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From the Editorial Committee

We are giving you the next Vol. 28, No. 2(2023) issue of the Quarterly of the Faculty of Management of the Rzeszow University of Technology entitled "Modern Management Review".

The primary objective of the Quarterly is to promote publishing of the results of scientific research within economic and social issues in economics, law, finance, management, marketing, logistics, as well as politics, corporate history and social sciences.

Our aim is also to raise the merits and the international position of the Quarterly published by our Faculty. That is why we provided foreign Scientific Council, as well as an international team of Reviewers to increase the value of the scientific publications.

The works placed in this issue include many assumptions and decisions, theoretical solutions as well as research results, analyses, comparisons and reflections of the Authors.

We would like to thank all those who contributed to the issue of the Quarterly and we hope that you will enjoy reading this issue.

With compliments
Editorial Committee

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Kassaye DEYASSA¹

DYNAMIC CAPABILITIES AND INNOVATION IN SMALL AND MEDIUM-SIZED ENTERPRISES (SMES): A SYSTEMATIC LITERATURE REVIEW OF PRIOR STUDIES

Based on previous studies, this study presents the role of dynamic capabilities and innovation in maintaining a competitive advantage for SMEs. This article is based on a literature review. Forty articles from JSTOR databases were selected for the study. The study period is between 2011 and 2020, and the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method was used. The results show that despite the contribution of Asian countries, almost 70% of studies on dynamic capabilities and innovation in SMEs in the Global North are conducted in Europe. Less attention has been paid to the Global South, which depends more on SMEs than large companies to enrich the economy. This study provides a clearer picture of the ideas through an empirical application that complements current vague notions. The author argues that more research needs to be done on dynamic capabilities and innovation in SMEs in the Global South.

Keywords: Dynamic capability, collaboration, innovation, SMEs.

1. INTRODUCTION

The concepts of dynamic capability and innovation implementation in SMEs have received much attention recently (Weaven, Quach, Thaichon, Frazer, Billot, Grace., 2021). Due to the more dynamic business environment and increasing globalization, researchers and practitioners agree that dynamic capability and innovation are an emerging trend in corporate innovation strategies (Torchia, Calabrò, 2019), as they provide opportunities for companies to achieve profits with inadequate resources (Siems, Land, Seuring, 2021). Dynamic capacity and innovation for enterprises, the extraction of knowledge from external and internal sources to enhance innovation performance, have received much attention in dynamic capability and innovation study (Torchia, Calabrò, 2019). The primary function of dynamic capability and innovation is to reconfigure internal and external resources and achieve the knowledge function in organizations (Alves, Barbieux, Reichert, Tello-Gamarra, Zawislak, 2017). Chesbrough and Bogers (2014) emphasized the importance of the inflow and outflow of knowledge. They pointed out that these are the

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main characteristics that underpin the notion of dynamic capability and the concept of innovation.

Large companies are good at implementing dynamic capabilities and innovation strategies because of their organizational strategy and structure. The literature confirms that previous studies on dynamic capabilities and innovation have mainly focused on large companies (Kodama, 2017; Nambisan, Wright, Feldman, 2019). Therefore, the gap in implementing dynamic capabilities and innovation practices in SMEs needs to be investigated (Bigliardi, Galati, 2016). Recent studies show that the focus has shifted from large companies to SMEs (Janssen, Castaldi, Alexiev, 2018; Torchia, Calabrò, 2019).

SMEs are not as critical as large companies in implementing dynamic capabilities and innovation strategies due to their specific organizational structure, strategy, and management capabilities. These aspects are crucial for SMEs to achieve effective results (Bigliardi, Galati, 2016). Therefore, there is a gap in implementing SMEs' dynamic capabilities and innovation practices.

Therefore, this study aims to present the role of dynamic capabilities and innovation in maintaining a competitive advantage for SMEs based on previous studies. The following research questions can be answered by implementing the set objectives and observing the research trends in the field of dynamic capabilities and innovation:

RQ1: What internal and external factors influence the implementation of dynamic capabilities and innovation in SMEs?

RQ2: What are the main barriers for SMEs to implementing dynamic capabilities and innovation?

2. LITERATURE REVIEW

2.1. Dynamic capabilities: An overview of their role

David Teece and Gary Pisano first developed the concept of dynamic capabilities in 1994 to complement the resource-based approach (Derayati, 2020). The starting point is to leverage the resource base to create a competitive advantage. A firm's resource base includes its tangible, intangible, and human assets, and capabilities that it owns, controls, or has access to. A company's resources are considered something that companies can use to achieve their goals (Warner, Waeger, 2019). Over time, the strategy literature has become very interested in the survival and growth of firms under changing conditions. A new stream of literature has gained prominence in this area that views dynamic capabilities as critical for creating a sustainable, evolving competitive advantage in organizations. The dynamic capabilities perspective focuses on an organization's ability to transform, build, and recombine static resources into new, strategically valuable combinations to create long-term value (Laaksonen, Peltoniemi, 2018).

The study of dynamic capabilities offers insights into organizational change and how organizational forms, practices, and competencies are shaped by the organization's environment and history (Teece, 2018). Teece, Pisano, Shuen (1997) postulated that the nature of a firm's dynamic capabilities and competitive advantage depend on the firm's management and organizational processes. The firm's management and administrative processes are shaped by its specific asset position (internal assets and external environment) and its history (i.e., constrained and guided by its past and present). Management and organizational processes refer to the way things are done within an organization or the routines or patterns of actual practice and learning. Therefore, this

introduction to the dynamic capabilities' perspective integrates insights from business and management theories to address strategic management issues.

A dynamic, evolutionary aspect characterizes the dynamic capabilities perspective. It recognizes that a firm's capabilities must change with the environment to gain a sustainable advantage for the future through new and adapted assets and capabilities. This critical step forward in explaining how organizations sustain advantage aims to consider the processes that contribute to the evolution and adaptation of an organization's capabilities, rather than attributing competitive advantage to possessing valuable, rare, and unique resources (Yadav, Han, Kim, 2017). From an interdisciplinary perspective, the dynamic capabilities approach draws on a synthesis of insights from different theoretical traditions, including evolutionary economic theory (Nelson, Dosi, Helfat, Pyka, Saviotti, Lee, Dopfer, Malerba, Winter, 2017) and the behavioral theory of the firm (Shinkle, Hodgkinson, Gary, 2021), as a foundation for the perspective, with elements from a knowledge-based view of business and entrepreneurship (Tece, 2018).

Extending some of the basic ideas of corporate behaviour theory, which overcomes some of the limitations of mainstream economics, such as optimization and equilibrium models, scholars have argued that an understanding of corporate behaviour should include individuals and organizations (Abubakar, Elrehail, Alatailat, Elçi, 2019).

2.2. Innovation: An overview of its role

Innovation is defined as the purposeful inflow and outflow of knowledge to accelerate internal innovation and expand the market for external use of innovation (Spender, Corvello, Grimaldi, Rippa, 2017). Innovation can manifest in three ways, depending on the direction of knowledge flow (Ahn, Minshall, Mortara, 2017): inbound, outbound, and coupled. Inbound innovation involves external resources and knowledge flowing into firms from outside, including insourcing and in-licensing, minority investments, acquisitions, joint ventures, research and development, collaborations, research funding, technical and scientific services, etc. Outbound innovation includes the flow of internal resources and knowledge from firms, such as licensing, innovation in sales projects, joint ventures for technology commercialization, technical and scientific services, and equity investments (Ahn et al., 2017). Finally, the coupled mode involves co-creation with complementary partners through alliances, collaborations, and joint ventures. Companies using the coupled mode combine the outside-in process with the inside-out process to bring ideas to market, innovate, and commercialize together. These different modes of innovation lead to multiple types and scales of strategic hiring, so it is also necessary to distinguish them to identify barriers more accurately to innovation (Albats, Alexander, Mahdad, Miller, Post, 2020).

Such differences may be necessary for SMEs that suffer from a lack of knowledge, resources, and skills that limits their ability to deal with barriers to innovation. Previous research has shown that SMEs innovate extensively even under challenging conditions by taking advantage of smallness (Albats et al., 2020). SMEs that leverage innovation activities achieve positive outcomes in their innovation performance (Väyrynen, Helander, Vasell, 2017). However, there is no academic consensus on what forms of innovation they use or how they deal with potential obstacles. Leckel et al. (2020) focus more on outbound innovation due to SMEs' lack of resources and capabilities.

In contrast, large companies focus more on research and development and inbound activities. Albats et al. (2020) also point out that SMEs' inbound innovation activities are more pronounced than outbound innovation activities. Overall, innovation risks may be a more significant barrier for SMEs than large firms (Väyrynen et al., 2017). However, few

empirical studies address the different types of innovations or detail what barriers they pose to SMEs.

3. RESEARCH METHODOLOGY

This study aims to present the role of dynamic capabilities and innovation in maintaining a competitive advantage for SMEs based on previous studies. Recently, researchers have been interested in knowing the impact of dynamic capabilities and innovation in SMEs. Research has also shifted to gaining a competitive advantage in a changing market environment and looking for other ways to integrate dynamic capabilities and innovation into business practices.

From 2011 to 2020, a systematic literature review of studies on dynamic capabilities and innovation in SMEs was conducted. According to Mikelf et al. (2019), a systematic literature review seeks to address problems in the current literature and identify, critically evaluate, and combine appropriate studies that have been conducted in a particular area by addressing research questions. The Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) explain selecting and rejecting articles. PRISMA helps researchers improve the reporting of systematic literature reviews (Page et al., 2021, Rethlefsen et al., 2021). The study draws on forty published articles from JSTOR databases and selects at least thirty highly cited articles published between 2011 and 2020.

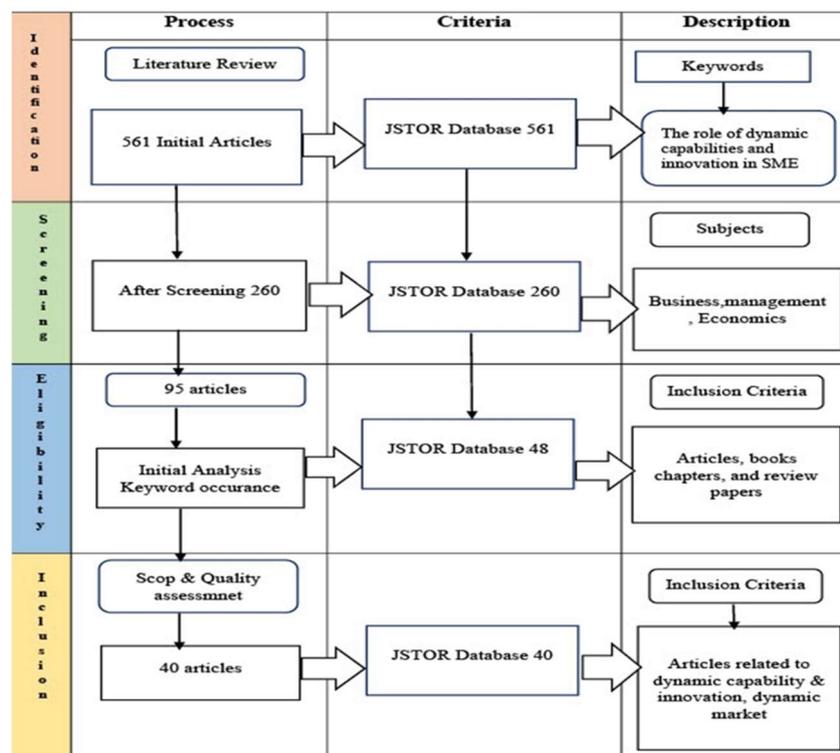


Figure 1. Research model according to PRISMA

Source: own elaboration.

The JSTOR database was searched for relevant literature as of February 2022. The search was conducted using “the role of dynamic Capabilities and Innovation in SME”. In addition, the search yielded 561 literature searches. Although the concepts of dynamic capabilities and innovation were first introduced in 1994 and 1997, the number of publications has increased tremendously over the past fifteen years. After selecting the literature search from 2011 to 2020, 260 literature searches were found. The researcher excluded the literature searches published under the other topics except for management and economics, leaving the researcher with 95 literature searches. The researcher chose articles as the document type and selected the works with 30 or more 30 citations from the analysis as more reliable while maintaining the quality standard. The remaining articles were 48. After deleting the repeated articles and excluding irrelevant articles, the remaining articles were reduced to 40. Figure 1 summarizes the selection process.

The identified articles underwent extensive screening to identify good articles for quality assessment. Articles with thirty or more citations were selected to understand the concepts better. Strict care was taken not to duplicate papers during the selection process.

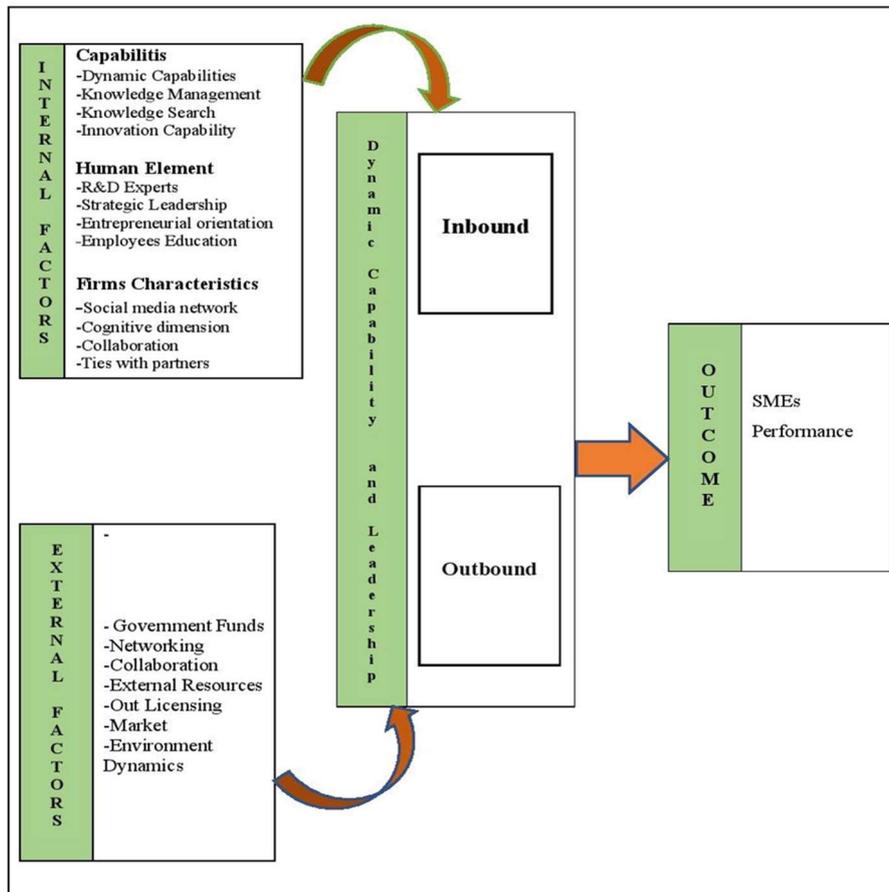


Figure 2. Reviewing factors of Dynamic Capability and Innovation and their outcomes
Source: own elaboration.

This review was also based on peer-reviewed original articles to meet the eligibility and inclusion criteria. The researcher is interested in studying dynamic capabilities and innovation from the perspective of companies and managers. No other areas of study were selected for this study. JSTOR was chosen for article selection because it contains many articles published in management and business (Klebel, 2018). Only articles published in English were selected to ensure comprehensibility and global acceptance.

This study provides qualitative and mixed methods research data from 2011 to 2020. Forty articles from JSTOR-indexed journals were selected for analysis. The corresponding metadata was exported, and a descriptive analysis of the literature was conducted based on the year of dissemination, topic areas, and distribution of countries practicing dynamic capabilities and innovation to achieve a competitive advantage in their SMEs. The year-based analysis monitored the number of publications over ten years. An industry analysis was conducted to identify the industries within SMEs that practice dynamic capabilities and innovation. This systematic review also identified the internal and external drivers of dynamic capabilities and innovation and summarized its findings in the research framework shown in Figure 2.

4. THE ANALYSIS OF BIBLIOMETRIC DATA

This section examines the number of articles selected in the review, the industry sector, the number of citations, and the journals in which the articles were published.

Figure 3 shows the studies of the selected articles on dynamics and innovation in SMEs from 2011 to 2020. The results refer to the journals per year but only to the frequently cited studies. We see that 2015 and 2019 had the most published articles with high citation reports, while 2020 had only one cited article with more than 20 citations.

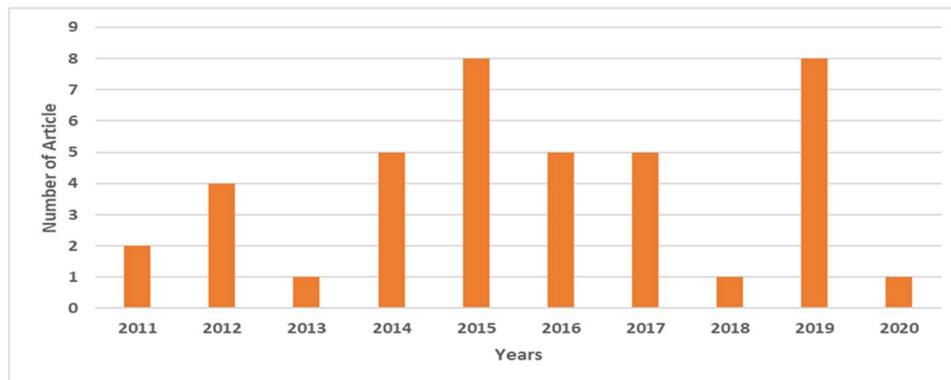


Figure 3. Publications on dynamic capabilities and innovation in SMEs in the years 2011–2020

Source: JSTOR databases.

Based on an industry sector, Figure 4 shows the sectors of industries that use dynamic capabilities and innovation practices. Some articles referred to SMEs in their study, while the remaining articles did not mention which sector was included. Of the selected studies, 23 articles were conducted in the manufacturing and service sectors. Manufacturing is the most studied sector of SMEs practicing dynamic capabilities and innovation, and the

number of studies totalled 18 selected articles. 5 articles were studied in the service sector, and the rest were conducted in other industrial sectors. Figure 4 shows that dynamic capabilities and innovation practices are more widespread in manufacturing and service SMEs than in other sectors.

