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Innovative Approach to Managing Small and Medium Scale Enterprises in the Covid-19 Era and Beyond: A Systematic Review

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Abstract

Countries of the world have used Small and Medium-Scale Enterprises (SMEs) and entrepreneurship to build a vibrant economy to reduce unemployment and poverty. The paper systematically reviewed innovative approaches developed and deployed in managing SMEs during and after the COVID-19 pandemic. SMEs encounter business problems during and after COVID-19, especially in developing countries, where the business environment is challenging and seemingly not favourable for businesses operating at a small or medium scale. For them to cope successfully in the COVID-19 era and beyond, there is a need for innovative approaches to managing their core business areas to guarantee the enterprises' sustainability and profitability in stimulating economic growth. Based on this, this study critically reviews innovative ways of managing SMEs' core business activities. The study reviewed twenty-one (21) significant papers out of nine hundred and thirteen (913) peer-reviewed articles through a theoretical perception systematic literature review (SLR). Our findings reveal how SMEs could use innovative approaches to manage business operations and activities during and after the pandemic. It showed a resilience strategy for SMEs to endure challenges. Also, the study presented a knowledge-based plan for SMEs to survive similar circumstances in future. It is expected that the research outcomes will serve as a guide in organising result-oriented training, workshop, and seminars for SMEs' operators, as well as providing a result-oriented training framework for students in tertiary institutions. This paper raises awareness of SMEs' innovative management approach as a tool to adapt during and after COVID-19. Finally, the propositions provided could be empirically investigated in future studies.

Keywords: COVID-19, Innovation, SLR, SMEs, Sustainability.



Introduction

The Coronavirus (COVID-19) pandemic began in late 2019 and has significantly impacted many countries' economies and human health. The restrictions in certain countries to curtail the spread of the virus have distorted the supply and demand chain of goods, thereby slowing down economic growth. According to Thukra (2021, p.153), small and medium enterprises (SMEs) have experienced many hurdles due to the pandemic. Some of the challenges faced in recent times due to the pandemic include a shortage/scarcity of raw materials (inputs) due to the distortion in the supply chain (Eggers, 2020). Since the commencement of the outbreak, certain SMEs have ceased operations (Belitski et al., 2022). The pandemic has resulted in poor sales and hampered business capacity to keep up with their operations (Amankwah-Amoah et al., 2021). The ripple effect of the pandemic on consumers is the reduction in their expenditures (Sawik, 2022).

The COVID-19 pandemic affected self-employed more than employed people. Also, it has wreaked havoc on businesses' finances and people's health worldwide. Globally, SMEs were more affected than large businesses (Thukral, 2021). SMEs were particularly vulnerable because they lacked professional skills and limited financial capacity. In response to the need for survival, many SMEs have received financial grants from the government to reactivate their business operations (Juergensen et al., 2020). Some SMEs owners implemented a series of techniques/skills to tackle the consequences of the crisis (Portuguez Castro & Gómez Zermeño, 2021). Digital transformation, customer behaviour

changes, and the need to close the managerial and technological knowledge gap have increased due to the pandemic (Klein & Todesco, 2021). Small businesses face weaknesses, strengths, threats, and opportunities in coping with post-pandemic challenges. Therefore, this study examines the innovative approaches that COVID-19 offers SMEs in exploring those strengths and opportunities and dealing with the weaknesses and threats. It seeks to inspire research on SMEs' innovative approach in the post-COVID-19 era and beyond. To this end, the authors presented possible propositions that could be the purview of constructs within the SMEs innovation research area.

We organise this paper into five sections based on the guidelines recommended by De Jesus Pacheco et al. (2017) for classic review writing. Firstly, we give a general overview of the study. Secondly, we discuss SMEs' innovation, performance and practice during and after COVID-19. Thirdly, we describe the methodology we apply in identifying, collecting and analysing the literature. Fourthly, we summarise findings from the systematic review on related studies to SMEs innovation, and finally, we propose possible areas that could be investigated on innovative approaches to managing SMEs post-COVID-19.

