSC leaders. This visualization offers immediate insights into the key focal points of SSC operations, highlighting recurring concepts and priorities that emerged throughout the interviews. The size of each word correlates with its frequency, providing an immediate visual representation of the dominant concerns and priorities among SSCs. The larger font size indicates the higher frequency of the word while the smaller font size indicates lower frequency.

The most prominent terms—"customer," "processing," "technology," "automation," and "cost"—highlight key areas of focus within SSCs. The frequent mention of "customer" suggests that customer-centric processes and services remain a top priority, reflecting a commitment to enhancing customer satisfaction and experience through streamlined operations.

"Processing" and "automation" emphasize the ongoing digital transformation efforts within SSCs, where technology is leveraged to automate routine tasks and optimize service delivery. This aligns with the industry's drive towards improving operational efficiency while reducing manual errors and costs. Leaders also underscored the role of technology as a critical enabler of these advancements, particularly in deploying automation solutions that shorten lead times, enhance productivity, and ensure faster service provision.

The appearance of "people" and "productivity" in the word cloud points to the human element's importance in driving technological adoption and ensuring smooth integration of automated systems. The emphasis on "cost" further indicates that SSCs remain acutely aware of the financial pressures and the need to continuously reduce expenses through automation and process optimization.

In sum, the word cloud provides a snapshot of the major concerns, challenges, and strategic areas of focus for SSC leaders, all of which revolve around leveraging technology to enhance operational efficiency, reduce costs, and meet customer demands more effectively. These findings corroborate the broader themes identified in the interviews, where participants consistently highlighted the need for innovation, technological investments, and a focus on sustainability to ensure long-term success in the SSC landscape. These findings represented through a word cloud, as shown in Fig. 6, which visually highlights the most frequently occurring terms and key themes extracted from discussions with SSC leaders.

The conceptual model in Fig. 4 synthesizes the theoretical framework with the empirical findings of this study, offering a robust explanation of the antecedents and consequences of technological innovation within SSCs. The empirical model, grounded in the research data, underscores that processes are foundational to enabling robotic process automation and remote access, both of which play a pivotal role in fostering operational sustainability. This emphasis on process efficiency is essential, as it drives operational excellence, which in turn, significantly impacts the financial dimension by enhancing cost-effectiveness and contributing to paper waste reduction.

Subsequently, the model links these process and financial improvements to customer outcomes, most notably through efficiency in service delivery, which directly affects customer satisfaction. The interplay between these factors—process, finance, and customer—presents a comprehensive understanding of how SSCs strategically leverage technological innovations to enhance performance and sustainability. The model illustrates that these innovations are not isolated improvements but part of an interconnected system where process optimizations cascade into financial gains and customer satisfaction.

Fig. 7 further elucidates this relationship, offering a clear, visual representation of how these variables interact. While the framework is inherently self-explanatory, its inclusion ensures that any potential ambiguities are addressed, thereby solidifying the study's contributions to the discourse on technological innovation and sustainable performance in SSCs. The model effectively demonstrates how shared services organizations can strategically deploy technology to achieve long-term operational and financial sustainability, reinforcing the critical role of innovation in modern business landscapes.



Fig. 6. Word cloud showing frequency of words.