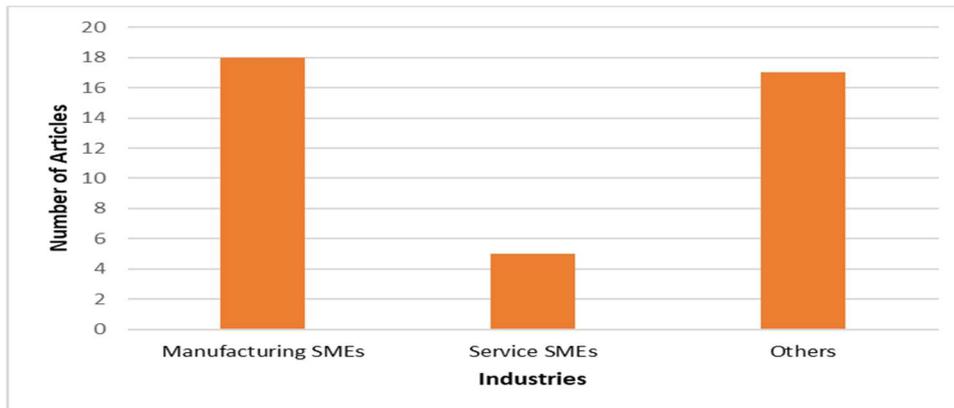


Figure 4. Number of articles on dynamic capabilities and innovation in SMEs by Industries

Source: JSTOR databases

Table 1. Journals and number of publications

Journals	Number of Publications
Small Business Economics	6
Journal of International Business Studies	4
Journal of Enterprising Culture	3
Journal of International Marketing	3
Journal of Knowledge Management	2
Emerging Markets Finance & Trade	2
Creativity and Innovation Management	2
Strategic Management Journal	2
Journal of East European Management Study	2
Management International Review	2
Journal of Economic Geography	2
Journal of Business Ethics	2

Source: JSTOR databases.

Based on the distribution by continent, one of the interesting findings of this study is the coverage of dynamic capability and innovation studies in the global North and South. Figure 5 shows that nine studies were conducted in the global south. The rest were conducted in the global North, indicating a significant gap in the lack of studies and practices on dynamic capabilities and innovation in SMEs in the Global South. The results are consistent with the study of Al-Hanakta et al. (2021). From the global North, Italy is the most significant contributor to scientific research in dynamic capability and innovation.

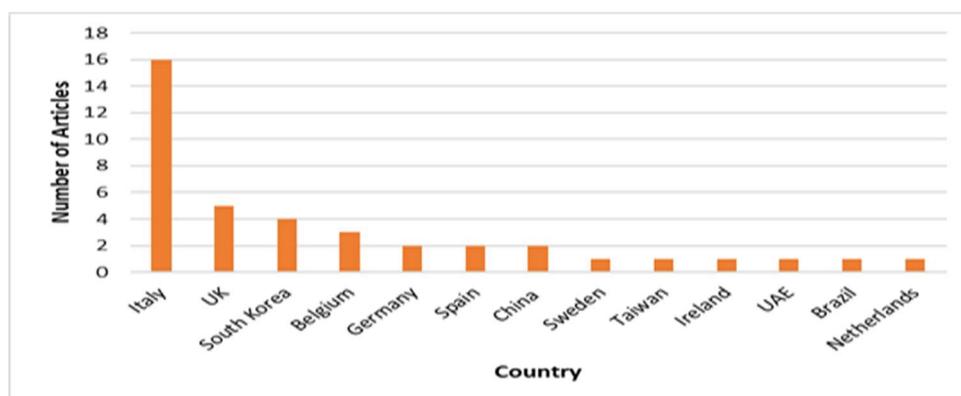


Figure 5. Number of articles on dynamic capabilities and innovation in SMEs by country

Source: JSTOR databases.

The minimum standard for paper selection for this study is thirty citations per article. Cavusgil and Knight (2015) is the most cited article with more than 410 citations in the selected field. Table 2 summarizes the ten most cited articles with author and year of publication.

Table 2. Journals, Articles, and number of citations

No.	Title of the articles	Authors	Journal	Cited by
1	The born global firm: An entrepreneurial and capabilities perspective on early and rapid internationalization	Cavusgil & Knight (2015)	Journal of International Business Studies	410
2	Innovation and internationalization through exports	Cassiman & Golovko (2011)	Journal of International Business Studies	296
3	Open innovation practices in SMEs and large enterprises	Spithoven <i>et al.</i> , (2013)	Small Business Economics	278
4	Open Innovation in SMEs: A Systematic Literature Review	Torchia & Calabrò (2019)	Journal of Enterprising Culture	214
5	Entrepreneurship and dynamic capabilities: how firm age and size affect the 'capability enhancement-SME performance' relationship	Arend (2014)	Small Business Economics	157
6	Firm Innovativeness and Export Performance: Environmental, Networking, and Structural Contingencies	Boso <i>et al.</i> , (2013)	Journal of International Marketing	149
7	DOES R&D OFFSHORING LEAD TO SME GROWTH? DIFFERENT GOVERNANCE MODES AND THE MEDIATING ROLE OF INNOVATION	Rodriguez & Nieto (2016)	Strategic Management Journal	91
8	On the path towards open innovation: Assessing the role of knowledge management capability and environmental dynamism in SMEs	Martinez-Conesa <i>et al.</i> , (2017)	Journal of Knowledge Management	78
9	SMEs strategic networks and innovative performance: a relational design and methodology for knowledge sharing	Vătămănescu <i>et al.</i> , (2020)	Journal of Knowledge Management	68
10	Entrepreneurs' creativity and firm innovation: the moderating role of entrepreneurial self-efficacy	Ahlin <i>et al.</i> , (2014)	Small Business Economics	60

Source: JSTOR databases.

To determine the research priorities in the current literature, the researcher identified four research directions. This section classifies the literature and identifies the primary research directions on SME dynamic capabilities and innovation.

4.1. Influence of internal factors on the development of dynamic capabilities and innovation

Inbound dynamic capabilities and innovation are continuously important and help tap external sources of knowledge so that they do not have to rely solely on their internal resources. At the same time, outbound dynamic capabilities and innovation are important to leverage ideas from external sources (Schoemaker et al., 2018). SMEs' internal sources serve as the backbone for dynamic capabilities and innovation. Arend (2014) emphasized the importance of leveraging externally acquired knowledge for dynamic capabilities and innovation in SMEs. They focused on capacity building through research centres at the inter-organizational level to achieve dynamic capabilities and innovation in firms.

Canhoto et al. (2021) discovered three dynamic capabilities for organizations to adopt leadership practices. These are reconfiguration, perception, and seizure. The reconfiguration capability refers to an organization's ability to respond effectively to rapid changes in a dynamic and turbulent market environment. Perceptual capability leads to continuous assessment and monitoring changes in a changing market environment. Perceptual capability is associated with an investment in innovative technology and is also related to additional assets and a willingness to seize current opportunities. Martinez-Conesa et al. (2017) claim that a changing environment provides good opportunities for companies to outperform their competitors. Therefore, companies should always be ready and respond quickly to changes in the market environment to benefit from a sustainable advantage.

Torchia & Calabrò (2019) stated that dynamic capabilities and innovation are important to respond to a dynamic and competitive market environment. In a changing market environment, internal and external resources and knowledge are essential. In addition, companies should overcome resource constraints by collaborating with other players and conducting research and development. However, internal management capacity and expertise are required to develop and utilize new external knowledge (Albors-Garrigós et al., 2011). Internal research and development are a critical component of a company's competitiveness. Internal research and development depend on the expertise of the research and development teams that perform the required activities. Government-funded research and development assistance can help develop dynamic capabilities and innovation in firms (Hakaki et al., 2020). Torchia & Calabrò (2019) find that organizational factors such as engagement-based HR practices positively influence dynamic capabilities and innovation.

Fabrizio et al. (2021) argue that companies with dynamic capabilities and innovation have more engaged R & D teams than companies with closed innovation. On the other hand, Albors-Garrigós et al. (2011) find that small firms are less likely to engage in R & D than medium-sized firms. The tendency of companies to use research collaborations depends precisely on the number of managers and research experts. In medium-sized companies, research collaboration depends on the number of managers (Albors-Garrigós et al., 2011).

The decision-making process in SMEs is usually centralized and made at the management level. Management has a significant influence on key strategic decisions, such as adopting dynamic capabilities and innovation strategies (Bogers et al., 2019). Boegers et al. (2019) pointed out the role of top management in advancing the organization. These

authors suggested that strategic leadership and good human resources play an essential role in promoting an organization's emotional capabilities and innovation. They also found that managers' entrepreneurial skills, academic background, and experience are related to implementing dynamic capabilities and innovation in organizations.

Ramirez-Portilla et al. (2017) identified different innovation approaches for companies: open, closed, and interactive. The authors grouped companies by their degree of openness, using breadth and depth as the two terms used by Janssen et al. (2018). The authors examined the internal and external (determinants) of the experimental groups. Braganza et al. (2017) discuss how Big Data can be used to create business opportunities and innovative solutions. Since Big Data comes from external sources, it represents an opportunity to maintain and improve dynamic capabilities and innovation effectiveness. Sharing knowledge, technology, and information also helps companies deal with the dynamic business environment, which is reflected in the company's innovation performance (Vătămănescu et al., 2020).

4.2. Influence of external factors on the development of dynamic capabilities and innovation

SMEs are good at developing inventions but cannot commercialize their products due to resource constraints (Cavusgil, Knight, 2015). SMEs rely on their dynamic capability and innovation to obtain and reconfigure resources to implement their strategies. Fabrizio et al. (2021) argue that SMEs collaborate with external partners to bring new products to market, while SMEs using closed innovation make incremental innovations to existing products. Companies use external resources to increase the flexibility of their functions, minimize risks, shorten the innovation timeframe, and minimize costs (Cavusgil, Knight, 2015). Dogbee et al. (2020) emphasize that companies should be careful in selecting practical innovation partners. Ko and Liu (2017) explore that an important driver of dynamic capabilities and innovation practices is identifying opportunities to strengthen firms' new technologies beyond their business. Sonntag and Vera (2018) emphasize the importance of dynamism, innovation capabilities, networks, intelligence, and barriers to understanding the advantages of emerging market firms.

It is helpful for companies to collaborate with external partners to develop innovative services and products (Spithoven, Vanhaverbeke, Roijakkers, 2013). Companies need to increase their competitiveness by collaborating with higher education institutions, research institutes, and businesses to bring technologies to market through dynamic capabilities and innovation (Fabrizio et al., 2021). According to Hakaki et al. (2020), contrary to previous findings, a collaboration between higher education institutions and industry is unnecessary for business dynamism and innovation development.

Battaglia and Neirotti's (2020) study suggests that technology acquisition is helpful in R & D collaboration for firms in manufacturing, services, and other sectors. Interacting with other firms to share information and gain work experience allows firms to benefit from knowledge outside the firm and develop dynamic and innovative capabilities (Cavusgil, Knight, 2015). Battaglia and Neirotti (2020) also analysed various collaborative activities related to dynamic capabilities and innovation and found that intra-firm R & D is positively associated with product and service innovation. Cassiman and Golovko (2011) found that vertical collaboration is associated with radical innovation, and horizontal collaboration within firms is associated with incremental innovation. Paradkar et al. (2015) claim that collaboration with large companies is the most effective way for start-ups to develop dynamic capabilities and innovation. Since large company start-ups operate

differently from small and medium enterprises, constrained by novelty and small size, SMEs should collaborate with their stakeholders, customers, and suppliers to find an innovative approach to overcome this problem. In this regard, leadership plays an essential role in understanding the dynamic capability and innovation process (Hutton et al., 2021). See Table 3 for the antecedents of dynamic capability and innovation in organizations.

Table 3. Antecedents of dynamic capability and innovation in the literature

Authors	Antecedents of dynamic capability and innovation
Braganza <i>et al.</i> (2017)	Resource management in big data initiatives: Process and dynamic capability
Tseng & Lee (2014)	The effect of knowledge management capability and dynamic capability on organizational performance
Martines-Conesa <i>et al.</i> (2017)	On the path towards open innovation: Assessing the role of knowledge management capability and environmental dynamism in SMEs
Vătămănescu <i>et al.</i> (2020)	SMEs strategic network and innovative performance: A relational design and methodology for knowledge sharing
Hakaki <i>et al.</i> (2020)	An optimized for innovation success in manufacturing SMEs
Spithoven <i>et al.</i> (2013)	Absorptive capacity
Canhoto <i>et al.</i> (2020)	Digital Strategy aligning in SMEs: A dynamic capability perspective
Sunday & Vera (2018)	Examining information and communication technology (ICT) adoption in SMEs: A dynamic capability approach
Teirlinck & Spithoven (2011)	Formal research and development management and research collaboration and research and development outsourcing in SMEs
Ko & Liu (2017)	Environmental Strategy and competitive advantage: The role of SMEs' dynamic capability

Source: JSTOR databases.

4.3. Barriers to dynamic capabilities and innovation

The literature on dynamic capabilities and innovation discusses how large companies integrate dynamic capabilities and innovation into their strategies and practices to innovate successfully. However, in the case of SMEs, this is unlikely to happen as they face various barriers to leveraging their resources. Table 4 shows some of the key barriers to dynamic capabilities and innovation in firms identified by the researcher.

Table 4. Barriers toward Dynamic Capability and Innovation

Authors	Lack of management academic background	Lack of experience	Lack of collaboration	Financial issues
Lin <i>et al.</i> (2016)	✓	✓	✓	✓
Vrontis <i>et al.</i> (2020)	✓		✓	✓
Cavusgil & Knight (2015)		✓	✓	✓

Source: JSTOR databases.

Four main barriers to dynamic capabilities and innovation were identified: lack of academic management background, lack of experience, collaboration, and financial issues. The barriers can help business leaders understand the factors considered barriers to dynamic capabilities and innovation to address the barriers (Lin et al., 2016). Since SMEs are different in size and performance from large enterprises, the nature of their problems

and barriers are also not the same. Small and medium enterprises face problems with a lack of infrastructure, qualified and experienced staff, a lack of up-to-date information, and limited financial resources (Cavusgil, Knight, 2015). Similarly, Vrontis et al. (2020) pointed out that lack of financial resources, skills and capabilities, management complexity, partner behaviour, and lack of infrastructure are barriers to implementing dynamic capabilities and innovations.

Companies in the Global North have mastered innovative pathways but still face various obstacles that hinder their innovation activities (De Silva et al., 2021). SMEs in the Global South contribute to economic growth and should not be neglected. DeSilva et al. (2021) suggest that countries address these issues by identifying new strategies and innovation centres that can work with external partners to promote innovative practices in SMEs.

4.4. The outcome of dynamic capability and innovation Studies

According to Cassiman and Golovko (2011), dynamic capabilities and innovation can improve the performance of large companies. Various studies on dynamism and innovation suggest that they are beneficial for large firms. However, various studies on SMEs also show a positive impact of dynamic capabilities and management activities on innovation performance. Du, Zhu, Li (2022) found that different dynamic capabilities and innovation activities lead to different performance outcomes for SMEs. According to their study, technology sourcing can influence radical innovation, while technology scouting is associated with innovation performance. Spithoven et al. (2013) also found that knowledge acquisition, a form of large dynamic capabilities and innovation, influences firm innovation performance. Väyrynen et al. (2017) identified different ways of knowledge scouting and described how companies use external sourcing to improve their dynamic capabilities and innovation implementation.

Start-up resource scarcity drives companies to choose dynamic capabilities and innovations to meet their strategic needs (Paradkar et al., 2015). In some cases, dynamic capabilities and innovative practices impact small and medium enterprises more than large enterprises (Cassiman, Golovko, 2011). Resource scarcity in medium and small firms can be used as an incentive factor to search for new knowledge (Spithoven et al., 2013). VU However (2020) argues that there is insufficient evidence that knowledge from external sources has a positive impact on the implementation of dynamic capabilities and innovations. Weerawardena and Mavondo (2011) found that few small and medium-sized enterprises succeed in developing dynamic capabilities and innovations compared to large companies.

Scuotto et al. (2017) argue that the role of social media in improving dynamic capabilities and innovation development in SMEs is crucial, confirming that receptivity and cognitive dimension contribute to building informal collaboration with external partners. Similarly, Veglio and Zucchella (2015) also emphasize the importance of strong connections between SMEs and their partners in developing their dynamic capabilities and innovation capacity.

Zacca and Dayan (2018) developed a model linking corporate strategy, dynamic capabilities, and innovation performance in small and medium-sized enterprises. They examined the influence of corporate strategy and its openness. Zacca and Dayan (2018) also identified how dynamic capabilities and innovation affect SME performance. Dogbee et al. (2020) found that openness contributes significantly to the dynamism and innovation performance of small and medium enterprises compared to large enterprises.

5. CONCLUSIONS

This study aims to present the role of dynamic capabilities and innovation in maintaining a competitive advantage for SMEs based on previous studies. This study is based on a literature review. Forty articles from JSTOR databases were selected for the study, and the research period is between 2011 and 2020: which was a primary selection criterion.

The first research question is answered by identifying the internal and external resources that small and medium enterprises need to build to improve their dynamic performance and innovation development. The importance of human resources for enterprises was discussed, and further study can establish a link between dynamic capabilities and innovation and the human resources of an enterprise to achieve its goals. The second research question was also answered by identifying four barriers to developing dynamic capabilities and innovation. These are lack of academic management knowledge, lack of management experience, lack of collaboration, and financial problems. The third research question answered those studies on dynamic capabilities and innovation that lead to the development of dynamic capabilities and the implementation of innovation in companies. Previous studies on dynamic capabilities and innovation suggest that they are beneficial for large companies. The studies found that different approaches to dynamic capabilities and innovation activities lead to different outcomes in SMEs' innovation performance.

Implication of the study

The results can be used by researchers conducting a study in related fields and by managers making decisions in SMEs. Governmental and non-governmental organizations can also use the results to develop policies and strategies. SMEs must strive to develop dynamic capabilities and constantly innovate to maintain and renew their competitive advantage. SMEs that operate internationally can leverage their competitive advantages to become more innovative. Research on dynamic capabilities and innovation has been conducted mainly in the global North. Therefore, future research can address the development of dynamic capabilities and innovation practices in SMEs in the Global South and identify the challenges involved and how to overcome them.

Research limitations

Many databases study the dynamic capabilities and innovation in SMEs in different periods. However, only the JSTOR database was used for study purposes within a limited period in this article. The second limitation of this study is that there are currently thousands of studies on dynamic capabilities and innovation. However, this study relies only on forty selected review articles.