Literature review

COVID-19 Pandemic

The World Health Organization (WHO) declared the COVID-19 pandemic on 11th March 2020. It had a massive impact on businesses across the globe. With countries in various stages of lockdown or loosening confinement periods, it became clear that the virus has particularly



impacted SMEs (Thukral, 2021). As of October 2020, COVID-19 had recorded over a million deaths from over 45 million infections (WHO, 2020). The frenzied endeavour to mitigate the spread of the virus from infecting other persons resulted in operations that led to business closures due to lockdown measures (Chenli et al., 2021). Certain businesses the government deemed necessary to continue operations were allowed to function but with strict compliance to set conditions such as social distancing among employees. However, it is unlikely that things might have improved if the technology currently in use by companies were not embraced (Cirillo & Molero Zayas, 2019). The consequence of the lockdown restrictions imposed by the government to curtail the spread of the virus increased the influence of digital innovation on the business strategies of some businesses (Papadopoulos et al., 2020). Companies have sought alternatives for personal training, tutoring, and client consulting using virtual platforms such as zoom, Microsoft team, etc. Applying these digital strategies has increased the performance of many SMEs (Flyverbom et al., 2019).

Small and medium-scale enterprises (SMEs)

SMEs constitute a significant part of most economies and contribute to their growth through innovation and competition (Sahut & Peris-Ortiz, 2014). SMEs are essential for economic and social development (Ribeiro-Soriano, 2017). The functions of SMEs are reflected in the creation of jobs, income and improved trade balance (World Trade Organisation, 2016). They are the main mechanisms for revitalising and enhancing national

economic advancement via income generation and job creation (Grant et al., 2019). Innovation opens the leeway to new technology adoption by firms to catch up with the prevalent technology frontier for sustainable economic growth and development (Chege & Wang, 2020). Small size is a crucial constraint for process and product innovations, which are the core of recent competitiveness (Popa et al., 2017). Research and Development Programs are formal avenues for introducing or inculcating innovative skills in the entrepreneur. These skills are what the entrepreneur translates into a business establishment and development (Niebel, 2018).

Innovation in small and medium enterprises

Innovation is a vital driver of economic growth and development (Blichfeldt & Faullant, 2021). It is crucial, even if other factors like capital or access to the market are in place (Roper & Hewitt-Dundas, 2015). Without innovation, SMEs might continue to fail. Thus, SMEs are encouraged to be innovative in their ventures if they wish to succeed and contribute to national development (Wang et al., 2020). However, the cost of innovation and uncertainty about acceptance and sustainability generate business risks (Biemans, 2018). Such risks become more extensive and daunting when financial resources are not easily accessible by these businesses (Squicciarini, 2017). Innovation has been defined as the introduction of a new or enhanced product in a company process (Santoro, 2017). It can also be defined as deploying a new procedure, marketing, or organisational method in external relations (OECD, 2019).



SME performance and innovation practices

Innovation is imperative for business survival in times of crisis and technological development (Gunawan et al., 2016). It could be described as embracing new technology to accomplish a set-out improvement of business productivity (Leckel et al., 2020). Generally, SME innovation relates to competitive, novel processes that yield more profit to small businesses (Hervas-Oliver et al., 2021). In this paper, "innovative practices" can be referred to as the successful deployment of novel solutions to difficulties faced by small businesses, such as the successful deployment of new ideas related to the organisation's product and services for work improvement. One of the primary drivers of SME innovation is the initiative to improve operations (Garzella et al., 2020).

According to Jevwegaga et al. (2018), SMEs' performance could be determined by the ability to meet the estimated sales, profitability and other business-specific objectives. A high degree of performance implies that a business thrives (Braune et al., 2016). Measuring a business's performance can help improve its operations. Also, achieving pre-determined marketing objectives might help assess SMEs' performance (Lin & Lin, 2016). It will promote innovative practices in SMEs. During the COVID-19 pandemic, SMEs' innovative activities favourably enhance their performance (Wang et al., 2020).