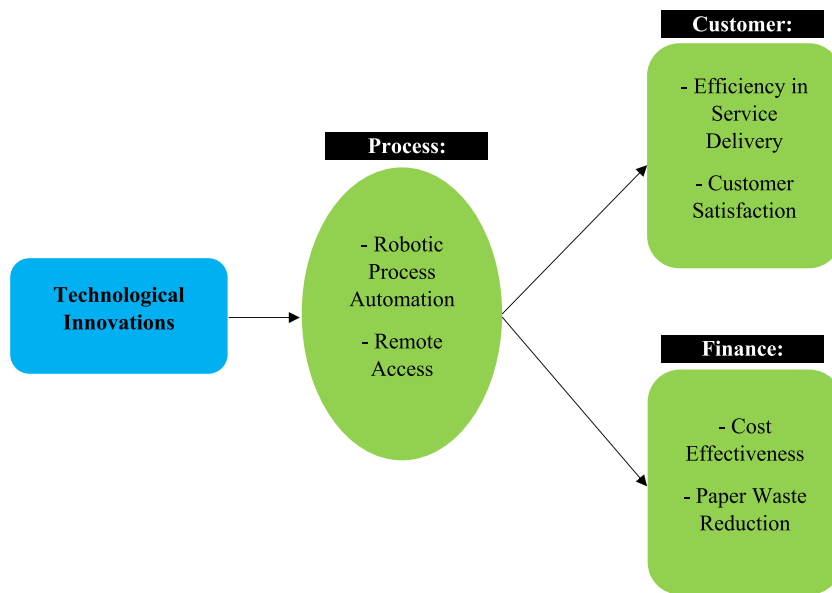


Fig. 7. An empirical model of the study.

5. Discussion

The findings of the study suggest that the shared service industry has fully embraced technological innovation, as its primary business is to provide numerous services to businesses. This large number of services has forced the shared service environment to lead the way in technological innovation. Respondents identified few technological approaches towards innovation needs in the transformation process, but perceived that technological innovation has a positive effect on the sustainability and performance of shared services. These findings align with previous studies that have found that implementing technology can increase the sustainability, agility, and overall performance of an organization [39,40]. Respondents also indicated that technological innovation can be cost-effective by reducing functional costs, and they anticipated that it would have a major impact on shared service's main goal. Furthermore, respondents believed that technology and innovation enable the reduction of manual activities through automation and robotics, which can shorten processing lead time. In this respect, previous studies have shown that automation of business activities can minimize transactional costs and lead times [41,42]. However, the authors of the above studies identified some limitations of the technology system and tools to meet the expectations of business units. Companies are rapidly establishing their operations of shared service in Malaysia [43,44]. The emergence of the shared service industry is described as the first step towards innovation in the platform of technology.

The results of this study conducted among respondents in the shared service industry indicated that technological innovation has a significant impact on various aspects of process activities. Respondents frequently mentioned robotic process automation (RPA), which may be due to the shared service's focus on handling a large volume of transactions with excellent delivery, standardized processes, and harmonization. To achieve their strategic goals, shared service takes the initial step to explore technological innovation approaches such as Digital Process Automation (DPA), Artificial Intelligence (AI), Machine Learning (ML), and Intelligent Automation (IA) [41]. This aspect of technological innovation is given higher priority than others as it enables digital transformation of processes, which in turn reduces paper waste, reduce operational costs, and eliminates the need for human effort and storage space. Respondents observed that technological innovation significantly improves the shared service's efficiency in delivering services. The technological platform provides opportunities for service delivery solutions in a sustainable manner. For example, in the accounts payable function, the approval workflow for invoices can be accessed remotely, streamlining the approval process and ensuring that invoices are paid promptly. This efficient service delivery ultimately satisfies customers.

The preceding discussion demonstrates the importance of operational excellence in the shared service industry, which refers to its ability to operate efficiently. The findings suggest that technological innovation plays a vital role in the sustainability of shared service organizations, and its impacts can significantly benefit the finance, process, and customer aspects of shared service. By taking advantage of technological advancements, shared service companies can optimize their repetitive processes, leading to increased productivity, cost savings, and improved service delivery. Management dashboards that provide real-time data on accuracy and responsiveness can help achieve these goals in a cost-effective manner. Such innovation initiatives are adding value to the industry and bolstering its competitive position [45]. Specialization in digital innovation approaches has the potential to impact business performance, resulting in a higher level of efficiency and sustainability for shared service organizations.

