

Implementation of Big Data Analytics Model in SMEs to Enhance Productivity in Post Covid Era

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Abstract:- Big data analytics (BDA) pledges that information could be categorized and analyzed into valuable data for small businesses and enterprises to transform into big data related knowledge and effective decision making cascades, by enlightening the performance of firms during and after the unprecedented conditions like COVID-19. Administration of data spawned from BDA, its integration and combination with business knowledge have hardly been investigated, despite of emergent, integrated, and structured approaches. This article aims to explore these challenges and figure out the possible remedies. Through an empirical analysis based on the contents of literature previously published in various journals the researchers evaluated the BDA capabilities to cope with the pandemic and their emergence after the pandemic. The findings suggest that the SMEs that developed technological advancements in their business models are resilient and sustainable after the COVID-19 due to the ability to incorporate innovations in their operational architecture. So, it could increase the efficiency that is based on the technology and innovations and playing a significant role in revenue generation for the firm. This research will explore new windows for the success of SMEs by utilizing the innovation in ICT and incorporate it into their business models.

Keywords:- Big data analytics, SMEs, ICT, Knowledge management, Business models.

I. INTRODUCTION

The epidemic of COVID-19 has left a negative impact on global and national economy. During the crisis, all businesses have faced a slew of issues. Supply chain interruption, a major drop in demand, a lack of raw materials, the rejection of external demand, and significant transport interruption are just a few examples. It is important to note that SMEs are concerned about skill shortages, financial concerns, and management issues (Kumar & Ayedee, 2021). In this circumstance, SMEs turned COVID-19 apocalyptic victims since they were unable to appropriately fight against these chaotic situations, which lasted longer than expected. Furthermore, SMEs are shown to be largely reliant on the regular financial transactions with a small figure of clients. In such a COVID-19 situation, SMEs frequently result in lost sales or face major supply chain management restrictions (Alharbi, 2022). Data-driven innovativeness pillar of development, particularly for SMEs. Sensors, IOT, supply

chain-related RFID, and other technologies create a massive quantity of data. The convergence of several trends, such as the IOT and other innovations, as well as the decreasing cost of data collection, storage, and computing, are all boosting the growth of massive amounts of data which is called big data analytics. The primary asset of SMEs is the vast quantity of data known as big data. Its abilities and procedures are rapidly impacting entrepreneurship and innovation, offering SMEs with considerable competitive advantages (Frederico, 2021).

Small and medium-sized businesses (SMEs) are the primary contributors to a country's wealth, and they aid in the enrichment of ideas and discoveries. SMEs are said to have aided a country's economy because they account for half of all jobs and 90% of all businesses globally. On both supply and demand side, the COVID-19 epidemic has harmed SMEs (Kumar et al., 2021c). On the supply side, SMEs saw a decrease in labor, raw materials, and other items. The disruption of supply networks led to a scarcity of intermediate items. On the demand side, a rapid drop in demand harmed SME operations and resulted in an artificial cash shortfall. Although all businesses were affected by the COVID-19 epidemic, SMEs were more vulnerable and less resilient because to their small size and limited resources. Much research has shown that SMEs may survive the COVID-19 pandemic by developing their supply chain utilizing contemporary technologies such as industry (Ufua et al., 2022). However, no studies have looked at how vast the data driven innovations may assist SMEs in maintaining their logistics operation in the post COVID age with the aid of associated leaders (Kumar et al., 2021b).

II. DATA ANALYTICS

The systematically computation and analysis of data is called analytics. It's a device for realizing, communicating, and interpreting significant pattern in specific statistics. It also entails utilizing the data pattern to do more knowledgeable assessments. Organizations and individuals utilize this to bring about sense of BDA. Primary data is frequently investigated by the analysts for patterns and insights (Maroufkhani et al., 2022). The manufacturing industry is facing a profound IT and smart advancements transformations, which will offer on demand computation analysis with precise scalability, availability, and reliability in a cloud environments. It is anticipated becoming a key enabler for production industry, reshaping business models, assisting in the alignment of product innovations