SME survival and innovation practices

One of the primary concerns of a business is its survival ability (Portuguez Castro & Gómez Zermeño, 2021). Nilsson and Chronéer (2015) assert that enterprise survival describes the time it takes a business to complete its operations. Several groups or individuals benefit from a business's survival besides from the owner or managers. They comprise workers, suppliers and customers (Basile et al., 2017). A firm can only thrive when it can adapt to changing environmental and business conditions (Eder et al., 2017). SMEs have a much shorter lifespan when compared to larger enterprises. However, they are more profitable but susceptible to environmental changes (Chang & Webster, 2018). Some experts believe that survival could be an objective indicator of business performance (OECD, 2017).

Hogan and Coote (2014) reveal that an organisation's longevity is related to innovation methods. A firm success, continuity and ability to expand largely depend on its innovative capacity (Sahut & Peris-Ortiz, 2014). Some researchers, Prasad and Junni (2016), Ben Arfi and Hikkerova (2021), Dubouloz et al. (2021), critically evaluate the relationship between corporate innovations and survival. Prasad and Junni (2016) found that firms' transformational leadership will benefit organisational innovation. Though Ben Arfi and Hikkerova (2021), relying on some data from three Tunisian SMEs, highlights how the growth of the internet and ICTs, together with the development of the sharing economy, has allowed corporations to conduct transactions. Whereas Dubouloz et al. (2021) affirm that the role of



intermediaries through open innovation would aid the survival of SMEs SMEs' survival depends mainly on innovation ability (Ritala et al., 2018). Studies show that adopting innovations helped SMEs address business difficulties and constraints (Makkonen & Johnston, 2014; Van Oorschot et al., 2018; Pellizzoni et al., 2019). Numerous types of research explain this link by referring to theories and concepts crucial to a business's survival and creativity (Mejri et al., 2018; Thukral, 2021; Du et al., 2022). Ritala et al. (2018), noted that survival represents triumph over externally imposed crises. Several SMEs in the service and retail industries have a direct touch with their clients. The COVID-19 epidemic affected these industries because of government restrictions and closures (Patrucco et al., 2022). As a result, Patrucco et al. (2022) found that SMEs' various innovative actions aimed at decreasing the adverse effects of the COVID-19 outbreak can have a positive impact on these businesses.

The pandemic promote innovation and expansion of economic opportunities. SMEs could operate in a niche or highly specialised areas, allowing them to provide specific services or products compared to the standardised products and services offered by large organisations (Cheah & Yuen-Ping, 2021). Several of them may serve as subcontractors to large corporations as specialist suppliers of components and sub-assemblies in industry sectors that, for the most part, remained operating during the COVID-19 period due to their status as economically vital industrial operations (Garzella et al., 2020). SMEs can survive through innovative ideas that expand their market worldwide (Hartono & Sheng, 2016). It would allow SMEs to

develop their capabilities and learn faster. That will result in international businesses displaying greater flexibility in responding to changes than domestically operated firms (Autio et al., 2018).

Theoretical background diffusion of innovation theory

Rogers propounded the theory of diffusion of innovation in the year 1962. The theory is anchored on the usage of information technology where new ideas and innovations are implemented in the organisation (Rogers, 1995). Information communication technology is a managerial tool usually used to share information with members, coordinate activities, reduce unnecessary burdens, and improve organisational effectiveness (Yunis et al., 2018). However, the diffusion of innovation theory is the process by which an innovation is communicated through specific channels over time (Geroski, 2000). It is usually among the members of a social system. In other words, the diffusion of innovation evaluates how, why, and at what rate new ideas and technology are communicated and adopted by users of communications (Steiber et al., 2021).

Methodology

This study used a systematic literature review method to develop an impartial summary of empirical research (Denyer & Tanfield, 2009). We conducted a systematic electronic search focusing on Scopus-published articles relevant to our study. For potential inclusion, three criteria were used to select and assess the papers. The included studies for the systematic review had the following: The keywords included studies that look at



SMEs' Innovation as a result of COVID-19; peer-reviewed published journals or books; and empirical, theoretical or conceptual studies that focus on innovation in SMEs during or after the COVID-19 pandemic. Though inclusion criteria were to help reduce bias in the selection and boost the literature review. It could fail to expose density if applied thoughtlessly. To avoid this challenge, we included some studies not listed on the inclusion criteria but are helpful in this research.