6. Implications

6.1. Theoretical contributions

This study makes a significant contribution to the scholarly understanding of the foundational role of technological innovation in SSCs, addressing the growing academic demand for insights into how innovative technologies can drive performance improvements. By examining the critical impact of technology on performance management systems, including process efficiency, stakeholder engagement, and financial outcomes, this research deepens the understanding of the relationship between innovation and organizational performance in SSCs [40]. Additionally, it highlights the increasing need for SSCs to adopt technological innovations, such as automation and digitisation, to meet sustainability objectives, both economically and environmentally [14]. The study contributes to broader academic discussions by showing how SSCs, through the adoption of new technologies, play a crucial role in enhancing efficiency, cost-effectiveness, and long-term organizational performance, aligning with overall business strategies [12].

6.2. Practical implications

In addition to its theoretical contributions, this study offers actionable insights for practitioners and policymakers on integrating innovative technologies within SSC operations. It identifies RPA as a key driver of efficiency, automating repetitive tasks to streamline operations, reduce processing times, and enhance service delivery—an essential recommendation for SSC leaders aiming for operational excellence [19]. The transition from manual to digital workflows is also highlighted as a critical step for reducing costs, minimizing errors, and improving profitability, especially in high-volume transactional environments [46]. Beyond internal improvements, the integration of technology enhances customer satisfaction by shortening service delivery times and increasing accuracy, which strengthens stakeholder relationships and boosts service quality [47]. The study urges leadership teams to fully recognize the strategic importance of adopting technologies like RPA, cloud computing, and AI, as these innovations are crucial for staying competitive and sustaining long-term growth. Practitioners are encouraged to foster a culture of continuous technological advancement, ensuring that technology investments align with broader business objectives [7].

In summary, this study not only contributes to academic discussions but also provides clear and evidence-based recommendations for practitioners looking to harness the power of technological innovation within SSCs. It offers a roadmap for integrating new technologies to achieve sustainable growth, operational efficiency, and enhanced stakeholder satisfaction.

7. Conclusion

The imperative of technological innovation is essential in fostering sustainable performance within shared service. Sustainable technological innovation is not just a responsibility but also an opportunity for shared service to improve their environmental impact, reduce costs, and enhance their reputation. The main aim of this study was to investigate the impacts of technological innovation contributing to enhance the sustainable performance within shared service. The findings of the study reveal that shared service employ technology strategically to impact performance and the subsequent impact of sustainable performance, influenced by aspects such as finance, processes, and customers. Through the integration of technological innovation, specifically through the utilization of robotic process automation and remote access approaches within the process aspect, shared service can enhance the customer-oriented aspect by achieving more efficient service delivery and higher customer satisfaction. Moreover, this technological adoption contributes to advancements in the financial aspect, leading to increased cost-effectiveness and a reduction in paper waste. Therefore, it emphasizes the significance of sustainable technologies in shared service industry for achieving their main goals and maintaining a competitive edge. Moreover, it provides valuable insights into the increasing importance of innovative technologies in the equation of strategic and sustainable shared service development. However, this study is limited to a specific region in Malaysia, making its findings less generalizable to other regions or countries with different regulatory and management practices. Expanding the research to cover additional states in Malaysia and local shared services would offer a more comprehensive understanding of how technological innovation influences sustainable performance in SSCs. Furthermore, the reliance on email interviews with SSC leadership, while efficient, may have restricted the depth of the data and real-time interaction. Future research should incorporate a mix of interview formats, including face-to-face and virtual interviews, to enhance data richness and triangulation. The study also focuses exclusively on SSC leadership, potentially limiting the perspective to the service unit. To capture a broader view, future research should include business unit stakeholders to provide a more holistic understanding of service performance. Ultimately, expanding the scope of future research is essential to fully grasp the role of technological innovation in achieving operational excellence and long-term success in SSCs.

CRedit authorship contribution statement

Agha Shadab Ali: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ruhanita Maelah:** Writing – review & editing, Supervision, Funding acquisition.

Availability of data and materials

All data generated or analyzed during this study are included in this published article ([Appendix 1](#)).