Suggestions for future research directions

In this article, only the JSTOR database was used for study purposes. Future studies could use other databases that contribute to the development of dynamic and innovative activities of SMEs. Most studies on dynamic capabilities and innovation in SMEs have focused on the manufacturing and service sectors of industry. However, more attention should be paid to other sectors of industry. In addition, most studies on SMEs have been conducted in the global North, and SMEs in the global South should also be considered in future studies. In the future, longitudinal studies may reveal other perspectives on the process that may not have been considered before.

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MONETARY POLICY AND SMALL AND MEDIUM ENTERPRISES (SMEs) PERFORMANCE IN NIGERIA

The Small and Medium Enterprises (SMEs) have been known to play significant roles in promoting economic growth, employment generation and foreign exchange earnings among others, of both developed and developing economies. Monetary policy, on the other hand, includes actions and strategies employed by a central bank or monetary authority to control and regulate the money supply, interest rates, and credit conditions in an economy. This study therefore, examines how monetary policy affects the performance of SMEs in Nigeria based on the data covering the period from 1981–2020 using the Autoregressive Distributed Lag Model (ARDL). ARDL captures both long-run equilibrium relationships and short-term dynamics, allowing researchers to examine the interplay between variables over time. The study found that monetary policy has not been a potent tool for promoting the performance SMEs in Nigeria.

Keywords: Autoregressive Distributed Lag Model (ARDL), credit to SMEs, money supply, monetary policy, Small and Medium Scale Enterprises (SMEs).

1. INTRODUCTION

The report of World Bank (2022) estimated that 600 million jobs will be needed by year 2030 in order to absorb the growing global workforce, this makes SME development a high priority for many governments around the world. Generally, small and medium-sized enterprises (SMEs) play important roles due to its ability to contributing to economic output and employment generation vis a vis in the global economy due to the fact that SMEs are the most common types of businesses worldwide as they represent 90% of businesses and also contribute more than 50% of global employment opportunities. In emerging economies, registered SMEs contribute up to 40% of national income (GDP). However, these numbers are considerably higher when informal SMEs are included. In

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addition, the study of PwC Nigeria in 2020 reported that the SME sector is the lubricant oil to the wheel of economy in developed economies, as well as significant contributor to employment, economic and export growth. In South Africa, SMEs account for 91% of businesses, 60% of employment and contribute 52% of total GDP. In Nigeria, SMEs contribute 48% of national GDP, or about \$207.504 billion, account for 96% of businesses and 84% of employment. With a total number of about 17.4 million, they contribute 50% of industrial jobs and nearly 90% of the manufacturing sector, in terms of number of enterprises (PwC Nigeria, 2020).

In the case of Thailand Korwatanasaku and Paweenawa (2020) asserted that there were approximately 3 million companies considered SMEs, which accounted for 99.8% of the total number of companies, in 2018. Moreover, SMEs generate 14 million jobs, equal to 86% of the total employment. SMEs also contributed enormously to Thailand's gross domestic product (GDP) as they accounted for 45% of the national GDP, or around \$215 billion. In emerging markets, most formal jobs are generated by SMEs, which create 7 out of 10 jobs. However, access to finance has been identified as key constraint to SME growth, it is the second most cited difficulty facing SMEs in emerging markets and developing countries (Sanni, Oke, Alayande, 2020).

Monetary policy are specific actions taken by the Central Bank on behalf of the government to control the supply, value and cost of money in the economy with in order to achieve macroeconomic objectives. Intently, objective of monetary policy varies in different countries. The first view objective of monetary policy is to achieve price stability, whereas the second view seeks to achieve price stability and other macroeconomic objectives. However, Central Bank of Nigeria (CBN), comparable to any other Central Banks in developing countries, accomplish the objective of monetary policy through the amount of money supplied or circulation (CBN, 2006). Therefore, this alludes to the critical role of money supply as a major tool of monetary policy actions.

NTO Philips, Mbanasor, Osuala (2012) asserted that apart from various forms interventions, the CBN had been constantly reviewing monetary policy instruments such as cash reserve ratio (CRR) and liquidity ratio (LR) in other to ensure accessibility of credit and likewise enhance liquidity in the banking system which will trickledown increase in accessibility of credit to SMEs and therefore, lessen the crippling effect on the crises in Nigerian economy. Surprisingly, monetary policy action has not been consistent in promoting expected economic growth. For instance Onyeiwu (2012) revealed that only money supply had positive and significant impact on economic growth whereas, other variables like liquidity and cash reserve ratio are insignificant and their direction of influence are variance to expectation.

There are various factors that enhanced economic output and growth including the monetary policy. The CBN reported that the Nigerian economy maintained its recovery path in 2019, as real output grew by 2.3 per cent, compared with 1.9 per cent in 2018. This was partly accredited to increased capital inflows, that helped to stabilize the foreign exchange market; improved lending to the real sector, based on CBN's directive to Deposit Money Banks (DMBs) to maintain a minimum Loan-to-Deposit Ratio (LDR) of 60.0 per cent in July 2019 and 65.0 per cent by end-2019; and persistent involvements in the real sector by the Federal Government.

SMEs are less likely to be eligible to obtain bank loans like the large firms; rather, they mostly depend more on internal funds, or cash from friends and family, to launch and initially manage their enterprises. In line with these, the International Finance Corporation (IFC) estimates that 65 million firms, or 40% of formal micro, small and medium

enterprises (MSMEs) in developing countries, were unable to meet their financial needs estimated of \$5.2 trillion every year, which is equivalent to 1.4 times the current level of the global MSME lending. The study of World bank, (2022) reported that East Asia and Pacific accounts for the largest share (46%) of the total global finance gap and is followed by Latin America and the Caribbean (23%) and Europe and Central Asia (15%). The gap volume varies considerably from region to region. Latin America and the Caribbean and the Middle East and North Africa regions, in particular, have the highest proportion of the finance gap compared to potential demand, measured at 87% and 88%, respectively (World Bank, 2022).

However, in Nigeria the CBN (2021) as reported by nairametrics.com (2021) was worried at ₦617.3 billion financing gap for MSMEs for each year noting that only about 5% of the enterprises have access to adequate finance that cover their working capital and expansion demands. Although the CBN has several interventions to address the paucity of funding in the SME subsector yet it still appears to be a drop in the ocean, meanwhile commercial bank lending to SMEs continue to deteriorate as a percentage of total lending from 7.58% to 0.14% and 0.32% in 2000, 2010 and 2020 respectively. All these are outcomes of the monetary policy. It then puts a question on the extent to which monetary policy has aided or affected the SME's in Nigeria.

Osinubi (2005) notes that one essential objective of monetary policy is to stabilize the economy, that is, it should manage the economy during recession and inflation period. However, this appears not to have been the case in Nigeria as indicated by available evidence. He confirmed the notion that monetary policy affects its ultimate target after a lag, which is both long and variable. It is therefore imperative that we really understand how the monetary policy affects the performance of SMEs in Nigeria. Against this background, this study addresses two research questions that highlight the relationship between SMEs and monetary policy in Nigeria. Firstly, how does the access to credit affect the performance of SMEs? Secondly, how does money supply affect SMEs output in Nigeria?

This paper is divided into five sections. Section 2, contains the literature review, and the methodology is presented in section 3. The results and discussion are featured in section 4 while section 5 concludes the study.

2. LITERATURE REVIEW

2.1. Theoretical Review

Monetary policy refers to the actions and strategies employed by a central bank or monetary authority to control and regulate the money supply, interest rates, and credit conditions in an economy. The primary goal of monetary policy is to achieve and maintain price stability, promote sustainable economic growth, and ensure the stability of the financial system. The Central Bank of Nigeria (CBN) is the federal government agency saddled with the obligation of making and implementing monetary policy in Nigeria. The Nigerian monetary policy is the set of tools adopted by the CBN to achieve its goals. The necessity to control money supply is based on the existing knowledge that there is a stable connection between the quantity of money supply and economic activity and that if its supply is not limited to what is required to support productive activities; it will result in undesirable effects such as high prices or inflation (CBN, 2006). This position derives from the quantity theory of money which posits that the general price level of good and services is directly proportional to the amount of money in circulation or money supply in an

economy. Although the Keynesians challenge this position arguing that economic policies targeted at influencing money supply should be the best way to address economic growth. Available evidence tends to support the idea that the practice in Nigeria appears to be on the monetarists' side.

The central bank uses money supply to control economic activities and credit creation by adjusting tools like the bank rate or discount rate, cash reserve requirement and liquidity ratio. If the central bank wishes to stimulate economic activities, it adjusts its various monetary policy tools in a direction that will enhance credit expansion capacity of commercial banks. It will for instance reduce its rediscount rate that is the rate at which it provides credit to banks (Monetary Policy Rate), lower liquidity ratio and cash reserve ratio if an expansionary policy is pursued and vice versa.

Monetarists hold the view that changes in the level of money supply have a direct influence aggregate expenditure and thus national income (Jhingan, 2010). Thus, the level of income can be influenced by adjusting the growth rate and level of money supply in the economy. The direction of such can be achieved through monetary policy tools such as cash reserve ratio, liquidity ratio, interest rate. The manifestation of these ratios depends on whether government intends to pursue an expansionary or contractionary monetary policy, such that increase in money supply tends to increase aggregate consumption and national income and vice versa. Therefore, growth in money supply theoretically should increase the output of SME'S and their contribution to the national output.

The Keynesians, however have argued that monetary policy may not be effective in stimulating aggregate demands / expenditure because demand for money is high interest elastic, as a small fall in interest rate will induce people to sell securities (since it's price is now high under an expansionary policy) and hold more money. Hence according to Keynesians an expansionary policy is not successful in raising the aggregate expenditure and income much (Jhingan, 2010)

Jhingan (2010) noted that though monetarists have built their arguments on empirical findings but they are equally skeptical as to the efficiency their proposition. He argued that using, money supply as economic stabilizer, monetary policy may do more harm than good because of the operations lag. On the average it takes a long time for a change in the supply of money to affect national income. This position has been confirmed in Nigeria by Osinubi (2005) that monetary policy outcome exhibit a long lag and can mean that monetary policy does the opposite of what it is expected to do, that is, it may stimulate the economy when it is over heated and dampen it when it is recession, in effect making things worse rather than better.

According to Friedman (1968) popularized the monetary policy, Jhingan (2010) reported that Friedman, agrees that if the operations lag is long and countercyclical, monetary policy may in fact have a destabilizing effect on the economy. The monetarist therefore, hold that the economy itself is on a stable path in the long run, hence they advocate for an annual fixed percentage growth in the supply of money and an end to discretion in monetary policy.

As argued, the Keynesians do not deny that money matters but via changes in interest rate. They posit that that monetary policy will be ineffective during depression and advocate the use of fiscal policy. They observe that a combination of fiscal and monetary policy will be more effective in driving national income. Following the line of the Central Bank of Nigeria, this paper examines the role of monetary policy in promoting SMEs output in Nigeria in line with the quantity theory of money as advocated by the monetarists. Thus, we examine how money supply and credit to the SMEs sector influence the output and performance of that sector.

2.2. Empirical Review

Osinubi (2005) appraised the implications of lags in the effects of monetary policy in Nigeria using quarterly data covering the period 1986 to 1998. One important aim of monetary policy is that of stabilizing the economy, that is, it should stimulate the economy in recession and dampen it in periods of inflation. The existence of a long lag can mean that monetary policy does the opposite of what it is expected. The problem of lag is further made difficult by the fact that the lag can be variable meaning that it can be of uncertain length. It is in this respect that the study empirically evaluates the lags in the effect of monetary policy in Nigeria using monetary growth model of aggregate demand. The results of the study confirmed the notion that monetary policy affects its ultimate target after a lag, which is both long and variable. The existence of a long and variable lag suggests that government monetary policy should not attempt to be actively anti-cyclical but should behave in a manner that is cyclically neutral. Also, since monetary transmission mechanism plays a major role as far as the timing of monetary policy is concerned and so because of its important role, government should put in place more efficient financial structures to ensure that the transmission mechanisms is hitch free.

Okay (2010) examines the impact of monetary policy instruments on the economic development in Nigeria during the period 1980–2006. With the aid of the t-ratio, the study revealed that only two out of the six selected explanatory variables exert a significant impact on the level of economic development in Nigeria between the study periods (pre-and-post deregulation). The study therefore, concludes that with the insignificant nature of most of the variables, policy formulation and implementation inconsistencies appear to hinder the full impact of monetary policy on the economy and therefore, should be critically watched.

However, the outcome of the study by Okay (2010) tends to suggest that there might not have been much difference in the economic policy of Nigeria over the years as he could only find significant difference in the outcomes treasury bill and treasury certificates pre and post deregulation of monetary policy whereas, no significant difference was found in the case of money supply, certificate of deposit, commercial papers and bankers' certificate. This puts a question on the effectiveness of monetary policy in Nigeria.

NTO Philips, Mbanasor, and Osuala (2012) examined the influence of monetary policy variables on loan supply to SMEs in Nigeria using quarterly data from the Central Bank of Nigeria (CBN) Statistical Bulletin and financial statements for five commercial banks. The data covered the period of 1995–2010 and were analyzed using Fully Modified Least Squares (FMOLS). Following the above procedures, the dependent variable (credit supply to SMEs) was expressed as a function of cash reserve ratio; liquidity ratio, interest rate on deposit and lending rate of banks in Nigeria. The study found that interest rate on deposit and lending rate has negative and positive and significant influence respectively on amount of credit supplied to SMEs. However, cash reserve ratio and liquidity ratio have positive but insignificant influence on credit to the SME sector in Nigeria. Their study thus implies that deposit interest and lending rates are the principal drivers of lending to the SMEs with implications on their final output. The study noted that this finding is contrary to the result of Rahji and Apatá (2012) who found that interest rate was positively and significantly related to credit supply to SMEs under the Small and Medium Enterprises Equity Investment Scheme in Nigeria.

Onyeiwu (2012) examines the impact of monetary policy on the Nigerian economy using the ordinary least squares method from 1981 to 2008. The result shows that monetary

policy represented by money supply exerts a positive and significant impact on GDP growth and balance of payment but negative impact on rate of inflation. The study thus, recommends that monetary policy should facilitate a favourable investment climate through appropriate interest rates, exchange rate and liquidity management mechanism and the money market should provide more financial instruments that satisfy the requirement of the ever-growing sophistication of operators.

Although the study reveals that while liquidity ratio, cash reserve ratio have negative and money supply has a positive impact on inflation, none of these variables is significant. This would imply that it may be futile relying on these instruments for curtailing rising price level in Nigeria.

Ayuba and Zubair (2015) examines the impact of banking sector credit on the growth of small and medium enterprises in Nigeria based on annual data between 1985 and 2010. The regression results show that credit to SMEs as a fraction of total loans has positive but insignificant impact on SME growth in Nigeria. Major macro-economic variables of growth such as inflation, exchange rate, were also not found to have had any significant impact on SME sector. Invariably, the volume of credit advanced to the SMEs sector over the years cannot be said to have been able to drive any significant growth in that sector of the Nigerian economy.

In their analysis of the role of monetary policy on Nigerian economy, Akinjare, Babajide, Isibor, and Okahon (2016) used Nigerian data from 1979 to 2013 and adopting the multiple linear regression technique based on the ordinary least squares. The study reveals that monetary policy variables of money supply, exchange rate and interest rate, except inflation have significant effect on economic development in Nigeria. In addition only exchange rate and inflation exert negative impact while the rest are positively related. Notwithstanding that the study was to evaluate the role of monetary policy on economic development, it advocates that money supply should be kept at a level consistent with economic development, and low interest rate should be charged on loans to SMEs in order to drive SMEs which will in turn reduce unemployment, crime and other social vices, thus pushing the economy to grow and develop.

Mjujahid, Begam and Nagis (2019) reports the submissions of various authors on the SMEs-growth nexus thus: (i) Carree, Van Stel, Thurik, and Wennekers (2002) confirmed direct and positive association between growth of the economy and entrepreneurial activities of SMEs. (ii) Somoye (2013) investigated the consequences of SMEs financing on the economic progress of Nigeria while using endogenous development system. The outcome is in favor of the argument that financial accessibility, real GDP, unemployment and industrial efficiency were acute factors to surge the growth of SMEs sector and (iii) Onakoya, Fasanya, and Abdulrahman (2013) observed the effect of finance availability on SMEs using quarterly series for the period of 1992–2009. The outcomes demonstrated performance of SMEs was subjected to the credit accessibility through operational loan facilities.

Sanni, Oke, and Alayande (2020) examines the effect of deposit money banks credit accessibility on SMEs performance in Kwara State, Nigeria. The population of the study consists of three hundred and eighty-two (382) respondents and one hundred and ninety-eight (198) were randomly selected as the sample size of the study. Data were drawn from the primary source to elicit responses from SME owners/managers. Descriptive statistics and Partial Least Squares – Structural Equation Model (PLS-SEM) estimation techniques were employed to analyse the data collected. The study revealed that deposit money banks credit accessibility has a positive significant effect on SME performance and credit related

charges (interest) also has a positive significant effect on SME performance. This implies that provision of finance by deposit money banks at relatively low cost plays an important role in boosting the performance of SMEs.

PwC Nigeria (2020) in one of its surveys provides insights into a range of issues concerning SMEs in Nigeria, and the challenges impacting business growth, particularly financing, taxation issues; and other factors - through the eyes of their CEO's. The survey reported that while the SMEs sector has witnessed significant growth it still faces a lot of challenges hindering the growth and development of the sector. Such hinderances have been attributed to challenge associated with factors like unequal access to finance, lack of skilled manpower, multiplicity of taxes and high cost of doing business. It further reported that according to the Nigeria Bureau of Statistics, small and medium scale enterprises (SMEs) in Nigeria have contributed about 48% of the national GDP in the last five years. With a total number of about 17.4 million, they account for about 50% of industrial jobs and nearly 90% of the manufacturing sector, in terms of number of enterprises.

SMEs are therefore affected by the monetary policy environment however, the depth of the impact of monetary policy tool varies and likewise the direction of such influence. These inconsistencies in the role of monetary policy further necessitate the need to further examine the impact of monetary policy on performance of SMEs in Nigeria. Therefore, compared to previous authors review the uniqueness of this research lies in using a macroeconomic and econometric means to understand the influence short- and long-run lag of the variables using Auto Regressive and Distributed Lag (ARDL) It is an econometric model used for analyzing the long-run and short-run relationships between variables, particularly in the context of time series data. The ARDL model is designed to handle situations where the variables may have different orders of integration, such as when some variables are stationary (integrated of order zero) and others are non-stationary (integrated of order one or higher).