Keywords such as "SMEs Innovation", "Small and medium enterprises Innovation", "COVID-19 and SMEs Innovation", and "Innovative approaches to SMEs" were searched. The process produced nine hundred and thirteen (913) studies on SMEs' innovation during and after COVID-19. After using the above methods to collect peer-reviewed and academic articles, we used the conventional approach of reviewing the literature to refine the publications pool by manually using three criteria. Firstly, all publications conducted under the theoretical perception of SMEs

innovation were retained by the researchers for the study. Secondly, we drop papers unrelated to the topic after scanning. Thirdly to refine the scope of the review, we focused on empirical studies, in line with Paul & Benito (2018). Finally, from the nine hundred and thirteen papers, eight hundred and ninety-two were extracted based on the title's relevance and abstract screening. Thus, twenty-one journals between 2019 to 2022 were eligible for the systematic literature review.

Data extraction and analysis

To ensure the robustness of the study, we extracted data from retained articles relevant to the research. After that, we used reviewed journals from a theoretical perspective of SMEs' innovation to present a summary focusing on current research in this area. The obtained information is presented in Table 1 below, showing authors, year of publication etc. Also, Figure 1 below shows the overview of the list of articles considered for the study. The later section presents a synopsis of the results and propositions.

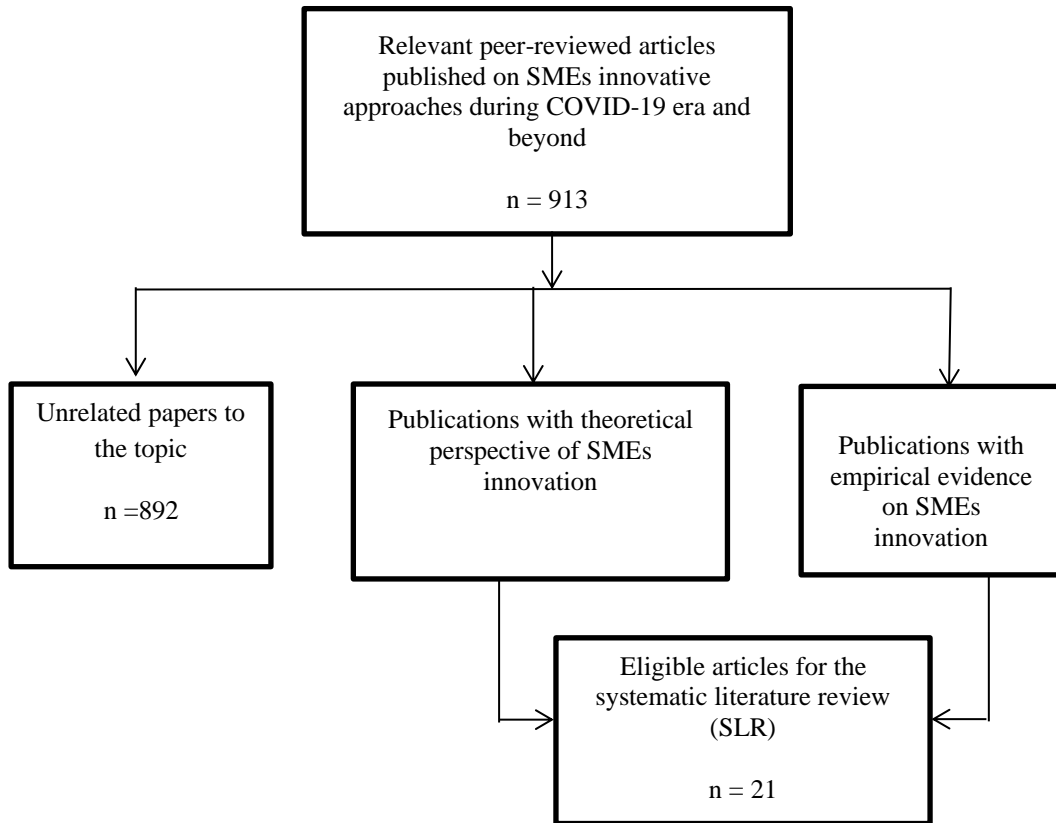


Figure 1 Flowchart of article extraction
Source: Authors' construction

**Table 1** Journals used for the SLR

Journal Name	Number	Author's Name
Journal of Business Research	6	Amankwah-Amoah et al., (2021); Du et al., (2022); Eller et al., (2020); Eggers, (2020); Fossen & Sorgner, (2021); Pappas et al., (2021)
Technology Analysis & Strategic Management	4	Chege & Wang, (2020); Garzella et al., (2020); Hervás-Oliver et al., (2021); Leckel et al., (2020)
Journal of Small Business Management	1	Aliasghar et al., (2020)
Industry and Innovation	1	Cassetta et al., (2020)
Small Business Economics	1	Sahut et al., (2021)
International Journal of Production Economics	1	Ricci et al., (2021)
Production Planning & Control	1	Zaridis et al., (2021)
R&D Management	1	Patrucco et al., (2022)
Strategic Change	1	Thukral, (2021)
International Journal of Information Management	1	Papadopoulos et al., (2020)
Journal of Enterprise Information Management	1	North et al., (2020)
Journal of Knowledge Management	1	Crupi et al., (2020)
Knowledge and Process Management	1	Klein & Todesco, (2021)

Results

The Common Market for Eastern and Southern Africa (2020) described the impact of the pandemic on entrepreneurship across Africa as weighty. Numerous businesses are in decline, with many cutting off or planning to lay off employees (Chenli et al., 2021). Similarly, several SMEs entirely ceased operations due to a lack of liquidity (Belitski et al., 2022). Before the pandemic, entrepreneurship in Africa was not sound, with SMEs facing many roadblocks (Okuwhere & Tafamel, 2022). COVID-19, on the other hand, aggravated the issue by posing new hurdles for African enterprises (United Nations Economic Commission for Africa, 2020).