with corporate strategy, and establishing intelligent production plant network that inspire efficient team cooperation (Ciasullo et al., 2022). The use of cloud computing to provide pronouncement support systems services to manufacturing industry allows for lower unit pricing due to increased operational magnitude, lower unit service costs due to increased number of services developed and provided, and lower unit costs due to increased variety of services put through the supply/demand chain. Furthermore, ICT and online databases have a comparable transformational effect on user retail, not only in terms of pure retail, such as through online retailers like Amazon or marketplaces like Etsy, but also in terms of user mediated product review, which can be found on retail websites or on dedicated consumer review platforms like Customer reviews (Asad et al., 2021).

These have developed progressively more significant through important data that could allow product creators to better recognize the requirements and predilections of users, while also persuading potential users in their buying and decision making processes (Song et al., 2022). The Data Warehousing Institute performed a broad analysis of businesses in 2009. Of the companies analyzed, 38% stated that they consume innovative data analytics, while 85% stated they would be performing it during upcoming years. According to survey, respondents were present evenly through a wide range of business dimensions. Whereas, just 23% of plaintiffs were from firms whose income was less than 102 million, within EU this is more than €50 million threshold for any medium enterprise while most of 23% of plaintiffs are micro scale companies with less than twelve workers or SMEs with 12 to 260 workers. In a British research steered for Department of Business Innovations and Skill stated that in year 2015, 98% of total quantity of companies operational within UK could be classified as being SMEs (Saura et al., 2021).

Entirely these firms accounted for more than 2/3 of UK private industries labor force and 47% of annual private industry turnover produced in UK. So, SMEs perform a significant role in sustained development, growth and achievement of national economy and research have indicated their impacts. The significance of SMEs could not be restrained, due to their role in accomplishing the demand and enhancing the productivity of supply chain associates, comprising large sized companies, since that they play a crucial character within modern economies while there are many investigations concerning collaborative design and big data, there is moderately little that inspects these perspectives from SMEs, despite of their financial significance. This research exclusively concentrates upon production SMEs, those are located in Greater Manchester and South Wales industrial zones of UK, their prospective rationales for utilizing the knowledge of big data driven user analytics (Saura et al., 2021).

The phrase 'big data analytics' refers to the use of advanced analytics technologies to large data sets in order to analyze them. As a result, big data analytics, sometimes known as 'big data,' can be thought of as being about two factors. To begin, big data refers to the amount of data that a corporation may store in gigabytes. Second, analytics includes the tools and procedures used to analyze data. In the twenty-first century, an organization's data will most likely come from a variety of sources, including electronic business records, emails, production monitoring systems, social media, and website logs, among others (Saura et al., 2021). Up until 2003, humanity generated a total of 5 exabytes of data; but, in the present day, it takes just two days to create this volume of data. Scientists from various fields such as statistics, economics, computer science, economics, and mathematics, have established a variety of methods and technologies to analyze, curate, visualize and capture big data, but they are still a long way from being able to meet a wide range of needs because the field of big data analysis also includes machine learning, data mining, neural networks, social network analysis, signal processing, patterns recognitions, and optimization. As a result, the large range of techniques, tools and disciplines might make implementation difficult, if not impossible, for non-IT manufacturing SMEs without professional supervision, as mentioned in "Large Data" also entails "huge systems," "big problems," and "big revenues," thus additional study in these areas is required to tackle the problem (Nassani et al., 2022).

➤ *Need in SMEs:*

The advent of SaaS (Software as a Service) and cloud computing may offer a way to retrieve complex IT systems and databases. Research have indicated that cloud computing will be a desirable choice for several SMEs because of its adaptable structure, scalability, and cost. Interoperability in cloud computing applications as well as cloud and desktop environments may represent certain issues.

➤ *Rationale:*

This study is thus set on the rationale that SMEs can use big data analytics to improve their operational strategies and gain the competitive advantage to ensure profitability and survival in the long run, particularly within the context of impacts of blockade and increase in competition in near future. The author emphasizes that technologies such as big data analytics are likely to be the main source of competitive advantage for SMEs, as they enable businesses to become more agile, creative, and innovative.