3. METHODOLOGY

The study adopted *ex post facto* research design sourcing secondary data from the Central Bank of Nigeria Statistical Bulletin from 1981-2020 covering a period of 40 years. The model is anchored on the quantity theory of money as postulated by the monetarist that the changes in the level of money supply and the level of money supply have direct influence on aggregate expenditure and national income. This has been operationalized by evaluating the output/ SMEs gross domestic product as a function of monetary policy variables. The study also employs the descriptive statistics to provide a better understanding of the behaviour of each of the variables at the level of univariate analysis using the mean, standard deviation, and coefficient of variation of the variables among others.

3.1. Model Specification

The research model is specified as follows:

$$MSE_{gap} = f(MS_t, CRsme, INT, INF) \quad (1)$$

Equation 1 is specified as an econometric model to aid estimation and presented in equation 2 as follows:

$$MSE_{gap} = \beta_0 + \beta_1 CRsme + \beta_2 INT + \beta_3 MS_t + \beta_4 INF + \varepsilon \dots \quad (2)$$

Where:

MSE_{gdp} – Output of SMEs in term of gross domestic product,

CR_{sme} – Bank credit to the SME sector,

INT – Interest rate on lending,

MS – Broad money supply (M2),

INF – Inflation rate,

A priori expectations – $\beta_1, \beta_3, \beta_4 > 0$ and $\beta_2 < 0$.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The descriptive statistical analysis results are presented in Table 1 and explained subsequently.

Table 1. Descriptive Statistical Analysis (1981–2020)

	SME GDP (₦' billion)	CREDIT TO SME (₦' billion)	INTERE ST RATE (%)	MONEY SUPPLY (₦' billion)	INFLATIO N RATE (%)
Mean	21,971.32	1,275.784	17.45425	7,321.040	18.97425
Median	4434.116	222.5300	17.53000	1073.890	12.55000
Maximum	93386.74	6296.290	29.80000	36014.88	72.84000
Minimum	64.19135	4.690000	7.750000	14.47000	5.380000
Std. Dev.	29139.16	1833.500	4.603288	10834.10	16.87954
Coefficient of Variation	1.3262	1.4372	0.2637	1.4799	0.8896
Skewness	1.167943	1.280569	0.237935	1.385651	1.823907
Kurtosis	3.022324	3.283685	3.618886	3.604644	5.157950
Jarque-Bera	9.094776	11.06651	1.015789	13.40951	29.93883
Probability	0.010595	0.003953	0.601761	0.001225	0.000000
Sum	878852.8	51031.37	698.1700	292841.6	758.9700
Sum Sq. Dev.	3.31E+10	1.31E+08	826.4200	4.58E+09	11111.84
Observations	40	40	40	40	40

Source: Authors' computations.

The descriptive statistical analysis results cover the data for the period between 1981 and 2020. It shows that the mean value of SME output (GDP) is ₦ 21,971.32 billion per annum but the output has not been stable over the years as indicated by the high standard deviation of ₦29,139.16. This is better understood based on the coefficient of variation of 1.326 indicating the level of variability in the performance of SMEs lacking capacity to withstand vagaries of the economic environment. It also further provides an insight into the level of risk associated with small businesses due to factors like small size, low capital, unequal capacity to compete with large firms, limited access to resources, like capital, skilled and experienced manpower among others. This is an industry that needs special support given its pervasiveness in the Nigerian economic landscape yet struggling to

survive despite the strategic position it occupies in the Nigerian economy in terms of employment generation among others.

The average credit to the SMEs was ₦1,275.784 billion per annum during the period but highly unstable as indicated by the high coefficient of variation of 1.437. A similar pattern was observed in the case of money supply with average annual money supply of ₦7,231.040 billion and coefficient of variation of 1.480. These patterns are generally unsupportive of adequate planning given the high degree of variability in the key monetary policy variables like money supply and credit to SMEs.

The mean interest rate was 17.45% while inflation rate averaged 18.97% per annum although both have been relatively more stable than the other variables. It is, however, important to note that an average annual borrowing rate of 17.45% can be considered too high for SMEs given the high cost of doing business in Nigeria and worst still when they have to operate in an environment where prices increase at the rate of 18.97% per annum and exchange rate of Naira/US dollar has deteriorated abysmally over the years. For instance, the exchange rate of was N109.55/\$1.0, N148.81/\$1.0 and N307/\$1.0 in 2000, 2010 and 2020 respectively. This implies a depreciation of the naira by 35.83% between 2000 and 2010 and 106.30 % between 2010 and 2020. By implication the naira has depreciated on the average by 10.63% per annum in the last one decade. This type of environment is obviously too inclement for the survival of an average SME in Nigeria which further explains the high level of variabilities in their aggregate gross domestic product output as earlier explained. For instance, Oladimeji, Sofoluwe and Oduanaya (2021) found that inflation, and exchange rate from 1985 to 2019 have negatively affected the growth of MSEs in Nigeria.

4.2. Test for Stationarity

As part of the initial diagnostic tests, we conducted the test for stationarity of the series to determine whether they contain unit root or otherwise. This is important in determining the most appropriate estimation technique in line with Granger and Newbold (1974) that series that are non-stationary series will generate spurious regression results if the ordinary least squares technique is adopted on them. This study thus, examines the nature of stationarity of each variable using the Augmented Dickey-Fuller (ADF) unit root test and the result is presented in Table 2. The ADF tests the null hypothesis that a series is I(1), that is, contains unit root(non-stationary) against the alternative that it does not(stationary). The null is thus accepted if the calculated t-statistics is less than the critical value, thus concluding that such a series contains unit root and it is not stationary.

Table 2. Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	Level			First Difference			Stationarity
	Statistics	Prob.	Critical Value	Statistics	Prob.	Critical Value	
SME Performance	-1.5441	0.5011	-2.9389	-4.0279	0.0034	-2.9411	I(1)
Credit to SME	-0.5983	0.8595	-2.9389	-6.6742	0.0000	-2.9411	I(1)
Interest Rate	-3.4815	0.0139	-2.9389				I(0)
Money Supply	-0.9153	0.7728	-2.9389	-4.0120	0.0035	-2.9411	I(1)
Inflation Rate	-3.4466	0.0151	-2.9389				I(0)

Source: Authors' Computation (2022) Using E-views 10.

It reveals that interest rate, and inflation are stationary at the level $I(0)$, as the t -values (absolute) are higher than the corresponding critical values. Contrarily, SME performance, credit to SME and money supply are integrated $I(1)$ as obtained statistical values (t -value) are less than the corresponding critical values at the level. This implies that series like SME performance, credit to SME and money supply having unit root exhibit strong upward or downward movements over time with no tendency to revert to a fixed mean. This has implications on how such variables are modeled in making predictions.

Having established the unit root test, the mixed stationarity of the series compels the use of Autoregressive Distributive Lag (ARDL) Error Correction Regression in estimating the influence of the specified variables on SME performance in Nigeria. The Johansen cointegration test cannot be applied directly if variables of interest are of mixed order of integration or all of them are not non-stationary, as this method requires all the variables to be $I(1)$ (Shrestha, Bhatta, 2018).

4.3. Regression Results

Shrestha & Bhatta (2018) posits that dynamic error correction model (ECM) can be derived from ARDL through a simple linear transformation. Likewise, the ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information and avoids problems such as spurious relationship resulting from non-stationary time series data. Relying on this, we present the long and short run dynamics of the influence of monetary policy on SME performance based on the ARDL estimation technique in Table 3 as specified in equation 2.

Table 3. ARDL Error Correction Regression

Dependent Variable: D(SME PERFORMANCE)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SME PERFORMANCE(-1))	-0.1179	0.1931	-0.6106	0.5474
D(CREDIT TO SME)	-0.0257	0.0790	-0.3258	0.7475
D(CREDIT TO SME(-1))	0.0150	0.0962	0.1560	0.8774
D(INTEREST RATE)	0.2480**	0.0909	2.7272	0.0120
D(INTEREST RATE(-1))	0.0978	0.0808	1.2101	0.2385
D(MONEY SUPPLY)	0.0650	0.1843	0.3528	0.7274
D(MONEY SUPPLY(-1))	0.0705	0.2307	0.3058	0.7624
D(INFLATION RATE)	0.0860**	0.0331	2.5957	0.0162
D(INFLATION RATE(-1))	-0.0135	0.0287	-0.4717	0.6416
CointEq(-1)*	-0.0108*	0.0028	3.8662	0.0008
R-squared	0.6556	Mean dependent var		0.0830
Adjusted R-squared	0.5450	S.D. dependent var		0.0606
S.E. of regression	0.0409	Akaike info criterion		-3.3333
Sum squared resid	0.0468	Schwarz criterion		-2.9024
Log likelihood	73.3345	Hannan-Quinn criter.		-3.1800
Durbin-Watson stat	1.90337			

N.B : * ; ** significant at 1% and 5%

Source: Authors' Computation (2022) Using E-views 10.

The regression result reveals that the model speed of adjustment (ECM) value of -0.0108 is correctly signed and statistically significant at 95% confidence level. The variables such as interest rate and money supply exert positive influence on SME performance both in their current and one-year lag period. While contemporaneous inflation rate has positive and significant influence on SME performance, lagged inflation rate depletes the performance of SMEs though not significant. Current loan to SMEs has negative while its lagged value has positive but insignificant influence on SME performance. Meanwhile, Ayuba and Subair (2015) found that credit to SMEs has positive but insignificant influence on SMEs' growth in Nigeria, thus exhibiting inconsistency.

The dynamics of variations in the influence of current and lagged monetary policy tools is in line with the findings of Osinubi (2005) consequent upon which he posits that the existence of a long and variable lag suggests that government monetary policy should not attempt to be actively anti-cyclical but should behave in a manner that is cyclically neutral. Also since monetary transmission mechanism plays a major role as far as the timing of monetary policy is concerned.

It is also surprising that money supply and credit to SME have not been able to aid SMEs performance in Nigeria. The implication is that these variables cannot be considered as any form of effective monetary policy tools in boosting performance of SMEs in Nigeria, whereas interest rate and inflation rate can be considered as more potent monetary policy tools. Contrary to expectation interest rate is positively related to performance of SMEs which may be a pointer to the challenges that SMEs that have been starved of fund no longer care about borrowing cost but are more concerned about access to borrowing; and strive to expand their operations and sales volume while managing costs more efficiently in other areas to cover for high cost of borrowing.

The coefficient of determination value (R^2) of 0.6556 indicates that the model adopted in this study explained about 65.56% variation in SME's performance in Nigeria. The Durbin-Watson statistics value of 1.9033 indicates the absence of autocorrelation in the patterns of data used in this analysis. The values of the various information criteria are within range, and they lend credence to the model quality in terms of closeness of fit and numbers of parameters.

5. SUMMARY AND CONCLUSION

The small and medium size enterprises play a key role in the global economy contributing between 40–60% of the gross domestic products of many countries. In Nigeria SMEs contribute 48% of national GDP, account for 96% of businesses and 84% of employment and they are about a total of 17.4 million in number. Despite the significance of MSEs in the Nigerian economy, yet they face a myriad of challenges despite all government's efforts at tackling such challenges ranging from political, macroeconomic, and monetary policy environment. Thus, we examine the role of monetary policy on the performance of SMEs in Nigeria from 1981 to 2020 using data obtained from the CBN Statistical Bulletin. The study tested the time series properties of the variables employed which confirmed that they exhibit mixed stationarity thus we employed the Autoregressive Distributed Lag (ARDL) model to examine the long run relationship between monetary policy and SME output.

The study found that monetary policy proxied by money supply although has positive impact on SMEs output, its impact is insignificant. Likewise loans to SMEs plays no significant role in enhancing SMEs' output in Nigeria and its effect is even negative in

current period but positive at one-year lag. In fact, the outcome of monetary policy on SME output has been counterproductive as factors like loans to SMEs affects SMEs negatively while interest rate has positive effect.

However, an important lesson from this study stems from the finding that loans to SMEs has negative influence in the current period but positive at one-year lag on SMEs performance. We infer that although the variable is not significant in both periods, it may imply that the benefits of loans granted to SMEs are delayed and not derivable in the immediate sense. Therefore, for SMEs to benefit maximally from bank credits a consideration of at least one year moratorium and other incentives should be given very serious attention by the banks and the CBN. Medium to short term loans will be more beneficial for boosting the performance of SMEs in Nigeria while bank overdrafts or short term loans may appear generally counterproductive.

The study concludes that monetary policy does not appear to be a potent tool for boosting SMEs performance in Nigeria. It therefore, recommends that the CBN should continue to impress on banks to increase lending to SMEs under more favourable terms (moratorium, interest rate, tenor etc.) and the CBN should continue with its interventions in the SMEs sector. We further recommend that SMEDAN should expedite actions on floating its proposed microfinance bank which is expected to appreciate the peculiarities of the SMEs better than the conventional banks and design more favourable credit packages/products that would accommodate their challenges and promote their performance. The inability of monetary policy to drive performance of SMEs in Nigeria in the desired direction suggests that there may be need for the CBN to look further into its monetary policy and its applications with special attention to SMEs. A suitable and well-balanced combination of fiscal and monetary policy tool may also be an option to consider arising from the inadequacy of monetary policy to drive SMEs performance in Nigeria such that the sector can contribute optimally to the growth and development of Nigeria.

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LAND RESOURCES MANAGEMENT ACCORDING TO AGRARIAN LAND ZONING

Management of land resources as a state system of measures is aimed at providing the population with food and other branches of the national economy with raw materials at the optimal level of capital investments in resources and their maximum return under the conditions of compliance with environmental goals and programs to ensure the norms and requirements of the rational use of land by agricultural enterprises with the aim of obtaining an ecologically clean plant and animal products while preserving natural resources. It is proposed to manage land resources of agricultural enterprises based on indicators of agricultural zoning, which provides information on zoned crops and types of crop rotation that are most suitable for growing on the territory of a specific agricultural enterprise, the implementation of technological measures for the use and protection of land, the level of influence of these measures on productivity and efficiency land use by an agricultural enterprise.

Keywords: land management, land zoning, agricultural zones, agricultural enterprise.

1. INTRODUCTION

Management of land resources as a state system of interconnected, legal, technical-economic, organizational-economic, technological measures of the state in market conditions, aimed at regulating land relations, organizing a rational, efficient and ecologically stable territorial unit at the appropriate levels on the basis of sustainable development.

The science of management is based on the works of F. Taylor (1991), F. Gilbreth, L. Gilbreth and G. Gantt The instability of the market capitalist economy and the need for government intervention in management was first proved by J. Keynes (2012).

Great merit in the development of scientific directions and ideas of humanizing production management belongs to R. Owen (1950), who practiced the introduction of socio-psychological management methods unknown at the time.

D. Ricardo paid considerable attention to issues of management in the conditions of industrialization – distribution of the value of goods between different classes of society, coordination and organization of production control at the enterprise (Ricardo, 1971).

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A. Smith (2007) analyzed the duties of the state and the individual. He believed that the state should ensure the safety of a person's life and property, resolve disputes, ensure compliance with rules, perform other functions that an individual is unable to perform independently or does so ineffectively.

For the first time, management functions (planning – forecasting – scientific prediction of the development of the national economy) were formulated by A. Fayol (1991).

Modern domestic scientists paid considerable attention to the management of land resources in Ukraine.

Such scientists as A.P. Verveiko (2001) and H.Y. Horokhov (1984) were engaged in studies of the issue of territory organization and management of land resources of agricultural enterprises using land management methods.

Methodological principles of economic and ecological management of land resources are investigated by A.Y. Sohnych (2018). Organizational and economic aspects of land resource management are studied by V.V. Horlachuk (2019).

The characteristics of economic management methods, which represent methods of achieving economic goals based on the implementation of the requirements of economic laws that apply to modern land ownership and land use, are explored in his works by A.M. Tretyak (2020).

A. Martyn (2018) proved in his research that economic methods of management are more flexible and respond faster to changes in social needs.

D.S. Dobriak (2016) paid attention to the ecologically safe use of agricultural land in the management of land resources.

The issue of land zoning as a component of land resource management, allocation of units of natural-agricultural zoning, establishment of their boundaries, classification features, development of schemes of natural-agricultural zoning of the territory of Ukraine was studied by such scientists as O. Kanash (2007), H.K. Loik (2011), B.S. Nosko (1985), S.O. Osypchuk (2011), B.M. Chepkov (1985) and others.

2. METHODOLOGY, MATERIALS AND METHODS

The methodological basis of the study is a dialectical method of cognition and a systematic approach to the analysis of the problems of the development of ecological and economic management of land resources of agricultural enterprises in the conditions of zoning. The theoretical basis of the study was made up of the scientific works of domestic and foreign scientists on the issues of land resource management, formation and development of agricultural enterprises in the conditions of zoning.

The following methods were used in the research process: historical-evolutionary (the theory of zoning in development and as a separate scientific field), abstract-logical (theoretical generalizations and formulation of conclusions), calculation-constructive (determining the optimal ratio of land plots for administrative regions), comparative and other generally accepted methods and modern economic and statistical techniques.

The purpose of the article is to substantiate the theoretical provisions of agrarian land zoning and to characterize its classification features. The task is the formation of agricultural zoning and taking into account its provisions in the management of land resources of agricultural enterprises.

The object of the study is the process of economic and ecological management of land resources of agricultural enterprises through the land zoning system. The subject of the study is theoretical, methodical and applied aspects of agrarian land zoning.

3. RESULTS AND DISCUSSION

Land zoning is carried out in the context of the management of land resources of agricultural enterprises on the territory of the object, according to which the sign of zoning is identified or manifested within the administrative-territorial unit, under the influence of the land resources management system while ensuring the use of land in accordance with their intended purpose. Land zoning should establish the presence or absence of restrictions on the use of a specific land plot, taking into account its location within a certain zone; restriction of the rights of land owners and land users. These restrictions should relate to spatial characteristics, the formation of the type of agricultural enterprise, the system of soil cultivation, restrictions on the location and cultivation of certain agricultural crops, types of crop rotation, etc.

Land zoning is the establishment, allocation and unification of homogeneous territories and land massifs in accordance with defined properties, which are established in accordance with the assigned task, the category of land, existing restrictions on the use of land resources and the type of land use.