Innovation is needed to contribute to long and short-term business management (Hogan & Coote, 2014). Despite the obstacles posed by COVID-19 to business, African countries are rapidly implementing creative techniques like using contemporary technology to sell and advertise their goods (OECD, 2020). This study presented how firms responded to the pandemic and revealed a benchmark approach for SMEs to develop a reaction plan and generate insight. Based on organisational resilience, SMEs search for additional knowledge to enrich their strategic possibilities and address prevailing challenges.

The research showed a practical implication by raising awareness of innovative approaches to managing SMEs



during and after COVID-19. It displayed a knowledge-based strategy for small firms to cope with a similar situation in future. Some reviewed papers detailed how SMEs could survive by developing knowledge approaches that would be helpful.

Many SMEs with innovative systems succeed in achieving the innovation goals in their business model and scorecard. Although not so much research has been done on SMEs innovation before COVID-19, the examined papers show how SMEs should develop their business model to reflect the culture of innovation that will promote business performance (Garzella et al., 2020; Ricci et al., 2021; Du et al., 2022).

Change management was one dominating focal point and theme that popped up while scrutinising related papers on SMEs innovation. Looking at the developmental strategy, transforming businesses through innovation tends to be too risky (Crupi et al., 2020).

Our findings also show that some of the innovation processes in SMEs will involve an enormous sum of finance that may require significant investment, which could be long-term and may include a partnership for research and development (Hervas-Oliver et al., 2021).

The following section discusses how to support existing or new firms using innovative techniques that could lessen the adverse effects mentioned earlier.

Proposition 1: The approach to new business model

SME owners appear to be novices regarding technology advancements (North et al., 2020). SMEs that were

creative before the coronavirus outbreak faced a few difficulties during the lockdown (Fossen & Sorgner, 2021). To temporarily or permanently fix the effect of COVID-19, SMEs should change their business strategies to reflect the current situation. Also, they should take the initial step of focusing on their core business operating functions. As a result, a feasible plan might be established to identify skills and creatively build on enterprises' strengths. To be in a better position for the eventuality, SME entrepreneurs must critically change their firms to the trend accelerated by COVID-19. Many SMEs have made the mistake of hiring the wrong people to lead their firms into the future. These firms should put modalities in motion to retrain their workforce or lay off those unwilling to learn.