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix 1. Excerpts on Themes Impacting Technological Innovation

Respondents	Quotations
Theme 1: Efficiency in Service Delivery:	
Respondent 1	"improves efficiency (faster processing, higher productivity, lower costs, etc.)".
Respondent 2	"market benchmark".
Respondent 7	"Positive impact".
Respondent 8	"and also the quality".
Respondent 9	"Operational excellence".
Respondent 11	"Increase efficiency, simplifies".
Theme 2: Robotic Process Automation:	
Respondent 2	"Automation, robotic, excel macro".
Respondent 3	"Make the job easier for staff/customer".
Respondent 4	"- Automation of manual processes leading to reduced manual controls and errors".
Respondent 5	"If previously 10 people is tasked to do one process, now, with AI and tech, we only need 2 people to do it".
Respondent 6	"When dealing with transactional volume & standard processes; technology & innovation is key in enabling automation. We have shorten the processing lead time, increasing accuracy".
Respondent 9	"Technology is a key enabler of SSC. automation are key focus areas".
Theme 3: Cost Effectiveness:	
Respondent 1	"On long-term, it is more cost effective".
Respondent 4	"- Lower cost of products".
Respondent 8	"Technology able to reduce the overall functional cost".
Respondent 10	"Downsizing".
Theme 4: Remote Access:	
Respondent 1	"and provides better accessibility/mobility (more resilience i.e. jobs can be performed anytime anywhere)".
Respondent 3	"Technology need to manage well to work together with people, a lot people have wrong understanding that technology is here to replace human".
Respondent 4	"- Real time data availability to make decisions".
Respondent 6	"as we can shift focus to analytics".
Respondent 11	"remote support definitely will be the trending business pattern we expected".
Theme 5: Customer Satisfaction:	
Respondent 1	"and provides better customer experience provided the digital platform is stable in its performance and user friendly, and have good customer service to support users".
Respondent 6	"& customers are happy".
Respondent 8	"which in turns pass the saving to ultimate customer".
Theme 6: Paper Waste Reduction:	
Respondent 1	"Digitisation reduces use of paper (lesser waste)".
Respondent 4	"- move from paper based to electronic invoices".

References

- [1] Z. Dudic, et al., The innovativeness and usage of the balanced scorecard model in SMEs, *Sustainability* 12 (8) (2020) 1–22.
- [2] J. Dempere, et al., The impact of innovation on economic growth, foreign direct investment, and self-employment: a global perspective 11 (7) (2023) 182.
- [3] MIDA, Malaysia ranks world's third most competitive GBS location, behind India and China, Available from: <https://www.mida.gov.my/mida-news/malaysia-ranks-worlds-third-most-competitive-gbs-location-behind-india-and-china/>, 2022. (Accessed 20 August 2023).
- [4] D.S. Schulman, et al., *Shared Services: Adding Value to the Business Units*, Wiley, New York, NY, 1999.
- [5] A. Joha, M. Janssen, Factors influencing the shaping of shared services business models, *Strategic Outsourcing An Int. J.* 7 (1) (2014) 47–65.
- [6] MDEC, MDEC accelerates plans to attract high-value digital global business services (GBS), Available from: <https://mdec.my/news/mdec-accelerates-plans-to-attract-high-value-digital-global-business-services-gbs>, 2021. (Accessed 24 February 2023).