In the USA, Germany, France, land zoning has been introduced into the legal field. Information on land zoning is open, and an entrepreneur or investor can get all of it about existing restrictions and risks in certain zones. The experience of the Russian Federation, which has already introduced certain types of land zoning, shows the perspective and effectiveness of this measure. It is obvious that this direction is also acceptable for the conditions of Ukraine.

In order to improve land use planning, form a land use regime and improve the effectiveness of land relations regulation, in accordance with the draft Law of Ukraine "On Land Zoning", types of land use are distinguished, one of which is agricultural.

Accordingly, there is a need to allocate a separate sectoral zoning for the agricultural type of land use – agricultural zoning, which is applicable to agricultural enterprises.

Land zoning as a direction of the State Land Cadastre is recorded in the Law of Ukraine "On the State Land Cadastre" (Article 17). Attempts to apply land zoning were made in accordance with the Law of Ukraine "On the General Planning Scheme of the Territory of Ukraine" with the aim of creating a full-fledged living environment and favorable conditions for the development of the economy, according to the provisions of which agricultural zones are allocated.

Zone boundaries are specified in the process of territory planning at the regional and local levels and are determined in accordance with the procedure established by law.

Land zoning is carried out on the territory of the council, where the interests of territorial communities and executive authorities are coordinated.

Natural and ecological conditions have a significant influence on the development of the economy in agriculture. There are six natural and economic zones on the territory of Ukraine: Polyssia, Forest Steppe, Northern and Central Steppe, Southern Steppe, foothills and mountain areas of Crimea, foothills and mountain areas of the Carpathians. Each of them has its own characteristics and differs in the sectoral structure of agriculture.

The natural and economic zoning of lands affects the concentration of means of production, land and labor resources in order to increase the output of products in specialized enterprises and associations – the concentration of agricultural production.

In order to provide more accurate recommendations to agricultural producers, it is necessary to take into account the indicators of ecological zoning – the division of the territory according to the intensity of use into 3 ecological and technological groups (ETG).

Such a division helps to use agricultural land differently, makes it possible to move from a rectangular organization of the territory to a contour one, provides information on the optimal ratio in crop rotations of row crops and continuous sowing, depending on the potential danger of the manifestation of erosion processes, intensive and biological agriculture.

The basis of zoning of agricultural lands is natural-agricultural zoning – the division of the territory of Ukraine and individual regions, taking into account the natural conditions and agrobiological requirements of agricultural plants.

As a result of carrying out research work in several stages, 5 natural-agricultural zones and 2 mountain regions, 19 natural-agricultural provinces, 33 natural-agricultural districts, including 1 sub-district, and 222 natural-agricultural districts. Each natural-agricultural taxon has a developed ecological-economic characteristic according to the indicators given in Table 1.

Table 1. Indicators of ecological and economic characteristics of natural and agricultural taxa of Ukraine

No.	Indicator	Basic elements, that characterize the indicator
1	Climate (multi-year averages)	a) distribution of precipitation by month and year; b) minimum and maximum amounts of annual precipitation; c) average annual air temperature; d) the sum of active temperatures (above + 10 degrees C); e) hydrothermal coefficient according to Selyaninov (GTK); f) duration of the growing season; g) reserves of productive moisture in the soil at the beginning of the growing season; h) the number of dry days.
2	Geomorphology, relief and hydrology	a) belonging of the territory to certain geomorphological regions and their characteristic features; b) the main types of relief, their ratio, dismemberment and drainage of the surface; c) surface waters (river network); d) groundwater (the depth of occurrence according to relief elements and mineralization).
3	Soil cover	a) areas and specific weight of agricultural soil groups; b) the main properties and indicators of soils (humus – content, profile depth; content of physical clay and silt; acidity – pH, etc.); c) the area and specific weight of degraded and unproductive lands as part of arable land; d) area and specific weight of particularly valuable lands.
4	Qualitative characteristics of agricultural lands	a) mechanical composition; b) salinity; c) acidity; d) waterlogging; f) deflation and erosion.
5	Suitability of soils for growing the main agricultural crops	a) points of separate crediting of arable land for the placement of agricultural crops; b) economic assessment of the effectiveness of growing the main agricultural crops.
6	Ratio of land plots	a) forest cover (area, specific gravity); b) optimization of land structure.

Source: tabular data created by the author.

As a result of the detailed analysis of types of land zoning, taking into account the priority of agricultural land use and the agrarian direction of Ukraine's development, it is expedient to form such a type of zoning as an agrarian one.

In our opinion, agrarian zoning is a sectoral zoning of land in the agricultural sector of the economy, which is based on natural-climatic, economic and ecological indicators, includes homogeneous land massifs with the corresponding production potential, the level of ecological and anthropogenic load, is characterized by a certain ratio of land areas, type agricultural production and zonal specialization, the level of labor productivity and allows the state administration bodies to determine the potential possibilities of the production activity of agrarian enterprises.

Agrarian zoning combines elements of a natural-agricultural, natural-economic, ecological and socio-economic nature that influence the activities of agricultural enterprises, provides directions for managing their development and provides for the allocation of agrarian zones within the territory of administrative regions.

The boundaries of agricultural zones are formed taking into account natural and agricultural zoning. In accordance with the affiliation of land use to the agrarian zone, the agricultural enterprise is provided with information about the zoned crops and types of crop rotations that are most suitable for growing on its territory, the implementation of technological measures for the use and protection of land, the level of influence of these measures on the productivity and efficiency of land use by the farm (Table 2).

Table 2. The component structure of natural-agricultural zoning as part of agrarian land zoning and its influence on the management of the development of agricultural enterprises

Natural and agricultural zoning	
Classification features	Rural development management of agricultural enterprises
<ul style="list-style-type: none"> • Soil and climatic conditions; • Dismemberment and drainage of the territory; • Level of erosion (deflation); • Agroclimatic conditions; • Zonal types of rural and urban areas production, systems of agrotechnical and reclamation measures. 	<ul style="list-style-type: none"> • Influence on the productivity, level of land use and efficiency of agriculture production; • Differentiation of technological measures regarding land use and protection; • A set of cultivated agricultural crops.

Source: created by the author.

Taking into account the classification features of the elements of ecological zoning, which are part of the agrarian, restrictions are given on the cultivation of certain crops on the territory of the agricultural enterprise, taking into account its local features and the optimal ratio of crops in crop rotations (Table 3).

Such economic indicators in the organization of the economy as specialization, concentration and integration of production with skillful application will contribute to increasing the efficiency of land use by agricultural commodity producers (Table 4).

Table 3. The component structure of ecological zoning as part of agrarian land zoning and its influence on the management of the development of agricultural enterprises

Ecological zoning	
Classification features	Rural development management of agricultural enterprises
<ul style="list-style-type: none"> • Degree of anthropogenic impact; • Intensity of erosion processes; • Soil contamination with pesticides, heavy metals, radionuclides, etc.; • Provision of soils with nutrients, trace elements; • Ratio of land plots. 	Optimum ratio of crops in crop rotations taking into account local features.

Source: created by the author.

Table 4. The component structure of natural and economic zoning as part of agrarian land zoning and its influence on the management of the development of agricultural enterprises*

Natural and economic zoning	
Classification features	Rural development management of agricultural enterprises
<ul style="list-style-type: none"> • Zonal, economic, production specialization; • Combination of production branches; • Concentration and integration of production. 	<ul style="list-style-type: none"> • Ensuring comprehensive development of the region's economy; • Agro-industrial integration; • Increasing the efficiency of land use.

Source: created by the author.

Socio-economic classification features of agrarian zoning will allow to determine the level of labor productivity and implement labor integration by increasing the qualification level of the population by sending them to training at the expense of enterprises in connection with the need to provide qualified personnel (Table 5).

Table 5. The component structure of socio-economic zoning as part of agrarian land zoning and its influence on the management of the development of agricultural enterprises

Socio-economic zoning	
Classification features	Rural development management of agricultural enterprises
<ul style="list-style-type: none"> • Trends in raising the qualification level of personnel and providing qualified personnel to agricultural and processing enterprises; • The level of labor productivity (time spent on the products obtained). 	Integration of labor of producers and processors of agricultural products

Source: created by the author.

Agrarian zoning should be defined as a mechanism of ecological and economic management of land resources, during the implementation of which zones are allocated within administrative regions, which are characterized by such classification features as

the ratio of land areas, the coefficient of erosion danger, soil washing, the presence of territories polluted by industrial waste, the relative homogeneity of soil and climatic conditions of the territory, which leave an impression on the efficiency of the use of available land resources and the development of zonal types of agricultural production, taking into account the specialization of agricultural enterprises.

In order to study the provisions of agrarian zoning of lands, the Kharkiv region was chosen as a specific example.

The border of the forest-steppe and steppe zones divides the territory of the Kharkiv region almost in half. The Steppe zone includes Zachepylivsko-Blyzniukivskiyi (04), Balakliiskiyi (05) and Kupianskyyi (06) natural and agricultural districts.

In addition to natural-agricultural zoning, ecological zoning has been studied in the territory of Kharkiv region in two directions: soil erosion on the territory of the regions in the cross-section of administrative districts, t/ha per year; pollution of the territory with industrial waste.

As a result of the research, the following areas of increased soil erosion risk (A) were identified, which include Krasnokutskyyi, Kolomatskyyi, Valkivskyyi, Novovodolaz, Zolochiv, Dergachiv, Zmiiv, Chuguiv, Pecheniz, Balakli, Izyum, Vovchan, Velikoburlut, Dvorichan, Kupian, Shevchenki and Boriv districts of Kharkiv region; and areas of reduced soil erosion risk (B).

Kharkiv region belongs to the moderately polluted region. In the territory of the Kharkiv region, the polluted areas are located around the cities of Kharkiv, Bogoduhova, Izyum, Barvinkovo, Lozova, and Pervomaiskyyi. Lands in the northwestern part of Krasnokutskyyi district, in the southeastern part of Novovodolazhskyyi district, to the northwest of the city of Balakliya, to the south and north of Shevchenkiv village, in the western and eastern parts of Kupyanskyyi district, to the north of Bliznyuki village are also subject to pollution. and to the east of the village of Zachepylivka. Pollution has a local nature and is related to the activities of industrial enterprises, GRES, gas production.

When managing land resources of an agricultural enterprise, it is mandatory to take into account the impact of pollution by technical elements. On lands polluted by industrial waste, we introduce vetch-oats and peas into the crop rotation (cleans the land and ensures ecological balance).

There are 57.1 thousand hectares of degraded, unproductive and polluted lands in Kharkiv region, 2339.2 thousand hectares in Ukraine.

According to the data of the State Agency of Forest Resources of Ukraine [28], for the Kharkiv region, the optimal forest coverage of the territory is 15.00%, for Ukraine – 20.00%.

The removal of eroded and polluted lands from cultivation, their reclamation, afforestation, or transformation into other lands should be important measures to optimize the land structure both in the territory of the studied regions and in Ukraine as a whole (Table 6). This will make it possible to reduce the level of plowing of the territory to ecologically optimal, to establish the optimal ratio of land and the recommended forest cover of the territory, to increase the fertility of the land.

The actual and optimal ratio of land areas within the agricultural zones of the Kharkiv region was calculated (Table 7).

On the territory of agricultural enterprises within the boundaries of agricultural zones, it is proposed to carry out land resource management measures: cultivation of agricultural products, which according to international and state quality standards are competitive on

foreign and domestic markets; preferential taxation of producers of ecologically clean products; economic stimulation of rational use of land resources.

Table 6. Areas of conversion of arable land into natural fodder lands and forests, liming and plastering of soils in the territory of agricultural zones Sumy and Kharkiv regions, thousand ha

Agrarian zones	Prejudice	Reforestation	Liming	Plastering
I	1,4	22,5	18,2	-
II	0,1	1,4	51,4	-
III	1,2	21,1	12,4	-

Source: created by the author.

Table 7. Actual and optimal ratio of land plots within the agricultural zones of the Kharkiv region

Agrarian zones	Ratio of land plots (arable land: natural fodder lands: forests areas)	
	actual	optimal
I	1 : 0,21 : 0,18	1 : 0,22 : 0,21
II	1 : 0,27 : 0,29	1 : 0,28 : 0,30
III	1 : 0,19 : 0,04	1 : 0,20 : 0,08

Source: created by the author.

Economic stimulation of the rational use of land resources consists in the provision of tax and credit benefits in the event of the implementation of measures for the use and protection of land, the allocation of funds from the state and local budgets to legal entities and individuals for the restoration of the previous state of land disturbed through no fault of their own, exemption from fees for land for land plots that are in the stage of development and restoration of their fertility, compensation of funds to legal entities and individuals for land plots that are subject to conservation or assignment to the national state reserve fund. Economic stimulation involves saving money by agricultural enterprises as a result of reducing the costs of environmental measures due to the withdrawal from intensive use of eroded areas of land that are part of the agricultural enterprise, by exchanging them for non-eroded ones.

Soil washing in the territory of agricultural zones and the cost of 1 ton of humus are presented in the table 8.

Table 8. Soil leaching in t/ha per year and the cost of a ton of humus, dollars USA, within the agricultural zones of the Kharkiv region

Agrarian zones	Soil washing, t/ha per year	Cost of a ton of humus, US dollars
I	5–10	200
II	3–7	200
III	~ 5	200

Source: created by the author.

The purchase of lands for the purpose of their transformation into other lands must be carried out by local state administrations by order of the departments of state control over the use and protection of lands, which have discovered eroded lands.

4. CONCLUSION AND RECOMMENDATIONS

The scientific novelty of the obtained results concerns the improvement of land resource management of agricultural enterprises in the conditions of zoning, taking into account the potential of agricultural zones.

In our opinion, the management of land resources of agricultural enterprises in modern conditions should be considered as an activity in agricultural production, which is aimed at providing the population with food and other branches of the national economy with raw materials at the optimal level of capital investments in resources and their maximum return while complying with environmental goals and programs for providing norms and requirements for the rational use of land of agricultural enterprises with the aim of obtaining ecologically clean crop and livestock products while simultaneously preserving natural resources.

Agrarian zoning is identified as a sectoral one in the agrarian sector of the economy, and its component structure is revealed. It has been proven that agrarian zoning is a sectoral zoning of land in the agricultural sector of the economy, which is carried out according to such classification features as the ratio of land areas, the coefficient of erosion danger, soil erosion, the presence of polluted areas, the relative homogeneity of soil and climatic conditions, which have an impact on efficiency use of available land resources, zonal types of agricultural production, specialization of agricultural enterprises. The agrarian zone includes homogeneous land massifs with the corresponding production potential and the level of ecological and anthropogenic load and allows the state administration bodies to determine the potential possibilities of the production activity of agrarian enterprises. Three agricultural zones were allocated in the Kharkiv region. Depending on whether the land use belongs to the agricultural zone, the agricultural enterprise receives information about the zoned crops most suitable for cultivation on its territory, types of crop rotation, technological measures for the use and protection of land, restrictions on the cultivation of certain crops. Such economic indicators of enterprise development as specialization, concentration and integration of production, with skillful application, will contribute to increasing the efficiency of the use of land resources. Socio-economic classification features of agrarian zoning will allow determining the level of labor productivity and implementing labor integration.

For the economic substantiation of the coefficients of the optimal ratio of land areas using the zonal approach and to take into account the areas of eroded, unproductive and polluted lands located on the territory of administrative territorial units, the optimal ratio of land areas was determined (arable land: natural fodder land: forests and other wooded areas): in the Kharkiv region – 1.00:0.23:0.25. The optimal recommended ploughability of the territory is determined for the Kharkiv region at the level of 59.6. The economic expediency of the transformation of eroded lands, the economic use of which is not economically efficient according to its purpose, is substantiated. This should contribute to reducing the amount of capital investments of agricultural enterprises in production, ensure an increase in the amount of ecologically clean products from a unit of area and increase its competitiveness.

When introducing research into production, we take into account that ecological zoning gives restrictions on the cultivation of certain crops, taking into account local characteristics. It is proposed to introduce vetch-oats and peas into the crop rotation on polluted lands, which ensure ecological balance and contribute to the purification of lands from harmful elements.

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ENVIRONMENTAL FACTORS AND SMES' PERFORMANCE IN OGUN STATE, NIGERIA

The effect of environmental factors has engendered a lot of debate in the existing literature. This study examines the effect of environmental factors on SMEs performance in Ogun State, Nigeria. The study is premised on the dimensions of environmental factors, which are employees, shareholders, government support and competitive pressure. Survey research design, comprising of 218 business owners in Ijebu Ode and Ago-Iwoye, Ogun State, Nigeria was employed. The F-statistics ($F_c = 32.931$; $P = 0.000$) shows that environmental factors are strong determinants of SMEs performance. The findings further revealed that shareholders ($T_c = 3.041$; $P < 0.05$) and competitive pressure ($T_c = -2.753$; $P < 0.05$) are the critical factors determining SMEs performance in Ogun State, Nigeria while employees and government support are also significantly related to the performance of SMEs. Hence, business owners should pay more attention to the environment factors as well as competitive pressure and shareholders since these are the most critical measures of the environmental factors determining the performance of SMEs in Ogun State, Nigeria.

Keywords: employees, shareholders, government support, competitive pressure, SMEs performance.

1. INTRODUCTION

Environmental factors (internal, intermediate or external) are critical issues that shape and will continue to shape organizations. Whether a business is micro, small medium or large scale and irrespective of the product the firm offers (goods or services) the business entity naturally operates in an environment. These environmental factors present opportunities and threats that every organization must find a means of coping with in order to achieve their stated objectives. It is therefore pertinent for business organizations to take cognizance of these environmental opportunities and threats irrespective of their goals and aspirations. Thus, managers must identify, analyze and respond appropriately to emerging environmental challenge because of their wide impact on the performance of the organization.

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The business environment can be explained in terms of internal (micro) and external (macro) environmental factors. The internal environment can be controlled by managers and entrepreneurs to some extent while the external elements are highly uncontrollable by businessmen or the organization (Ogunmuyiwa, 2022). Business environment can be explained using the 'SWOT' analysis which simply means strength and weaknesses, opportunities and threats. Strengths and weaknesses are related to internal factors and opportunities and threats are looked at from the macro (external) environmental perspective. In the words of Abubakar, (2018), the relationship between a firm and its environment should be healthy to promote the firm's success.