➤ *Objectives:*

- To familiarize with the reasons of decreased efficiency of SMEs in COVID.
- To present the data analytics model for the betterment of SMEs.
- To evaluate the impact of data analytics on the efficiency of SMEs to national economy.

III. LITERATURE REVIEW

Businesses are facing an unprecedented problem as a result of COVID outbreak. Due to the inadequate resources, SMEs have been targeted even harsher. Many treatments have been proposed in the literature to help SMEs endure in the post pandemic era, but no research have looked into how big data mediated innovations could improve SCM processes in the post COVID era under moderating impact of SME technologies and leadership assistance. As a result, there exist research. void in this crucial area. The goal of this research is to look at how a SME's supply chain system is affected by big data-driven innovations and technological competence. In post pandemic scenario, research additionally looks at the lessening influence of SME technology leaderships assistance on SME operations. A theoretical model has been conceptualized using literature and resource-based view (RBV) and dynamic capability view (DCV) theories. The model is then tested using 327 relevant respondents from Indian SMEs using the structural equation modelling (SEM) approach. Big data mediated innovations and SME techno functional competency both have an influence on supply chain capabilities, which in turn has an effect on SME success in post pandemic era, according to the study. The study also discovers that SME technology leadership assistance has a lessening effect on SME success (Chatterjee et al., 2022).

The COVID-19 epidemic wreaked havoc on the world economy, stunting economic development and jeopardizing the viability of small businesses. Panic ensued, resulting in out-of-control spending to aid recovery. Major goal of this study is to look at the potential for SMEs in the aftermath of the COVID-19 outbreak by embracing digitalization. It is simple to attract and keep new consumers, enhance communication, save money, and strengthen connections with business partners with SMEs digitization. The author believes that digitalization is a sensible way to boost SMEs' efficiency (Kala'lembang, 2021).

Various hurdles to using BDA for sustained production processes following pandemics are discussed in this study. Through an exhaustive literature analysis and expert perspectives, 17 impediments to investing in BDA implementation are highlighted in this study. Expert comments are gathered using a questionnaire-based survey. With the use of factor analysis, the discovered impediments are divided into three groups. There are three types of barriers: organizational, data management, and human. The graph theory matrix approach (GTMA) is used for barrier quantifications. The report identifies a number of obstacles to BDA adoption for SMOs following the COVID-19 epidemic. Through an exhaustive literature analysis and expert perspectives, 17 impediments to investing in BDA implementation are highlighted in this study. Expert comments are gathered using a questionnaire based assessment. With the use of factor analysis, the discovered impediments are divided into three groups. There are three types of barriers: organizational, data management, and human. The GTMA is used to calculate the number of

obstacles. The paper outlines obstacles to BDA implementation investment. It uses factor analysis to identify the barriers and calculates the concentration of each type of obstacle for BDA investment in SMOs. Organizational obstacles are found to be the most intense, whereas personal barriers are found to be the least intense. This research might aid organizations in making strategic decisions about whether or not to invest in BDA applications in order to achieve one of the Sustainable Development Goals. Corporations should concentrate their endeavors first on overcoming organizational hurdles, followed by human barriers and data management. The originality of this research is that it examines the impediments to BDA investments for SMOs in context of Indian manufacture companies. The study's findings will aid experts and practitioners in developing policies that are based on the real nature and severity of obstacles (Kumar et al., 2021a).

This research was carried out as part of the United Nations Development Account projects "Global Ingenuity towards Post COVID upsurge of the SME Sector which aimed to investigate how regulatory agencies in the Caribbean and Latin America supported (SMEs) during COVID-19 and helped them restore. This text examines the character of competition strategy in digital platforms, focusing on association between business approaches, technological innovations, and market concentrations, the suitability of Latin American countries' current legal and institutional frameworks for competition in dealing with current contests. It also discusses some of the techniques employed by major technology companies, as well as how these strategies affect SMEs' market access. Its goal is to highlight the necessity for industrial and competition policies to be compatible, as well as for better coordination between the authorities in charge of data privacy and competition policy, as well as between other government agencies (Da Silva & Núñez Reyes, 2021).