Additionally, findings reveal that digitalisation will make modern businesses more efficient and profitable than physical stores. SMEs' business model transformation process will improve the organisational culture by considering different sectors affected by the pandemic. The new generations are progressively using modern devices to meet their needs for purchasing products or obtaining services besides socialisation, leisure and receiving information.

Proposition 2: Contemporary employment

Individuals can now work as freelancers as a result of COVID-19. According to Johnson and Sohi (2017), freelancing is a business concept that involves promoting products or services on behalf of numerous companies without being directly employed. Because of the rules related to COVID-19, most businesses



have transferred their marketing and sales efforts to Internet channels. As a result of the pandemic, more people are shopping online. African SMEs adjusted their sales strategies to adapt to the changing economic reality. It was done to accommodate the current situation on the ground. The World Health Organisation (2020) recommends that online payment platforms be used instead of traditional cash methods. They said using cash to make payments could help the virus spread faster. The manufacturing of the payment devices will constantly be, and this development will provide modern employment prospects. Employees will also monitor the websites regularly due to client traffic.

Proposition 3: Partnership

To overcome the challenges in the supply chain caused by the pandemic's lockdown, SMEs could form a network that promotes collaboration among comparable enterprises that rely on one another for better product or service delivery (Zaridis et al., 2021). The cooperation will not only help to grow and sustain the firms engaged, but it will also support creative growth and sustainability ideas (Chen et al., 2019).

SMEs require a diverse range of external partners to be competitive in this rapidly changing business world (Ritala et al., 2018). Collaboration with research institutes, universities and innovative organisations will help acquire various resources and capabilities. Also, due to the advent of online business, several firms like technological businesses are likely to form alliances to mitigate risk and reduce cost (Amankwah-Amoah et al., 2021). High-tech firms are often motivated by customer-related and

practical knowledge or digital technology advances (Lazzeretti & Capone, 2016). Some of these firms may lack the resources and expertise necessary to identify and leverage various external partners, making it more challenging to grow their partner network and apply digital innovation technologies (George et al., 2021).

Conclusion

COVID-19 has had an immense impact on several sectors of a business, as revealed in the findings of this study. The pandemic had a noticeable effect on SMEs' innovation. This study investigated the problems and opportunities of entrepreneurship arising from COVID-19. The pandemic posed numerous obstacles to Africa's economy, which impacted SMEs. Since they are battling to survive, SMEs are bearing the brunt of COVID-19. To run their enterprises, almost all SMEs in Africa rely on importing one or more items from developed countries. The global lockdown, which severely limited all modes of movement, made this difficult. Due to the lockdown, most businesses were forced to cease or curtail back operations. Even though this development has hampered entrepreneurship in Africa, it may also provide chances for SMEs to grow through innovation. Small businesses are encouraged to change their business practices to become more online-oriented.

In addition, the research unveiled how collaboration could increase the economic contribution of SMEs to the society. Innovative approach will enhance infrastructural facilities and amenities and stimulate SMEs creative capacity. Although access to finance is one of the



challenges observed from the reviewed papers, SMEs should form financial organisation, like cooperative societies or rotational fund transfer to fund their businesses instead of relying so much on government or big financial institutions. The various intervention provided by regional or corporate bodies should be embraced by SMEs to facilitate the process of accessing loans.

There are a lot of opportunities created for SMEs' innovation, directly or indirectly, through the COVID-19 pandemic that should be built upon. Some of these opportunities include digital transformation, collaborative innovation, development of new business models and sustainability of business practices. COVID-19 has accelerated the digital transformation of businesses, including SMEs, as remote work, online sales, and digital communication become essential. SMEs have had to adapt to new technologies to stay operational and serve customers, which has created new opportunities for innovation and growth. For example, SMEs have developed new digital products and services, such as online marketplaces, e-commerce platforms, and virtual events. The pandemic has also led to increased collaboration among SMEs, as they work together to solve common problems and share resources. SMEs have collaborated on research and development projects, joint ventures, and strategic partnerships, which have helped to create new products, and services. COVID-19 has forced SMEs to rethink their business models, as traditional methods of doing business became untenable. SMEs have had to explore new revenue streams, such as subscription services, delivery options, and remote consultations, which have created new opportunities for innovation