Small and medium enterprises (SMEs) are vital for economic development of emerging and developing countries. Small-scale enterprises are no doubt the engine room for economic growth, poverty alleviation, job creation and by extension crime rate reduction in third world countries. As put by Nuwagaba, and Nzewi (2013), most of the existing SMEs employ less than 20 workers which comprise mainly of family members and part of the shortcomings is that they seldomly expand by employing more workers and opening other branches,

Several past works have studied the relationship between environmental variables and SMEs development on one hand as well as environmental factors and SMEs performance on the other (Arsalan, Arfan, Rohail, 2020; Eze, Ojo, Adedeji, Nwaba, 2019; Tahir, Inuwa(2019; Olakunle, Timothy, Yusau, 2018; Jasra, Asifkhan, Hunjra,Rehman I-Azam, 2011). However, few studies have been done on the effect of environmental factors (employees, shareholders, government support and competitive pressure) on SMEs performance in Ogun State, Nigeria. Sequel to the above, this study fills this gap by investigating the impact of environmental factors on SMEs performance in Ogun State, Nigeria. Arising from the objective, the study hopes to test the following research hypotheses:

H0₁: Employees do not have significant impact on SMEs' performance in Ogun State, Nigeria.

H0₂: Shareholders have no significant effect on SMEs' performance in Ogun State, Nigeria.

H0₃: Government support does not contribute significantly to SMEs' performance in Ogun State, Nigeria.

H0₄: Competitive pressure has no significant impact on SMEs' performance in Ogun State, Nigeria.

H0₅: Environmental factors (employees, shareholders, government support and competitive pressure) have no combined effect on SMEs' performance in Ogun State, Nigeria.

The remaining part of the study is broken down into four (4) sections. Section II, centers on the review of relevant past studies while section III is on the methodology and section IV discusses the empirical results. Section IV concludes the study and proffers recommendations.

2. REVIEW OF PAST STUDIES

Olakunle, Timothy, and Yusau (2018) examined the relationship between environmental variables and the performance of micro and small scale enterprises (MSEs) in Ikare and Ugbe in Akoko North East of Ondo State, Nigeria. Findings from the results showed that environmental variables (inadequate finance, inadequate infrastructure and poor managerial skills) have a significant but negative relationship with SMEs performance.

Jasra, Asifkhan, Hunjra, Rehman and I-Azam (2011) analyzed the determinants of business success of SMEs in Pakistan and asserted that funds, marketing strategy, government support, technology and entrepreneurial skill have a positive and significant impact on business success. In a similar study conducted by Drbie and Tilaye (2013), they found out that the major factors affecting small business in Ethiopia include scarcity of raw materials, deficit of infrastructural development, and insufficient access to funding, as well as insufficient support from governmental and non- governmental organizations.

Eze, Ojo, Adedeji and Nwaba (2019) examined the impact of business environmental factors on SMEs survival in Oyo State, Nigeria. The study identified and employed three business environmental factors (Business development support, infrastructural facility and regulatory service). The study concluded that environmental elements play a significant role in enhancing SMEs survival in Oyo State, Nigeria. Specifically, the study concluded that business development support and infrastructural facility are the most critical elements of business environment driving SMEs survival in Oyo State, Nigeria.

Idris and Farrah (2019) investigated the influence of environmental problems and challenges of small-scale business in Bauchi Central Market using descriptive analysis and regression analysis. Findings showed that lack of easy access to credit facilities, multiple taxations, poor market competitive advantage and low volume of sales are the elements determining the performance of small-scale business in Bauchi Central Market.

Salisu, Momoh and Uba (2019) analyzed the environmental factors affecting small and medium enterprises in Kogi State, Nigeria. A survey research design was adopted which covered 171 SMEs. The findings revealed that business strategy has a significant but negative on profitability of SMEs. Arsalan, Arfan, and Rohail (2020) investigated the impact of e-commerce on small and medium enterprises performance. The empirical finding showed that competitive pressure and management support have a positive and significant relationship with e-commerce. Also, Ozoh, Okeke and Jacobs (2020) investigated the impact of environment on performance of SMEs in Anambra State, Nigeria. A sample of 304 was drawn from a population of 1393 SMEs in Anambra using a structured questionnaire. The regression result showed that economic, financial, technological as well as political factors have significant effect on small and medium enterprises profitability.

Friday (2020) examined the influence of environmental variables on productivity in oil service firms in Port-Harcourt, Rivers State, Nigeria. Survey research design was used for the study. A sample of 330 was drawn from a population of 1875 employees in 20 oil companies. Using regression analysis, the study affirmed that technological, economic political environmental factors have significant impact on oil service firm's productivity in the area of study.

Ali, Awad and Abduilsalam (2020) while investigating the factors affecting the performance of small-scale enterprises with particular reference to construction firms used focus group participation to identify 82 measures grouped into internal and external measures. Empirical findings showed revealed the basic variables influencing performance of small-scale enterprises such as lack of experience and track records, financial indiscipline by contractors, corruption, multiple taxation, lack of entrepreneurship skills, delay in payment for work done and poor policy by commercial banks on SMEs.

Also, Abraham (2021) while analyzing the impact of external environmental factors on performance of micro and small scale enterprises using 395 Micro Scale Enterprises (MSEs) owners working in manufacturing, trade and service sectors found out that a positive and significant relationship exist between external environmental factors and

industry performance in the study area. In addition, the study specifically found infrastructure, marketing factors, work premises, trade fair factors and financial factors as variables having significant effect on enterprises' performance while political/legal factors do not influence performance of industry in the chosen area.

In addition, Ogunmuyiwa (2022) investigated the influence of business environment on the performance of ICT firms in Lagos State, Nigeria. Survey research design and purposive sampling technique were employed to select a sample of 156 from a total population of 257 employees drawn from Zinox Technologies and Spectranet Nigeria Limited. Data was collected from the two firms through a 5-point Likert rating questionnaire administered to the selected ICT firms. Empirical findings from the O.L.S regression technique revealed that all the explanatory variables (infrastructural environment, insecurity and political environment) are the critical variables determining fluctuations in ICT performance in Nigeria.

3. METHODOLOGY

The study adopts survey research design. The design is suitable for this study as it helps to evaluate the effect of business environmental factors on SMEs survival in Ogun State. The study's population includes all the SMEs operating in Ogun State. According to Business List, Nigeria (2021), the total population of SME operators in Ijebu Ode and Ago- Iwoye, Ogun State, Nigeria is 481 enterprises. The study employed Yamane (1967) sample size formula at 95 % confidence level and margin of error of 5% in arriving at a sample size of 218. Hence, it focuses on the chief executives or owners of SMEs in Ogun State. The reason for choosing the chief executives or owners of SMEs is because they are the major decision makers in SMEs operational activities.

Using a structured questionnaire designed in close ended pattern which was administered directly on the selected operators of small and medium enterprises, the questionnaire was divided into two sections. Section A of the questionnaire captures the demographic data of the respondents, such as status and nature of business while section B addresses the research objective on a 5-point Likert rating scale measurement.

The validity of the instrument was done using content validity index (CVI). The assessors evaluated the instrument on a two-point rating scale (relevant and not relevant), after which the content validity index formula was employed.

$$CVI = n/N \quad (1)$$

Where: n = numbers of items rated as relevant and N= total number of items in the instrument.

This gave a CVI value of 0.896, which indicated that the instrument is valid.

The test-retest method was employed to test the internal consistency or reliability of the instrument (questionnaire) through a pilot study. The instrument was administered on Thirty-Six (36) SMEs in Ijebu Ode and Ago- Iwoye, Ogun State, twice within an interval of two weeks, which gave a correlation coefficient of 0.8072 indicating the reliability of the instrument.

3.1. The model

The models for this study are stated in simple behavioural forms below:

$$SMEP = \alpha_0 + \alpha_1 EMP + \mu \quad (2)$$

$$SMEP = \beta_0 + \beta_1 SH + \mu \quad (3)$$

$$SMEP = \gamma_0 + \gamma_1 GS + \mu \quad (4)$$

$$SMEP = \delta_0 + \delta_1 CP + \mu \quad (5)$$

Where $\alpha_0, \beta_0, \gamma_0$ and δ_0 are constant parameters while $\alpha_1, \beta_1, \gamma_1$ and δ_1 are the slopes of the equation parameters to be estimated.

For the multiple regression equation for the combined effect of environmental factors on SMEs performance, the behavioural equation is presented thus:

$$SMEP = \beta_0 + \beta_1 EMP + \beta_2 SH + \beta_3 GS + \beta_4 CP + \mu \quad (6)$$

Where $\beta_0, \beta_1, \beta_2, \beta_3$ and β_4 are the parameters to be estimated.

$SMEP =$ SMEs Performance; $EMP =$ Employee; $SH =$ Shareholders;
 $GS =$ Government Support and $CP =$ Competitive Pressure.

In a – priori terms, EMP, GS and CS are all expected to be positive while CP is expected to exhibit a negative relationship with SMEs performance.

$$\text{Thus, } \beta_0, \beta_1, \beta_2, \beta_3 > 0 \text{ and } \beta_4 < 0 \quad (7)$$

4. RESULTS AND FINDINGS

Table 1. Multiple Regression Analysis of Environmental Variables and SMEs Performance

Dependent Variable: SME Performance

Variables	Beta	Std Error	Standardized Coeff Beta	Tc	Sig
Constant	4.706	0.289		16.295	0.000
Employees	-0.510	0.063	-0.567	-8.167	0.000
Shareholders	0.202	0.066	0.184	3.041	0.003
Government Support	-0.352	0.072	-0.299	-4.916	0.000
Competitive Pressure	-0.123	0.048	-0.171	-2.573	0.011
R = 0.639	R ² = 0.408	Adj. R ² = 0.396	F-Statistics = 32.931	Prob (F-stat) = 0.000	

Source: Authors' Computation from Regression Output, 2022.

Results from Table 1 show that the constant term, competitive pressure and shareholders are correctly signed in line with the a-priori expectation while the coefficients of employees and government support negate theoretical expectations. For employees, the T-statistics of (Tc = -8.167; P < 0.05) confirmed the significance of the explanatory

variable. Thus, the H_{01} is equally rejected. Shareholders and government support also showed significant relationships ($T_c = 3.041$; $P < 0.05$) and ($T_c = -4.916$; $P < 0.05$) respectively. These also led to the non-acceptance of the two hypotheses H_{02} and H_{03} . The T-statistics results revealed that competitive pressure with a negative relationship is significantly related to SME performance ($T_c = -2.753$, $P < 0.05$) at 5 % significance level and thus the null hypothesis (H_{04}) is rejected.

The adjusted R^2 of 0.396 showed that 39.6 percent variation in SME performance is responsible for by the combined effect of all the four (4) explanatory variables (employees, shareholder, competitive pressure and government support). The F-statistics ($F_c = 32.931$; $P = 0.000$) also revealed the significance of the regression equation and the parameter estimates in the model at less than 5 percent.

4.1. Discussion of findings

Hypothesis 1 shows that employee has a significant outcome and this indicates that employees contribute significantly to the variation in SMEs performance in Ogun State, Nigeria. It can be inferred that SMEs should be more concerned about their employees because they contribute to the performance of the business through their skills and experience. Hypothesis 2 indicates a positive and significant outcome and this implies that shareholders or business owners contribute significantly to SMEs performance in Ogun State, Nigeria. The findings negate the argument of Olakunle, Timothy, and Yusau (2018) who submitted that majority of SMEs are not well financed by the owners or shareholders. Hypothesis 3 also revealed a non-significant outcome which implies that government support does not contribute significantly to the performance of SMEs in Ogun State, Nigeria. The result of the analysis supports the findings by Jasra, Asifkhan, Hunjra, Rehman and I-Azam (2011), who opined that government support (top management support) have significant and positive effect on business success.

Hypothesis 4 indicates that competitive pressure has significant contribution to the variation in SMEs performance. The result of the analysis confirms the opinions by Jasra, Asifkhan, Hunjra, Rehman and I-Azam (2011) who are of the view that competitive pressure has a positive and significant impact on the use of e-commerce. This means that for SMEs to survive on the long run there is need to focus on how to satisfy their customers in order to outwit their competitors in the marketplace. Hypothesis 5 findings revealed the combined effect of employees, shareholders, government support and competitive pressure which equally showed a significant effect on SMEs performance in Ogun State, Nigeria. The outcome of the analysis confirms the argument of Arsalan, Arfan, and Rohail (2020); Olakunle, Timothy, and Yusau (2018) and Jasra, Asifkhan, Hunjra, Rehman and I-Azam (2011) who are of the view that environmental factors are critical determinants of SMEs performance. Consequently, the study further revealed that the dimensions of environmental factors individually contribute to SMEs performance. Additionally, it was found that employees and competitive pressure serve as the engine that drives the performance of SMEs which give them an edge to compete with other competitors in the marketplace leading to greater market share profitability.

5. CONCLUSION AND RECOMMENDATIONS

The study establishes that environmental factors are a significant driver of SMEs performance in Ogun State, Nigeria. Understanding the dimensions of environmental factors (employees, shareholders, government support and competitive pressure) is the key

to providing services which have capacity to bring about positive changes in SMEs performance. In addition, going by the expected theoretical expectations, competitive pressure and shareholders are the critical environmental variables explaining movements in SMEs performance. Arising from the above, business owners should pay more attention to their environment as this will increase their business capacity to tailor their products towards meeting the specific needs of the customers and creating a new and exciting experience. Business owners should be more concerned about their competitive pressure and shareholders since these are the most critical measures of the environmental variables determining SMEs performance in Ogun State, Nigeria.

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SEQUENCE OF SELECTED QUALITY MANAGEMENT TOOLS TO ANALYZE QUALITATIVE PROBLEMS OF PRODUCTS

Identification of causes of incompatibilities of the products treated with the powder method allows their elimination or minimization of those differences, which contributes to the improvement of the powder coating method and thus to the development of processes in the field of metallurgy. The aim of the article is to analyze the corrosion problem on the ventilator cover with the use of the sequence of selected quality management instruments (Ishikawa diagram and the 5Why method) and proposed actions to eliminate or minimize the problem and improve the powder coating process and organization within the workplace place of the selected company. The analysis was carried out at the request of the management of the Podkarpackie fan producer. The management wanted to analyze some of a problems in the simple and cheaper way, and thus in the enterprise this using the types of the method was not practiced. The management were wanted to analyze the problem with using these types of method because, in this enterprise, this was not practiced yet. The analysis of corrosion using the new sequence – Ishikawa diagram and 5Why method allowed, i.e.: appropriate analysis of the problem, identified the root cause of adequate problem and proposed the actions for the problem, thanks to which is possible to improve the powder coating process and a good organization workplace in the selected company. The sequence used and the proposed improvement actions can be used to analyze quality problems in other production and service companies.

Keywords: Ishikawa diagram; 5Why method; quality management tools; improving of product; production engineering; mechanical engineering.

1. INTRODUCTION

Quality management is a key action of enterprises to improve product quality. Usually, it is supported by quality management tools (Pacana, Siwiec, 2021). A typical problem is

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an increase in the demand for high-quality paint coatings, which are obtained by the powder method. It requires prevention of incompatibility, such as corrosion on the paint cover. To increase resistance to corrosion, the cast iron or steel castings are covered with powder paints. Powder coating is included in ecological methods and does not require large amounts of financial resources. Additionally, powder methods are one of the few methods by which high-quality paint covers are achieved, and, moreover, powder painting is considered a dynamically developing method in the field of metallurgy (Pacana, Siwiec, Bednarova, 2019).

The powder coating process is the method of painting with finely ground paint particles that do not contain solvents. The powder coating process consists of charging electrostatically dry and well ground pigment particles and resin and successively sputtering them onto objects that are electrically grounded (Rustico et al., 2015). The powder, whether charged or sprayed, adheres to the surface of a given item until it is melted in an oven at elevated temperature into a homogeneous coating. In powder coating, the basic types of coating materials are thermoplastic and thermoset coatings. Thermoplastic coatings fuse together with the supply of the right amount of heat and their chemical components remain unchanged after cooling and merging (John, 2015). In the case of thermosetting coatings after melting, chemical reactions occur, in which the cured thermosetting coating has a chemical structure than before the melting process (Naderi, Attar, Moayed, 2004). As a result, the thermosetting coatings are stable and do not react to reheating, which is why, unlike thermoplastic coatings, they do not soften. The advantages of the powder method are that it does not affect the environment (the powder coated coatings do not emit the organic compounds responsible for ozone) and do not increase the economic costs associated with the petroleum solvents used in traditional liquid coatings (Pardo, Aristizabal, 2017).

The development of powder coating materials was caused by the desire to replace liquid solvent-based paints that are not environmentally friendly. One of the first steps was the development of a hot mixing process using a bladed mixer, which contributed to the more homogeneous powder materials. In 1960 the method of spraying thermosetting powder coatings was developed, where with compressed air the decorative covers were sprayed. The development of the powder method resulted in the creation of many other factors that affected its effectiveness (Mozaryn, 2018; Wade, 2002). After analyzing the selected research on powder painting, it was concluded that only the improvement of the products and the machines used for powder grinding will not contribute to the minimalization of the corrosion on the products. For example, the dependences of the thickness of the coating in relation to the four variables of the powder coating process, i.e. oven temperature, curing time, and conductivity, as well as powder yield, have a significant impact on the quality of the paint coating. After selecting the optimal values for the given parameters, it is possible to obtain an average coating thickness (about 80 microns) (Adams, 1989; Boer, Petruta, 2014; John, 2015; Kramer, 1993). The coatings, in particular thermally cured, phenolic or epoxy phenolic, provide corrosion resistance, and the heat-curing coating to protect against corrosion must be stable at elevated temperatures of up to 220°C. In addition, if adequate air conditioning is provided, which also applies the ventilators, the occurrence of corrosion and contamination results in a smaller temperature difference between the liquid or gas and the outside air. This phenomenon can be minimized by achieving a higher condensing temperature that provides the ability to conduct heat (Donelli, Picoltrini, Donelli, 2012; Naderi, Attar, Moayed, 2004). Other factors that may affect the corrosion of the product

are, for example, the poorly prepared cover for powder painting or the poorly performed process of the powder coating.

In the article, the causes of the corrosion of ventilators for external use were analyzed. For the analysis, previously not practiced (in the enterprise in which the problem was identified) were used. Thus, the Ishikawa diagram and the 5Why method were used. In view of the large potential causes of corrosion, to analyze of the problem, the Ishikawa diagram was used. In view of a large number of potential causes of the corrosion to analyze the problem, the Ishikawa diagram was used. Thanks to this method, the main causes were identified, i.e. pollution, inadequate ventilator cover, and lack of periodic training. Next, using the 5Why method, it was concluded that the root cause of the corrosion was the lack of broadening knowledge of the powder painting principles and the lack of implemented Lean Manufacturing instruments. Due to the conclusions which were made and the improvement actions that were proposed, it could be avoided by preventing corrosion on the products and improving the powder painting process.