The global economy and natural science both have been affected by pandemic. SMEs especially in poor nations, have been especially targeted severely by pandemic due to their limited usage of modern digital technologies. From a skill for social good viewpoint, this research used a literature research and personal observations to present COVID-19 digitizing lessons for sustainable growth of SMEs. We create a platform to enable SMEs digital transition after COVID-19 for long-term growth. We believe that digital transactions, especially mobile money, should be a top focus for SMEs in their digital innovation. Establishments must also help SMEs develop the resources and expertise they need to embrace digital revolution for business planning and long-term manufacture and utilization. Their conclusions suggest that SMEs managers and other participants reevaluate the business approach, incorporating crisis situations and business stability plans to effectively retain users to improve long term resilience. We also recommend other study topics to help SMEs succeed in their digital transformation post COVID scenarios (Bai et al., 2021).

Apart from affecting public health, the COVID-19 pandemic has resulted in the stalling of travel-bureau firms and management of SMEs in tourism industry. Pandemic as a cause of travel business inactivity and commotion in SMEs, effect of human resource, business development, and products marketing on efficiency of travel and SMEs business, direct and indirect impacts of business innovations, economic digitization's, and utilization of technology. on business constancy and economic business resilience, and the direct and indirect effects of business innovations, economic digitizations, and the use of technology on business stability and economic-business sustainability are all examined. An explanatory sequential qualitative–quantitative strategy is used in this investigation. Observation, in-depth interviews, questionnaires, and documentation were used to collect data. The goal of this study is to evaluate how travel agency business players and small businesses respond to and adapt to changes in the business environment, both internally and externally. With a coefficient of determination of 95.84 percent, human resources, business development, and product marketing all have an impact on the productivity of travel agencies and SMEs. Furthermore, with a coefficient of determination of 63.8 percent, business innovation, economic digitalization, and technology use all influence company stability, and business stability affects the sustainability of travel and SMEs with a coefficient of determination of 67.6 percent. In the North Toraja Regency, South Sulawesi, Indonesia, this study offers a plan for travel agency company sustainability and the stability of SMEs' economic-business management in order to increase economic growth (Surya et al., 2022).

In view of its prospects, obstacles, and predicted advantages, BDA is gaining popularity in both practice and theory. Despite the fact that it has been in a continual battle with the constraints that limit its adoption, developing economies see big data analytics as being extremely important. As a result, the primary goal of this research was to discover the drivers of big data analytics in Jordan, a developing economy. Using PLS-SEM for analysis, the study looked at the impact of technological, organizational, and environmental variables on big data adoption in Jordanian SMEs. The empirical findings indicated that relative advantage, complexity, security, top management support,

organizational spreparedness, and government assistance all influence BD adoption, whereas competition pressure and compatibility appear to have little impact. For both academic and practitioner circles concerned with the use of big data in developing nations, the results are expected to contribute to enterprise strategy and organizational use of BDA in the current dynamic market context (Lutfi et al., 2022).

According to existing research, digital technologies (BDA, AI and blockchain) assist businesses in gaining a competitive edge. The research, however, are not focused on the micro, small, and medium-sized company (MSME) sector. MSMEs also face a number of obstacles, including considerable supply chain interruption as a result of the COVID-19 epidemic. As a result, there was a pressing need to transition to digital technology in order to thrive during this challenging period. Various beneficial developments are mentioned in the current literature in the context of MSME. However, there is a scarcity of research on the significance of big data analytics capabilities (BDAC) in gaining a long-term competitive edge. Our research intends to address this void and answer the following question: How does BDAC assist MSMEs in achieving SCA? Organizational information processing theory (OIPT) and institutional theory provide theoretical basis for understanding the phenomena (IT). Through supply chain coordination, quick trust, and supply chain risk, we establish a conceptual framework that connects BDAC and SCA. In addition, the firm's age and size are employed as control variables. The information was gathered from MSMEs' employees in the Indian service sector, yielding 497 valid replies. To test the hypotheses, we employ PLS-SEM using Warp PLS 7.0. The fact that the BDAC has an indirect influence on the SCA is a significant result. (Behl et al., 2022).