and growth. The pandemic has also highlighted the need for sustainable business practices, and SMEs have responded by developing more sustainable products, services, and processes. SMEs have also adopted circular economy principles, such as product reuse and recycling, which have created new opportunities for innovation and growth. In conclusion, while the COVID-19 pandemic has posed significant challenges for SMEs, it has also created new opportunities for innovation and growth. SMEs that are adaptable, collaborative, and innovative have been able to take advantage of these opportunities and emerge stronger from the crisis.

Managerial implications

The COVID-19 pandemic has brought about significant changes in the way small and medium-scale enterprises (SMEs) operate. As a result, innovative approaches to managing SMEs have become increasingly important to survive and thrive in the current environment. One of the managerial implications of adopting an innovative approach to managing SMEs in the COVID-19 era and beyond is the need to embrace technology. The pandemic has accelerated the adoption of digital technology across various industries. SMEs need to adopt new technologies to remain competitive and efficient. This includes using cloud-based services, e-commerce platforms, digital marketing tools, and virtual communication tools. By embracing technology, SMEs can improve their operations, reduce costs, and reach a wider customer base. The COVID-19



pandemic has also shown the importance of being flexible and agile in responding to changing circumstances. SMEs need to be able to adapt quickly to new situations, whether it is changing customer demands, supply chain disruptions, or government regulations. This requires a culture of innovation, where employees are encouraged to experiment and take calculated risks. The pandemic has also changed the way customers behave and interact with businesses. SMEs need to understand their customers' changing needs and preferences and tailor their products and services accordingly. This includes offering new delivery options, contactless payment methods, and personalized customer experiences. The need for collaboration and partnerships cannot be overemphasized as SMEs can benefit from partnerships with other SMEs, suppliers, and even competitors. Collaboration can help SMEs to share resources, reduce costs, and access new markets. Finally, the COVID-19 pandemic has demonstrated the importance of having a resilience plan in place. SMEs need to be prepared for future crises and disruptions. This includes developing contingency plans, diversifying supply chains, and building financial resilience. In summary, innovative approaches to managing SMEs in the COVID-19 era and beyond require a culture of innovation, flexibility, customer focus, collaboration, and resilience planning. By adopting these approaches, SMEs can survive and thrive in the current environment and beyond.

Future research

Innovative approaches to managing small and medium-sized enterprises (SMEs) during the COVID-19 era have been

crucial in enabling their survival and growth. However, there are still several areas that require further investigation. The COVID-19 pandemic has led to the implementation of various policies by governments to support SMEs. However, it is unclear which policies have been most effective and why. Research could explore the impact of policies such as financial support, tax relief, and regulatory changes on the survival and growth of SMEs. The impact of digital transformation: Digital transformation has been essential for the survival of many SMEs during the COVID-19 era. However, there is a need for further studies to explore the extent to which digital transformation has impacted the competitiveness and resilience of SMEs. While innovative approaches can be beneficial, they also present challenges for SMEs, such as a lack of resources, technical know-how, and resistance to change. Research could explore the challenges that SMEs face when adopting innovative approaches and strategies to overcome them. The long-term sustainability of innovative approaches: Many innovative approaches adopted by SMEs during the COVID-19 era may not be sustainable in the long term. Research could explore how SMEs can sustain these approaches beyond the pandemic and how they can continue to innovate and adapt to changing circumstances.

Future researchers could focus on empirically investigating the approach to new business to ascertain why some SMEs especially in developing economies are finding it difficult to adopt new technologies. Also, the opportunity provided by the pandemic for contemporary employment could be scrutinised by researchers. It will determine the innovative approach of



freelancing business that COVID-19 offers to entrepreneurs. Future researchers could quantitatively examine how collaborations and partnerships can be

explored to build a valuable network for an innovative supply chain to ease SMEs' operations.

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