- [7] M.N. Lakshmi, Y.S. Sricharan, T. Vijayakumar, Leveraging technology for shared services transformation, in: Rajagopal, R. Behl (Eds.), *Innovation, Technology, and Market Ecosystems*, Palgrave Macmillan, London, United Kingdom, 2020, pp. 51–64.
- [8] A.S. Ali, et al., A conceptual framework of sustainability balanced scorecard to enhance the performance of shared service centre, *Asian Journal of Accounting Perspectives* 15 (2) (2022).
- [9] Y. Sun, Digital transformation and corporates' green technology innovation performance—The mediating role of knowledge sharing, *Finance Res. Lett.* 62 (2024) 105.
- [10] R. Avila, Shared Services Centers as catalysts for new technologies and AI [cited 2024; Available from: <https://elogroup.com/en/insights/shared-services-centers-genai/>, 2024.
- [11] S. Liu, R. Thurasamy, S.R. Hati *Determinants and Outcomes of green technology innovation Adoption among third-party logistics Firms in China: a SEM-ANN analysis*, *Systems* 12 (2024), <https://doi.org/10.3390/systems12090331>.
- [12] S. Bernow, R. Nuttall, *Why ESG is here to stay*. 2020, Available from: <https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/why-esg-is-here-to-stay/#/>. (Accessed 15 March 2023).
- [13] Deloitte, Why ESG should feature on the shared Services agenda, Available from: <https://www.deloitte.co.uk/sharedservicesconference/assets/img/presentations/deloitte-uk-ssc2020-the-esg-imperative.pdf>, 2020.
- [14] W. Yang, et al., *Sustain. Dev.: How Digitalization, Technological Innovation, and Green Economic Development Interact with Each Other* 19 (19) (2022) 12273.
- [15] A.-A.A. Sharabati, et al., The impact of digital marketing on the performance of SMEs: an analytical study in light of modern digital transformations, *Sustainability* 16 (2024), <https://doi.org/10.3390/su16198667>.
- [16] J. Abbas, et al., Financial innovation and digitalization promote business growth: the interplay of green technology innovation, product market competition and firm performance, *Innovation and Green Development* 3 (1) (2024) 100111.
- [17] X. Teng, Z. Wu, F. Yang, Research on the relationship between digital transformation and performance of SMEs, *Sustainability* 14 (2022), <https://doi.org/10.3390/su14106012>.
- [18] H.R.M. Sapry, N.H.M. Ali, A.R. Ahmad, A shared service centre (SSC) for consolidation and outsourcing of SMEs internal business process in Malaysia, *Journal of Critical Reviews* 7 (8) (2020) 136–140.
- [19] X. Yang, Y. Hou, W. Zhang, Research on performance management of financial shared service center based on cloud accounting, in: 2021 the 4th International Conference on Software Engineering and Information Management, Association for Computing Machinery, Yokohama, Japan, 2021, pp. 89–93.
- [20] A. Bryman, *Social Research Methods*, fifth ed., Oxford University Press, Oxford, United Kingdom, 2015.
- [21] M.N.K. Saunders, P. Lewis, A. Thornhill, *Research Methods for Business Students*, eighth ed., Pearson, Harlow, United Kingdom, 2019.
- [22] J.W. Creswell, J.D. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, sixth ed., SAGE Publications, Thousand Oaks, CA, 2022.
- [23] G. Anderson, N. Arsenault, *Fundamentals of Educational Research*, second ed., Routledge, London, United Kingdom, 1998.
- [24] A. Bryman, E. Bell, *Business Research Methods*, second ed., Oxford University Press, Oxford, United Kingdom, 2008.
- [25] W.J. Potter, *An Analysis of Thinking and Research about Qualitative Methods*, first ed., Routledge, New York, NY, 1996.
- [26] J.A. Maxwell, *Qualitative Research Design: an Interactive Approach*, Thousand Oaks: Sage, 2013.
- [27] D.K. Padgett, *Qualitative Methods in Social Work Research*, SAGE Publications, New York, NY, 2016.
- [28] A.S. Figueiredo, L.H. Pinto, Robotizing shared service centres: key challenges and outcomes, *Journal of Service Theory and Practice* 31 (1) (2021) 157–178.