➤ *Gap identification:*

It is analyzed that previously researchers focused on big data utilization for increasing the efficiency of SMEs by relying on only one solution, but it is presented that we need to use a blend of techniques to solve the problems of SMEs that arise during and after the covid-19. So, we proposed a multi layered cross verification cascade of novel technologies to attain resilience in the basic operation of SMEs and their associated supply chains.

➤ *Conceptual framework:*

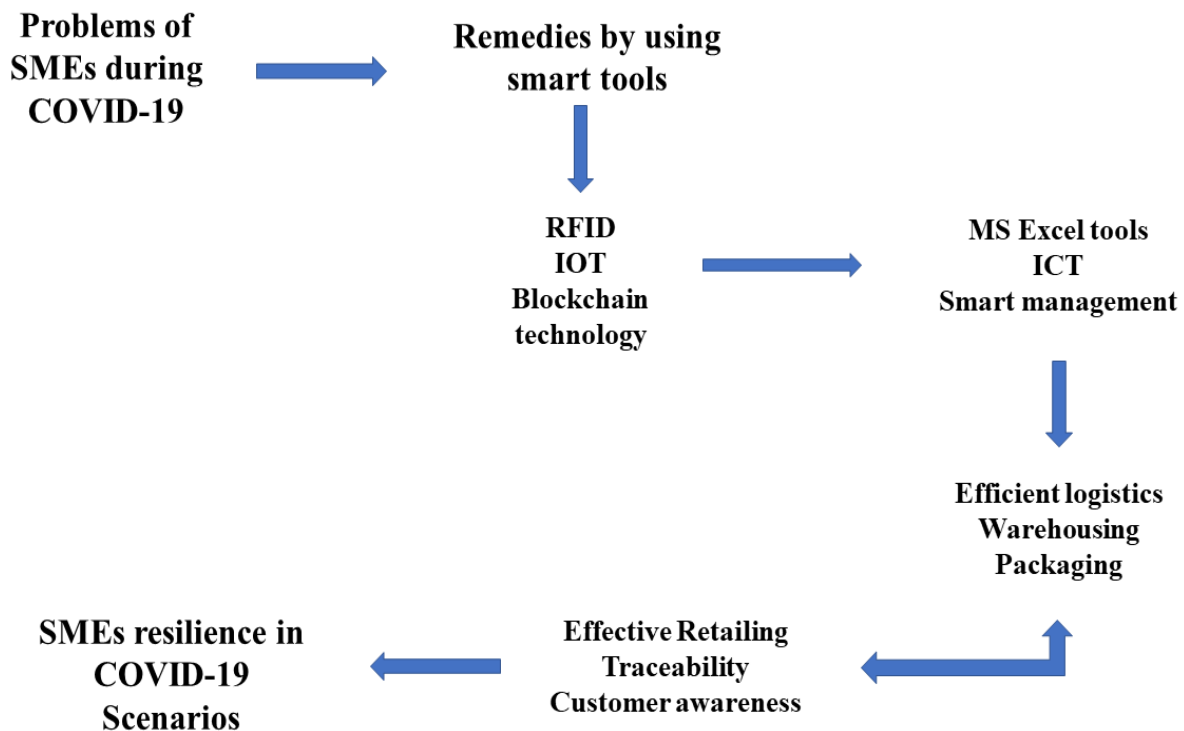


Fig 1:- Presenting the Conceptual Framework of the Research.

The figure reports the conceptual framework of the research by figuring out the problems encountered by SMEs around the globe and proposing a novel model that could be implemented to cure these challenges to face post COVID scenarios in a minimum possible time span to increase the productivity and revenue generation of SMEs for the betterment of global economy and uplift of the workers associated with SMEs.