2. SUBJECT OF RESEARCH AND METHODS

The problem was related to the corrosion that occurred in the ventilators, which was detected after several months of use by the external customer (Figure 1).

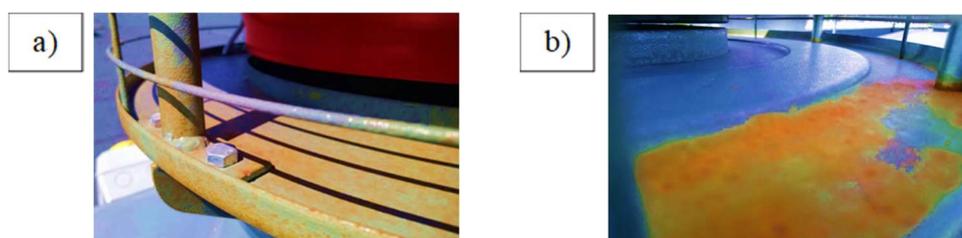


Figure 1. Example of the corrosion identified in the ventilator: a) outside part; b) internal part
Source: Own study.

The ventilators, in which the corrosion was identified were fixed on the building roof (on the free space). These were PFD-200 roof ventilators designed for general use. The temperature at which the ventilator should not be damaged is for the pressed medium from -25°C to 60°C and for the area to 40°C . The ventilator covers were made of steel sheet (TH 1300, 2000) and painted with using the powder painting (called the furnace method).

The powder painting process began with the preparation of the ventilator cover by mechanical cleaning to remove the impurities. Mechanical cleaning included the process of prerinsing and the application of iron phosphates to the cover to protect it from corrosion. Subsequently, the ventilator cover was powder coated with polyester paint for a paint coat thickness of $95\ \mu\text{m}$ and the powder was baked by the furnace method. The sintering was made in a convection oven at about $200\ ^{\circ}\text{C}$ for about 10 minutes.

The heat in the oven was distributed in the circulation system. After the powder was mixed with a uniform surface in the oven, the coating was cured for about 20 minutes. The simplified scheme of the powder coating process is shown in Figure 2.

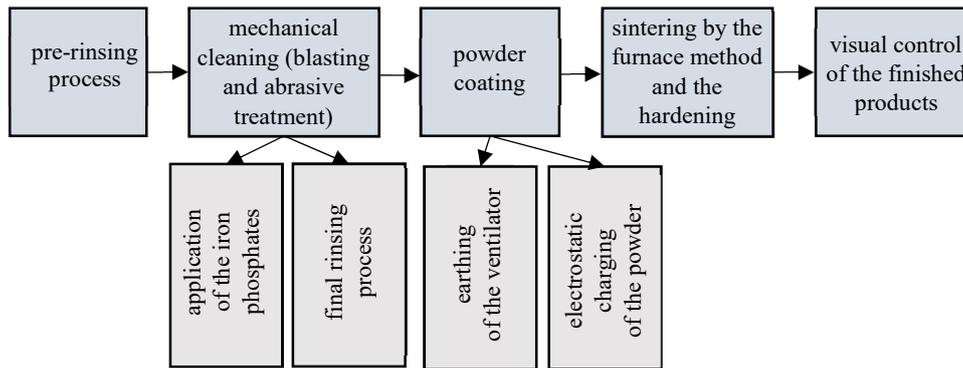


Figure 2. Scheme of the powder coating process

Source: Own study.

In view of a large number of potential causes of the ventilator corrosion, the Ishikawa diagram (called fish bone) was made (Bilsel, Lin, 2012; Braglia, Frosolini, Gallo, 2017; Chokkalingam et al., 2017). In the fish head the problem was put, i.e. the ventilator corrosion. Next, the five categories to analyze this problem were selected, i.e. man, method, machine, material, and environment. These categories allowed us to find the potential causes of corrosion and therefore allowed us to thoroughly analyze individual indirect causes (Lira et al., 2017). Subsequently, the company manager and the quality department chose the main causes of corrosion for the reasons (Salvador, Goldfarb, 2004; Shin, Lee, Son, 2015). To find the root cause of the problem, the 5Why method was used. The analysis was started by defining the problem (coating in the fans) and giving the pre-defined root causes of the problem. The analyze was started from the definition of the problem (conductor corrosion) with the main causes of the problem, which were selected at the previous stage. The analysis was based on the task for every cause of the “why” question until the root cause was identified (Benjamin, 2015; Wade, 2002). The analyses allowed us to propose improvement actions, thanks to which it is possible to minimize the risk of corrosion on ventilators.

3. RESULTS OF ANALYSIS

In the first stage of the analysis, the Ishikawa diagram was made, to identify the potential causes of the corrosion problem that was involved on the ventilators (Figure 3).

The main causes of the corrosion problem were the poorly prepared ventilator cover and lack of periodic employee training. These factors meant that the process of preparing the fans and the process of painting them were not carried out correctly. The poor adhesion of the varnish coat and subsequent corrosion of the ventilators were considered to be directly on the poor surface preparation of the ventilator before painting. The possible impurities that caused the paint to not adhere properly to the ventilator, resulting in damage of the ventilator cover and consequent corrosion as a result of external factors (including atmospheric). The ventilator surfaces contaminated before painting caused deterioration in the protective properties of the coating and corrosion. Impurities were also related to the

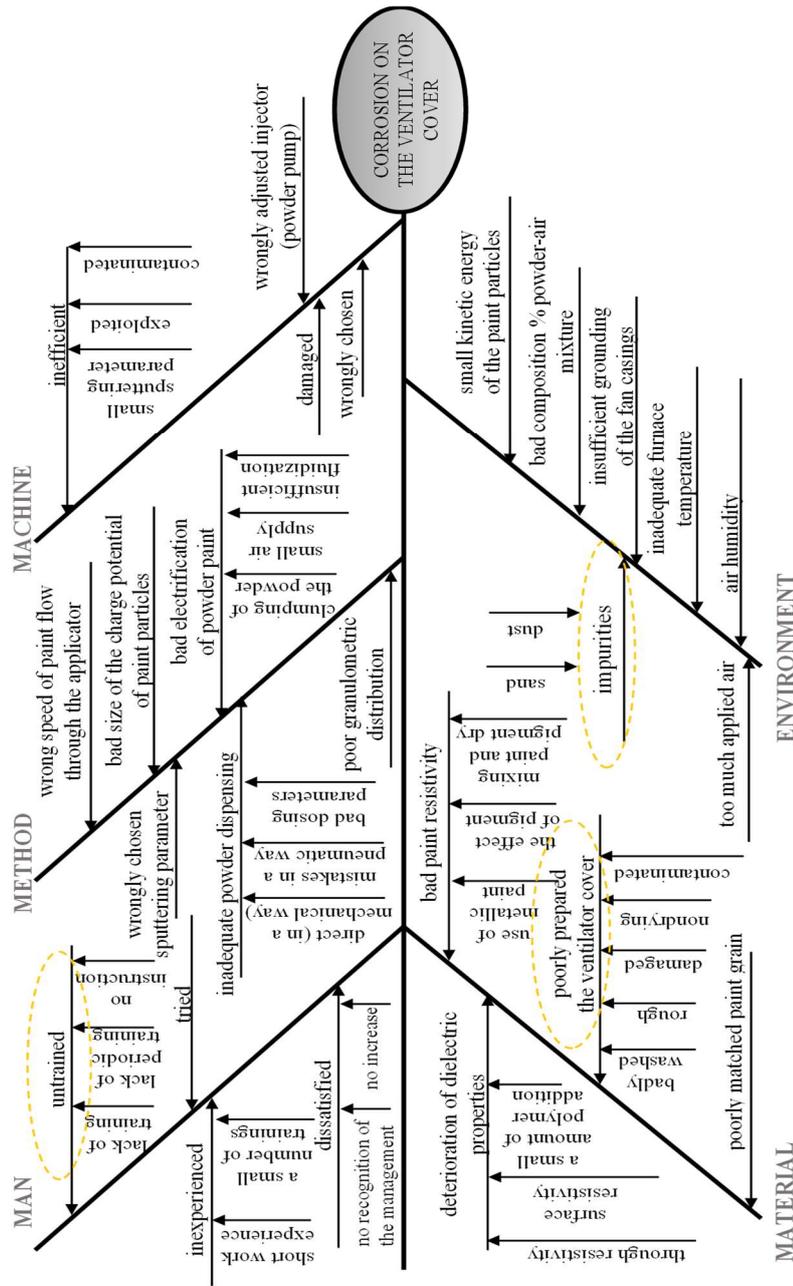


Figure 3. Ishikawa diagram for the corrosion problem on the ventilator cover
Source: Own study.

maintenance of the equipment used during the cleaning and painting of the ventilators, as well as the rooms in which these processes were carried out. The employees were not subjected to periodic training, so their knowledge of the correct implementation of the production processes was not good enough, which led to their mistakes. To identify the root cause of the problem, the analysis was performed with the 5Why method (Figure 4).

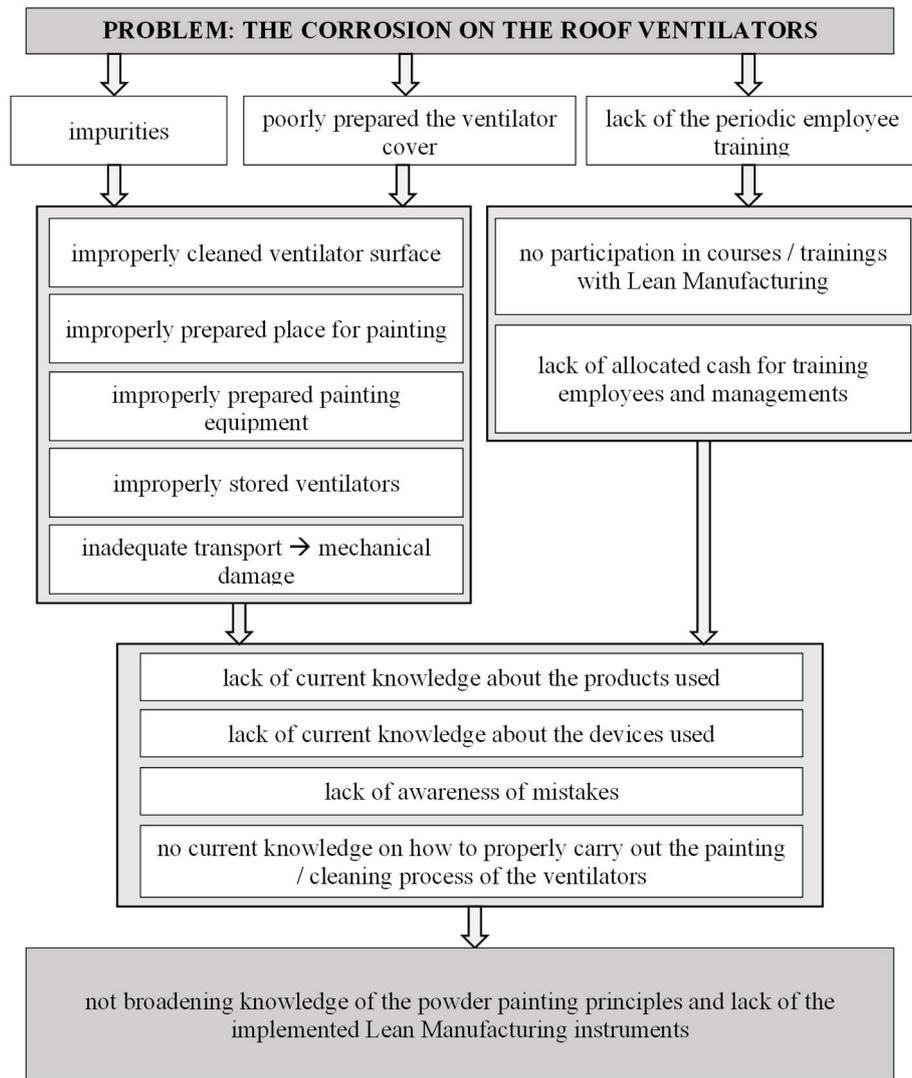


Figure 4. An analysis of the corrosion problem of the ventilators with using the 5 Why method

Source: Own study.

After analyzing the main causes of ventilator corrosion with the 5Why method, it was concluded that the root cause was the lack of broadening knowledge of the powder painting

principles and lack of managements awareness of the benefits of practicing Lean Manufacturing.

4. DISCUSSION AND CONCLUSION

Achieving high-quality products and simultaneously customer expectations are still a challenge (Ostasz, Siwiec, Pacana, 2022; Pacana, Siwiec, 2022; Siwiec, Grebski, 2022; Siwiec, Pacana, 2021). Therefore, it is necessary to use different techniques which will support during achieve a stable production process of products (Siwiec, Pacana, 2022; Siwiec, Pacana, 2021). In this case, it was concluded that the production process should be improved and Lean Manufacturing instruments should be introduced. Improvement actions in the production process that would minimize the corrosion of the ventilators are as follows:

- replacement of the mechanical washing process with the chemical cleaning process, thus introducing the following:
 - surface degreasing,
 - application of zinc coatings, which would be a primer for powder coatings and thus would increase the protection against corrosion,
 - application of painting sets with increased resistance;
- introduction of visual inspection of the products prior to the powder coating process, in which the number of items to be inspected, would be consistent with the technology adopted.

The example of the simplified scheme for the implementation of the powder coating process with the improvement actions presented in Figure 5.

In addition, the improvement of the powder coating process and the functioning of the entire company can be achieved through the implementation of Lean Manufacturing instruments such as: 5S, TPM and standard work. The steel surfaces of the ventilators require careful workmanship, in particular in the case of ventilators whose use is intended for external use. The replacement of mechanical cleaning for chemical washing, together with the degreasing process, and the use of zinc coatings together with phosphate coatings increase the corrosion resistance. The implementation of the selected Lean Manufacturing instruments (5S, TPM and standard work) would allow for, i.e.:

- maintaining cleanliness at work stations,
- maintaining the good condition of the machines and devices used during the production process of the ventilators,
- analysis of individual processes and measure,
- to identify problems on an ongoing basis,
- eliminating or minimizing problems.

Using the 5W2H method sequence, the Ishikawa diagram, and the 5Why method, it was possible to:

- characterizing the problem in a transparent way, including the most important information about the problem,
- identifying the causes of the potential problem and selecting the main causes,
- identifying the cause of the source problem,
- developing improvement actions that are adequate to the identified cause of the source problem.

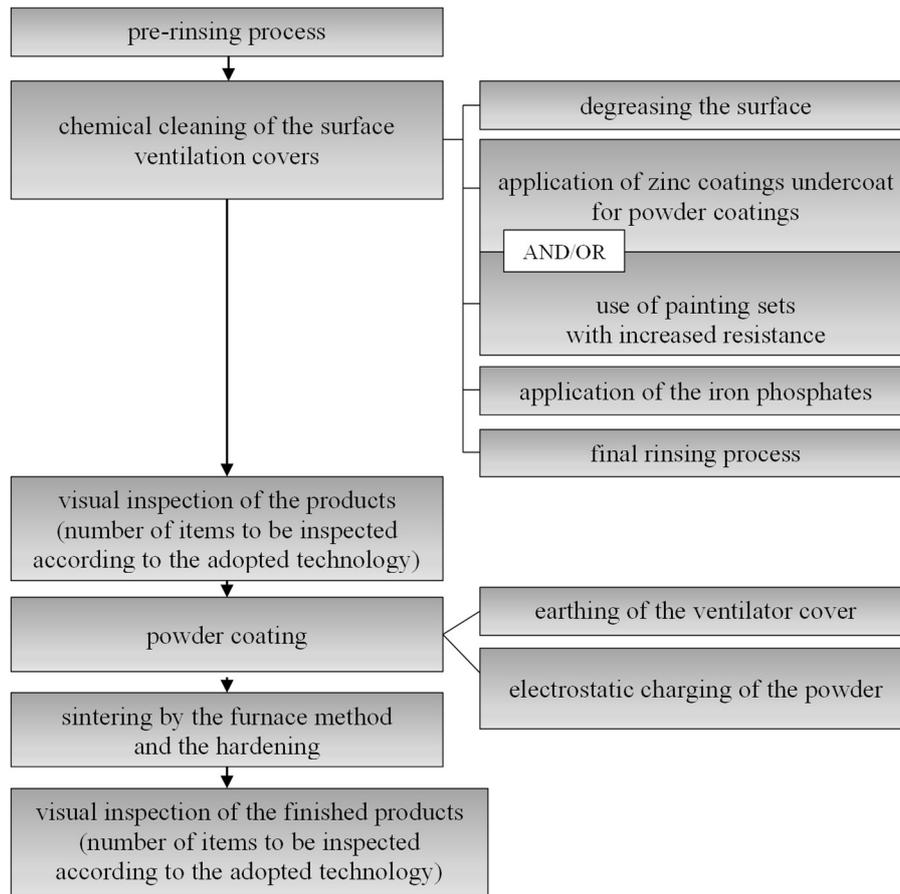


Figure 5. Simplified scheme of the powder coating process with suggested improvement measures

Source: Own study.

Quality management tools used to solve the problem of ventilator corrosion and the proposed improvement actions can be practiced in the case of other problems in the field of metallurgy.

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ROLE OF UNIT PACKAGING VISUAL LAYER IN MARKETING ACTIVITIES

Packaging and its visual layer form a unique value for a product and have an impact on its image. The component elements of a visual layer are signs whose precise division is shown in a classification based on the structure and functions of signs. Every single sign of packaging has huge importance in the context of providing specific information designed to induce a potential buyer to make a purchase. The aim of this paper is to analyse and synthesise information pertaining to the signs of a unit packaging visual layer in relation to marketing activities – effective consumer communication and attractive product presentation. Considerations and findings presented herein may prove to be useful in the designing of packaging².

Keywords: packaging, packaging visual layer, brand, marketing communication.

1. INTRODUCTION

A visual layer of unit packaging is a term which can be found in the packaging literature quite often and is usually associated with the marketing function of unit packaging. Sellers strive to induce consumers to purchase a product by using an innovative design of a visual layer. Packaging is often referred to as a “silent salesman” (Cichoń 1998), however, this term should relate, as a matter of fact, to a visual layer of packaging, which may, by means of a variety of signs such a layer contains, have a considerable impact on consumers’ decisions. Every element of a visual layer of packaging should be carefully selected in the visual layer design process because the combination of components enables a consumer to receive specific information from a seller. In addition, a visual layer of packaging allows for the identification of a given product with a brand.