- [29] D. Fernandez, A. Aman, The challenges of implementing robotic process automation in global business services, *International Journal of Business and Society* 22 (3) (2021).
- [30] L. Finlay, Debating phenomenological methods, *Hermeneutic Phenomenology in Education: Method and Practice* 3 (1) (2012) 6–25.
- [31] S. Baker, R. Edwards, How Many Qualitative Interviews Is Enough? Expert Voices and Early Career Reflections on Sampling and Cases in Qualitative, *Research* (2012). <https://research.brighton.ac.uk/en/publications/how-many-qualitative-interviews-is-enough-expert-voices-and-early>.
- [32] K. Ratislavová, J. Ratislav, Asynchronous email interview as a qualitative research method in the humanities 24 (4) (2014) 452–460.
- [33] J. Saldana, The coding manual for qualitative researchers, in: *The Coding Manual for Qualitative Researchers*, SAGE Publications, Thousand Oaks, CA, 2009 xi, 223–xi, 223.
- [34] V. Braun, V. Clarke, Using thematic analysis in psychology, *Qual. Res. Psychol.* 3 (2) (2006) 77–101.
- [35] L. Wong, Data analysis in qualitative research: a brief guide to using nvivo, *Malays. Fam. Physician: the Official Journal of the Academy of Family Physicians of Malaysia* 3 (2008) 14–20.
- [36] A. Ali, A.K. Muhammad, Understanding the role of internship as an activity based learning: a case study, *Journal of Education and Educational Development* 5 (2) (2018) 92–106.
- [37] M.B. Miles, A.M. Huberman, *Qualitative data analysis: an expanded sourcebook*, in: 2nd Ed. *Qualitative Data Analysis: an Expanded Sourcebook*, second ed., SAGE Publications, Thousand Oaks, CA, 1994, p. 338, xiv, 338–xiv.
- [38] K. Heebkhokhsung, W. Rattanawong, V. Vongmanee, A new paradigm of a sustainability-balanced scorecard model for sport tourism, *Sustainability* 15 (2023), <https://doi.org/10.3390/su151310586>.
- [39] M. Aydin, Process mining & BPM: BMW process mining journey, Available from: https://event.on24.com/eventRegistration/console/EventConsoleApollo.jsp?&eventid=2812697&sessionId=1&username=&partnerref=&format=flvideo1&mobile=&flashsupportedmobiledevice=&helpcenter=&key=CE4A6713B72B74539C772D4B7BF1FAEF&newConsole=true&nxChe=true&newTabCon=true&text_language_id=en&playerwidth=748&playerheight=526&eventuserid=426705853&contenttype=A&mediametricsessionId=368109750&mediametricid=3950055&usercd=426705853&mode=launch, 2020.
- [40] M.A. Akinde, Y.A. Bako *technological Innovation and organizational performance*, *International Journal of Innovative Research in Education, Technology & Social Strategies* 7 (2020) 155–166.
- [41] M.V.N. Lakshmi, T. Vijayakumar, Y.V.N. Sricharan, Robotic process automation, an enabler for shared services transformation, *Int. J. Innovative Technol. Explor. Eng.* 8 (2019) 1882–1890.
- [42] D. Ivanov, A. Dolgui, B. Sokolov, The impact of digital technology and Industry 4.0 on the ripple effect and supply chain risk analytics, *Int. J. Prod. Res.* 57 (3) (2018) 829–846.
- [43] Deloitte, *Global shared services survey report*, Available from: <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/2019-global-shared-services-survey-results.pdf>, 2019.
- [44] MIDA, Malaysian global business services industry's revenue to hit US\$6.7 bil by 2025 — GBS Malaysia, Available from: <https://www.mida.gov.my/mida-news/malaysian-global-business-services-industrys-revenue-to-hit-us6-7-bil-by-2025-gbs-malaysia/>, 2022. (Accessed 26 February 2023).
- [45] S. Stojanović, M. Stanković, The impact of innovation on business performance, *Knowledge Without Borders* 45 (2021) 185–191.
- [46] P. Modrzyński, Development of the shared services market, in: *Local Government Shared Services Centers: Management and Organizations*, Emerald Publishing, 2020, pp. 51–89.
- [47] L. Ivancić, D.S. Vugec, V. Bosilj-Vuksic, Robotic process automation: systematic literature review, in: C.D. Ciccio, et al. (Eds.), *Business Process Management: Blockchain and Central and Eastern Europe Forum*, Springer, Vienna, Austria, 2019, pp. 1–16.