IV. METHODOLOGY

For this systematic literature review a search strategy was developed by using keywords big data analytics, efficiency of SMEs and effect of COVID on SMEs. This search extending from beginning of database from 2022 to back in 2019 to compare the efficiency of SMEs before and after the COVID-19 for deeply understanding the effects of pandemic. The search was performed on two databases and obtained 32 articles from the Google Scholar and 30 articles from Ebscohost. To refine the search criteria for this systematic review it was narrowed down to the data analytics in SMEs during pandemic and its effects on SMEs. Articles that did not referred to the above criteria was then excluded from the search and now the number of articles for further analysis was 41 which we used for thematic analysis to interpret the results for our systematic literature review that fully met the specified search criteria. Through a forward and backward search, identifying which sources the authors of the

published articles cited and which sources cited the articles, 6 additional articles were added to the collection of literature that met the selected search criteria. 4 additional articles were identified through other sources. The study is based exclusively on articles published in reputable scientific journals. Article abstracts were thoroughly reviewed for analysis and cleaning to ensure the quality and relevance of the scientific literature included in the review process. At a later stage, a careful evaluation of the individual research papers was conducted. The quality of published articles from other scientific journals, were evaluated with the Journal Impact Factor. For this purpose, the journal citation report of the journal to be evaluated for quality was examined in the Web of Science database. To ensure the quality of the scientific literature, only articles with a journal impact factor were selected for our article. In the data extraction phase, 24 articles were selected, and the following characteristics were extracted:

- The article must be a journal article from a scientific journal.
- The article must be written in English and be from the field of information science, digital transformation, business administration, and listed with the impacts of pandemic.
- The article deals with the content of SMEs and data analytics.

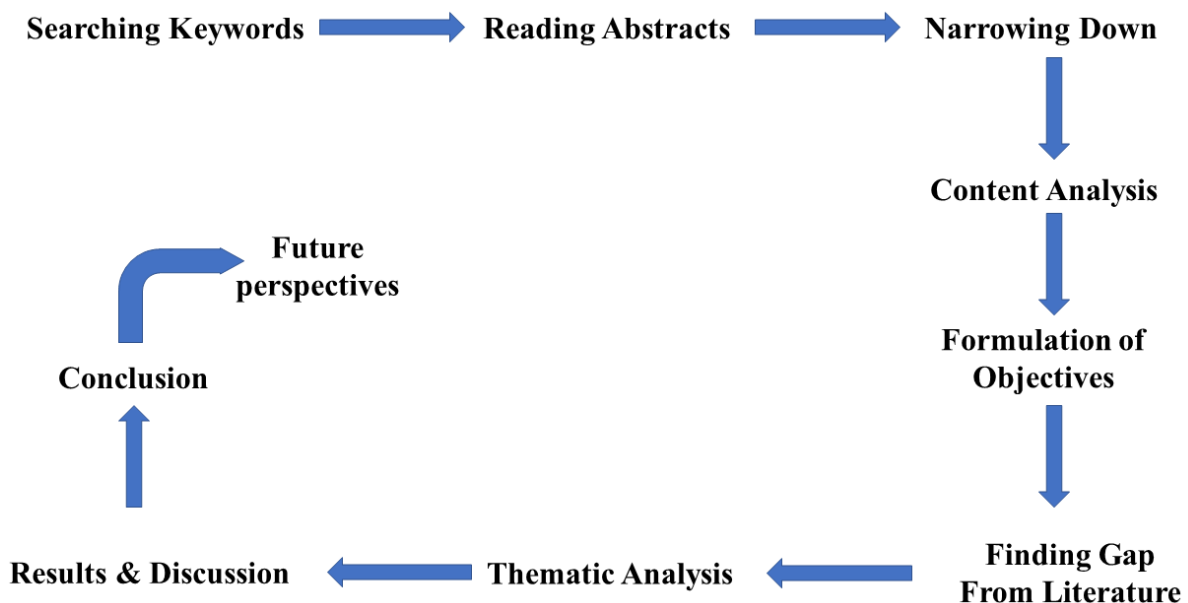
➤ *Theoretical framework:*

Fig 2:- Presenting the Theoretical Framework of the Research.