The aim of the paper is to analyze the available literature sources regarding the visual layer of the packaging. It will allow to verify the hypothesis that publications referring to the visual layer of unit packaging clearly indicate the relationship between the visual layer and the marketing function of the packaging, because the visual layer allows the seller to communicate with the consumer, is a guarantee of an attractive product presentation and identifies the brand.

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2. DEFINITION OF UNIT PACKAGING VISUAL LAYER

The definition of a visual layer has received wide coverage in the literature on the subject. Nevertheless, the extent to which that definition is interpreted is closely related to authors' understanding of the role and importance of a visual layer. According to J. Szymczak (2003), a visual layer of packaging is "a set of signs which are inseparably connected with packaging, and which form and are perceived as a whole". M. Pyszczyk (2011) considers the definitions of packaging and a visual layer of packaging synonymous. Broader meaning is presented by M. Lisińska-Kuśnierz (2009), who submitted that a visual layer is formed by many signs which are manifested mainly through such elements as: material type, shape, colour, all sorts of texts and varieties of lettering, font size, graphic design, ergonomic solutions, etc., and these components serve mainly as informational and promotional means. A similar view on a visual layer was taken by K. Kołomańska (2014; 2016), who described it along with its elements which, according to the author, include: packaging shape, colour, information on a product showed on packaging, symbolism, marking, closure, ornaments, as well as the material which is used for packaging. On the other hand, Cholewa-Wójcik (2016) portrays a visual layer as a unique instrument designed to create positive emotions and product experiences. The perception of both packaging and a visual layer depends also on a profession practised by an individual. Striving to find the limits, experts in the field can tend to narrow the very definition down. Whereas representatives of art schools will endeavour to place packaging and its visual layer in space.

Making an attempt to define, as precisely as possible, the term in question, it is expedient to refer to dictionary definitions of "layer" and "visual". *Słownik języka polskiego PWN* (PWN Dictionary of Polish Language) says that a "layer" can be understood as "a certain amount of something which forms a uniform plane on the surface or between something and something" or as "components of an object or a phenomenon, which form a certain whole" (layer, [an entry in:] *Słownik języka polskiego PWN*). Given the first of these two definitions, a "layer" bears identical meaning as a "plane", hence its perception could be limited. Whereas the word "layer" construed as *components of an object or a phenomenon* gives opportunities to interpret the term in question as something complex. It appears that the very term "layer" is used slightly more often in relation to a "plane", however, in the context of a visual layer of packaging, researchers – when speaking of a "layer" – more frequently opt for the definition which says that it means *components of an object*.

As regards the word "visual", when one consults the aforesaid dictionary, *Słownik języka polskiego PWN*, it is defined as "linked to sight and an image as a means of conveying information" (visual, [an entry in:] *Słownik języka polskiego PWN*). Therefore, a visual layer of packaging can be understood as the signs which are inseparable elements of packaging, perceived as a whole.

A visual layer of unit packaging is particularly relevant to marketing, as it is seen as a marketing communication instrument (Ankiel-Homa, 2012).

3. DESCRIPTION OF SIGNS OF UNIT PACKAGING VISUAL LAYER AS A MEANS OF MARKETING COMMUNICATION

A visual layer of unit packaging is a vehicle for signs including anything that constitutes the components of packaging and, at the same time, sends a message to a recipient. According to the semiotic concept, a visual layer of packaging is construed as "an

intentional code – coordinated in a precisely defined manner – that is to say, a system of signs” (Ankiel-Homa, Szymczak, 2008). As argued by M. Ankiel-Homa (2012), the signs of a packaging visual layer are categorised exclusively as iconic and symbolic signs. Iconic signs include photographs; drawings, ornaments or decorations, while symbolic signs encompass: colours, as well as separable and inseparable signs. Separable signs are ideographic and word signs, e.g. words, expressions, sentences, whereas inseparable signs comprise the size of packaging, closure, shape and design form.

However, the signs of a visual layer do not include so-called transcendental signs, which are additional elements, attached (as part of sales promotion activities) to packaging – such as free samples, competition coupons etc. As a matter of fact, these are not inextricable components of packaging.

The signs of a visual layer encompass obligatory signs (whose form and content is prescribed by applicable legislation under which manufacturers are required to use specific signs) and optional signs (which can have any appearance, content and form).

The elements of a visual layer can be classified using many criteria (Żmijewska, 2016), however, the most transparent classifications were proposed by M. Ankiel-Homa (2012). These are classifications based on the function and structure of signs and the relationship between a sign and its object and interpretant. The most comprehensive division is based on the function and structure of signs. Figure 1 shows the classification of the symbolic signs of a packaging visual layer based on the function and structure of signs.

Inseparable signs are conceived of as the signs which do not have their opposite elements within particular packaging (Szymczak, 2013) and are placed on it, taking one form (Ankiel-Homa, 2012). They are associated directly with an object. The first inseparable sign is a design form which is one and only for particular packaging and cannot take any other additional form at the same time. The most popular design forms of unit packaging include bottles, jars, boxes, cans, bags, ampoules, aerosol containers, trays or sachets. Another inseparable sign is shape, defined as *external appearance of an object or a design of something* (shape [an entry in:] *Słownik języka polskiego PWN*). In the case of packaging, they most often are figures or solid bodies. Next identified inseparable sign is the size of unit packaging, characterised by its dimensions – and both the size and volume are parameters which do not change for particular packaging. The last inseparable sign of a visual layer is the type of packaging closure/the manner it is closed, which depends on the type of packaging and material it is made of. Glass packaging usually comes with metal or plastic caps or stoppers, metal packaging – with lids made of galvanised or aluminium sheet, each of which has varnish coating, whereas plastic packaging uses such techniques like welding or closures made of polymers – e.g. polypropylene (Gajlewicz, 2021). Each of the inseparable signs of a visual layer conveys specific information and affects a consumer in a given way. Combinations of design forms having a certain size and volume, their specific shapes and methods of closure build a unique product picture, as well as affect the way how both a product itself and a brand are seen.

A symbolic sign of a visual layer is colour, which attracts a consumer’s particular attention because it is the colour that is capable of triggering his or her emotions. Respective colours are associated with particular emotions, but their perception is culture-bound. Differences can be noticed not only for cultures on various continents, but also within one continent. Table 1 demonstrates how colours are perceived in Europe.

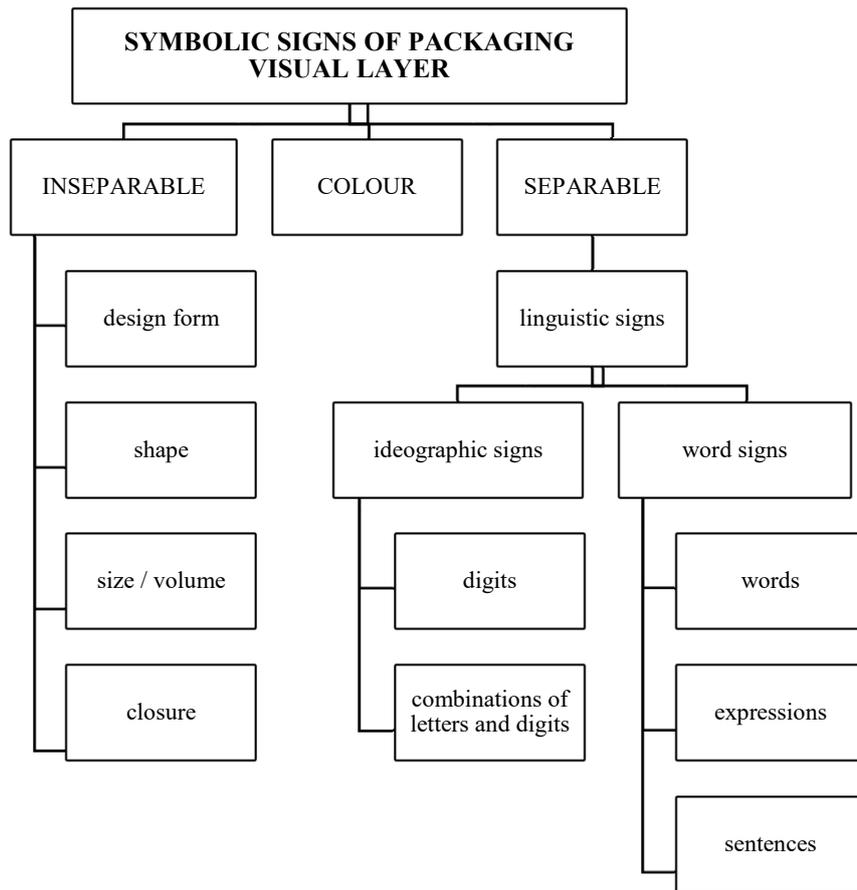


Figure 1. Classification of Symbolic Signs of Packaging Visual Layer Based on Function and Structure of Signs

Source: (Ankiel-Homa, 2012).

Colour, apart from arousing certain consumer's emotions, is also used for brand identification. "Milka" chocolate evokes associations with purple, "Lipton" tea with yellow, while "Coca-Cola" with red colour. Consumers are not keen on rapid changes, hence sudden modifications to packaging colour are also undesirable (Pyszczek, 2011).

The third type of symbolic signs of a visual layer includes separable signs, which are identical to linguistic signs. Word signs and ideographic signs placed on packaging are used to convey specific information. Word signs encompass both single words (e.g. "ecological"), expressions (e.g. "power derived from the nature") and whole sentences, giving, to a large extent, a product description. They have a specified font, which affects the way how a visual layer is perceived by a consumer. Ideographic signs are digits or combinations of digits and letters conveying a given message. Manufacturers usually use them to emphasise or highlight special information pertaining to a product, while ideographic signs are designed to attract consumers' attention. In some cultures, certain digits may be deliberately avoided, also in a visual layer of packaging, due to symbolism.

For instance, in Japan and China, the digit 4 means a failure, and even death (Rudnicki 2000).

Table 1. Differences in Symbolic Perception of Colours in Selected European Countries

COUNTRY	COLOUR		
	green	blue	yellow
Austria	hope	fidelity	jealousy
Denmark	hope, boredom, health	tranquillity, cold, indifference	danger, insincerity, modesty
Finland	hope, modesty	good quality	-
France	youthfulness, concern	anger, concern	disease
Portugal	hope	jealousy, difficulties	despair
Switzerland	something unwanted or immature	rage, anger, love affair	-
Sweden	inexperience	recklessness	lack of money
Italy	youthfulness, lack of money, anger	concern	anger

Source: own elaboration based on M. Pyszczek (2011).

Apart from symbolic signs of a visual layer, M. Ankiel-Homa (2012) distinguished iconic signs. Figure 2 shows the classification of iconic signs based on the function and structure of signs.

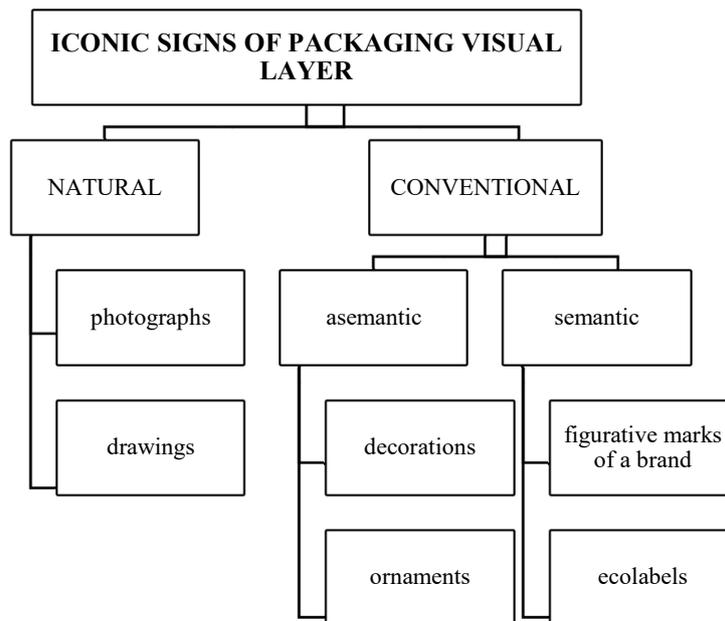


Figure 2. Classification of Iconic Signs of Packaging Visual Layer Based on Function and Structure of Signs

Source: (Ankiel-Homa, 2012).

Iconic signs of a visual layer are classified as natural and conventional signs. Natural signs are those signs which are based on natural, instinctive human knowledge. According to M. Ankiel-Homa (2012), natural signs comprise photographs and drawings, which can also – as is the case with colours – constitute an element of brand identification. Picture 1 depicts packaging of the product “Kinder Cioccolato” with a photograph showing a boy who is smiling. That image sparks off clear associations with the product of the Kinder brand.



Figure 3. Packaging of “Kinder Cioccolato” Product

Source: (<https://spozywczzo.pl/1054-kinder-czekoladki--4szt---opak-20>).

Apart from natural iconic signs of a packaging visual layer, there are also conventional, that is to say, normative signs. Additionally, they are divided into semantic and asemantic signs. Semantic signs include: figurative marks of a brand (logos, logotypes) and ecolabels, which can be placed in a visual layer of packaging only when a manufacturer obtains relevant certificates demonstrating that its product is eco-friendly. Decorations and ornaments are categorised under asemantic signs. Decorations can be made, e.g. by screen printing, hot stamping or flocking, whereas ornaments are decorative motifs. Both forms of asemantic signs constitute a unique added value to a design of packaging visual layer (Ankiel-Homa, 2012). Figure 4 shows ornaments on packaging.



Figure 4. Visual Layer of Packaging with Visible Ornaments

Source: (<https://www.opakowaniacukiernicze.pl/produkt/kartony-na-ciasto-18x18x9-cm>).

The basic division of signs of a unit packaging visual layer proposed by M. Ankiel-Homa (2012) with reference to J. Szymczak (2003) shows that a visual layer of packaging is a broad concept, and all its signs are significant in the context of their perception by consumers.

4. DESIGNING SIGNS OF PACKAGING VISUAL LAYER

The designing of packaging is a complicated process, which must be subject to essential requirements (Ankiel-Homa, Czaja-Gagielska, Assman, 2011). Creating signs and codes (a set of signs), which may be used in a visual layer of packaging and which are a vehicle for encoded market information, is extremely difficult. The way signs are perceived and interpreted by consumers varies, which is often completely different from assumptions made by an entity putting a packaged product on the market (Ankiel-Homa, 2012). Apart from the knowledge of properties and characteristics of individual visual elements, importance is attached to specific recipient's impression and association regarding quality, value and effectiveness, as well as factors that have a bearing on the perception and interpretation of signs of a visual layer. They include biophysical, ethnic, tradition-related factors and stereotypes rooted in awareness (Kołomańska, 2016).

Research conducted by P. Silayoi and M. Speece (2007) proved that the effectiveness of packaging in attracting the attention of a prospective consumer results from a graphic background and a verbal message placed on it. L. Garber, E. Hyatt and U. Boyna (2009) observed that out of all signs of a packaging visual layer, word signs and characteristics understood as the manner in which packaging is perceived play a key role from the marketing perspective. The perception of packaging may be conditional, among other things, on gender, e.g. in the context of colours. In her research, A.I. Baruk (2009) demonstrated that taking into consideration a recipient's gender in designing a visual layer of packaging proved to be of key importance. Men in general do not understand colour nuances (e.g. they do not differentiate between canary yellow and peach). Using the pallet of colours must be therefore simplified, if the target group of designing are males (Steward, 2009).

It is not uncommon that a figurative mark of a brand is altered to adapt it to dynamically changing consumer expectations and requirements. Attempts are made to design a logo (logotype) from scratch, retaining an element recognised by purchasers, which is a demanding and risky task. Another difficult challenge for designers is the selection of a proper font or its size. Apart from a requirement for clarity, a sign being created must reflect the nature of a brand, identify and embellish. What is useful for designing signs of a visual layer is the knowledge of how a human eye perceives, moving always from left to right, from a big to small element, from black to white, from colourful to colourless. Additionally, a characteristic human feature of people's sight is a preference for order and harmony (Pyszczek, 2011).

A visual layer should be designed, while taking into account emerging trends, which nowadays could include personalisation or adapting recyclable materials (Smoleń, Cholewa-Wójcik, 2021). It is also vital to ensure that a visual layer of packaging is designed carefully, with attention being given to every detail and taking into consideration the fact that consumers' perception of every sign should be concurrent with a designer's intention. The application of an eye-tracking method is inestimable added value (Cholewa-Wójcik, Kawecka, 2015).

5. CONCLUSIONS

The concept of a “visual layer” of packaging has a broad scope and refers not only to what can be seen on a shop shelf, but it is definitely wider. Elements (signs) of a visual layer are also a design form, shape or a type of product packaging closure. The components of a visual layer of packaging are the signs whose visual layer serves as a vehicle. These signs, which constitute a visual layer of packaging, are at the same time a manifestation of a product which is contained in packaging and send specific messages to consumers, persuading them to make a purchase. Nowadays, the field which is occupying a greater and greater role in designing a visual layer and its signs is neuromarketing (Pradeep, 2011). In times when people are overloaded with information and, to a certain extent, as a consequence of that, need to make quick decisions, messages represented by signs of a packaging visual layer are received and processed by consumers immediately. Similarly, purchasing decisions are made quickly. Hence the role of signs of a packaging visual layer is sometimes dominant. Bloch (2011) demonstrated in his paper that packaging provides a consumer with useful, hedonistic and semiotic benefits. However, this may be achieved by an appropriate design of a packaging visual layer.

After reviewing the publication of this topic, it can be concluded that the concept of the visual layer of the packaging and a number of signs that this layer contains have been thoroughly and in great depth analyzed by researchers. They agree that each of the signs of the visual layer of the packaging should be carefully selected in the visual layer design. The signs of the visual layer of the packaging can be analyzed both separately and as a whole. In addition, researchers in their publications repeatedly draw attention to the connection between the visual layer of the packaging and the marketing function of unit packaging. The consumer, through the interpretation of the signs of the visual layer, receives a number of specific information from the seller, who communicates with the consumer just through these signs. For the seller, careful selection of signs in the process of visual layer design of the unit packaging may contribute to the attractive presentation of the product, as well as build the value and importance of the brand that the product represents. Thus, the term “silent salesman” should be used in relation to the visual layer of the packaging, created by a series of signs.

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