The figure explains the theoretical framework on which our proposed model is based to elucidate the problems of SMEs and their solutions by implementing BDA in the operational architecture, SCM and retailing of SME products. The researchers deeply investigate the problems of SMEs from the literature by using content analysis and find gap by thematic analysis and utilized abductive reasoning approach for the finding to propose a new direction for the future research.

V. DISCUSSION

The present research has analyzed literature in the field of SMEs, their efficiency, utilization of modern technologies and effect of COVID-19 on their productivity both financially and socially. There are certain defects in the basic operation of SMEs that these cannot utilize effective data leverage system to meet the current requirements, and these are not aware of the international market trends due to the utilization of conventional methods (Žandaravičiūtė & Varaniūtė, 2022). An effective data leverage system based on the digital platform could be served as a remedy for solving the issues of SMEs and it will enable them to compete around the globe when start to utilize e-commerce platforms which is the key to success. Currently SMEs are using some of the novel ICT tools, but these are at its initial stages due to the untrained staff to manage with these technologies, lack of infrastructure due to high cost, limited resources, and lack of interest by the owners and shareholders. While analyzing all these conditions researchers interpreted that utilization of modern technologies like blockchain technology, internet of things, smart packaging, traceability technologies, efficient retailing and customer awareness is necessary for the survival of SMEs at national as well as international levels. Previously scholars have evaluated the dynamic capabilities of SMEs that these have potential to generate a lot of revenue to their owners as

well as to their country if they start to utilize the digital business platforms as with the case of Chinas SMEs, they developed in previous two decades (Seseni & Mbohwa).

After the COVID-19 scenarios when world is facing a shortage of goods SMEs has a golden chance for their growth by producing better goods to fill the gap and to build the trust among users so that they could use the SMEs products again and again. So, there is a need to bring revolutionary changes in supply chain of SMEs to manage the goods effectively and to supply them to the users without any hurdle (Zairis, 2021). Blockchain will enable SMEs to aware about the goods storage conditions, supply, and demand gaps to produce the goods that are facing shortage in market. Moreover, smart packaging will enable the SMEs to maintain standard by introducing the efficient and environment friendly packing materials that maintains the integrity of manufactured goods. The integration of technological models as eBay, Alibaba and Walmart is necessary for the development of SMEs because these platforms could help SMEs to perform better by competing other industries when they have a direct access to the end users and generate a lot of revenue which in turn could improve the basic infrastructure of the SMEs for the betterment of working conditions as well as for the owners and employees (Sorger et al., 2021).

VI. CONCLUSION

Current expansions in world economy and highly competitive corporate settings deliver substantiation that novel technologies are crucial to maximizing competitive advantages and ensuring survival, as expressed in the editorial and research conducted by scientists whose finding has been discussed previously. Now the world is making to attendant in the fourth industrial rebellion, where innovations and technology will chaperon operational happenings and

command pace, SMEs can get benefit of cloud computing's, which is now commonly accessible for a wide variety of Information System platforms, despite their limited financial resources. The cloud alternative is cost-effective, needs little or no upfront investment, and can be set up with minimum technical knowledge. Low-cost machineries are now accessible that can help small firms in conducting simulated activities in the times of lockdown, such as those experienced during the COVID-19. Growing small businesses with clever cutting-edge technology helps build and sustained competitive strategies in today competitive business landscapes, laying groundwork for long term development and markets leaderships. Additionally present COVID-19 situations provide a chance for a new production of entrepreneurs to resurge and lead next industrialization by inventing new business models using cutting-edge technologies.

FUTURE PERSPECTIVE

Future studies need to report behaviors to overwhelmed the encounters impeding SMEs' implementation and adoption of digital innovations in small business and need to analyses the policies of governments to produce an ease for the entrepreneurs so that they can contribute to the national economy and produce employment for others instead of being a burden on their country economy by thinking to serve as a government employee which would waste their potential and capabilities and alarming situations as in underdeveloped countries.

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