

Knowledge Management in Enhancing Organizational Flexibility in Manufacturing Enterprises

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Abstract: In today's market conditions, enterprises operate in times of uncertainty, constant pressure from competition, increasing quality requirements, and rapidly changing technologies. The speed and intensity of changes mean that enterprises are forced to look for the most effective flexible actions to meet market conditions. The dynamic capabilities of enterprises are reflected in the dimensions of flexibility, which have different speeds and are conditioned in different ways, e.g., through the level of knowledge management in the enterprise. The article is based on the review of international literature using the science mapping method in the area of knowledge management and organizational flexibility, as well as the results of the research conducted on a group of manufacturing companies. The aim of the article is to indicate the level of knowledge management in manufacturing enterprises and its impact on selected dimensions of flexibility in the areas of organizational activity. The study is based on the results of the research on a group of 355 Polish enterprises, which was carried out in 2022. The author's questionnaire was used during the study. The results of the study were the basis for the analysis, which indicated the level of knowledge management and the level of organizational flexibility in manufacturing enterprises. The analysis also made it possible to indicate whether there are dependencies between the level of knowledge management and the level of flexibility in the organizational dimensions of companies' operations. The novelty of the article is the indication of recommendations for the increase in the level of knowledge management in order to enhance the flexible actions necessary in an extremely turbulent organizational environment.

Keywords: Management, Knowledge management, Organizational flexibility, Manufacturing enterprises, Poland

1. Introduction

In the face of the rapidly changing industrial environment and competitive pressure, companies have had to develop their ability to respond and adapt better to the dynamic business environment (Cheng, 2007). Therefore, the flexibility, and thus organizational capacity of the enterprise to use resources, strengthening their internal competencies in terms of developing diverse strategies and actions that enable the achievement of organizational goals, turns out to be essential. Organizational flexibility is a dynamic capacity, since the organization is able to renew and recreate resources, rapidly and efficiently integrating and configuring them in response to the dynamics of the environment (Yousaf & Majid, 2018). Furthermore, Shukor et al (2020) recognize organizational flexibility as a dynamic capacity, as it is important to cope with complexity, minimize uncertainty, and support management in complex and turbulent environments. In such an environment, knowledge management is the most important strategic resource and therefore is considered crucial for improving the company's performance (Carrasco-Hernández & Jiménez-Jiménez, 2016). However, knowledge management processes and the extremely dynamic environment require new ways of operating of the organization, in particular the departure from the rigid framework of functioning and the transition to flexibility in many organizational dimensions.

The objective of the article is to examine the level of knowledge management in companies and its impact on selected dimensions of organizational flexibility in the areas of business activity. The reasoning is based on the results of the research conducted in 2022 on a group of Polish manufacturing companies. The article contributes to science by combining the level of knowledge management with selected dimensions of flexibility building organizational flexibility in extremely turbulent conditions. In addition, the scientific contribution of this article consists in the demonstration of the analysis of bibliometric data related to the identified procedures in two areas, namely, knowledge management and organizational flexibility in a turbulent business environment.

2. Literature Review

2.1 Procedure

To achieve the planned main objective, the review of literature concerning the subject matter was conducted using the science mapping method in the VOSviewer software. The method used in this research is to conduct bibliometric analysis to produce a network visualization of keyword maps for the queries (Visser, van Eck & Waltman, 2021; van Eck, et al, 2010). The review of literature performed is based on the structure of data obtained from the original queries, as well as the scope and results of the database. The queries used in this study enabled the exploration of the Scopus database, which is commonly used in scientometrics to examine

the progress and evaluate various fields of science (Van Eck & Waltman, 2010). The conducted review of literature allows for data analysis using mapping tools and enables the formulation of the research problem.

The review of literature was conducted using keyword coexistence analysis, which was used to group reflecting research into organizational flexibility and knowledge management. The criteria for searching records in the database included searching by subject (title, abstract, keywords), the accepted word phrases "flexibility" OR "organizational flexibility" OR "flexibility of organization" AND "knowledge management" OR "management of knowledge". As a result, 1262 documents were obtained, which included scientific articles in journals in the field of "Business, Management and Accounting" and "Environmental Science" in English with no time limit. The further analysis of abstracts and modification of keywords not meeting the criteria (the first 20 most frequently repeated keywords) allowed for the identification of three main clusters (Fig. 1). Cluster 1 "Knowledge management" (red), Cluster 2 "Flexibility" (blue), Cluster 3 "Competitions" (green). The conducted bibliometric analysis allowed the formulation of the research problem in the form of the research question: What are the relationships between the level of knowledge management in the company and its organizational flexibility?

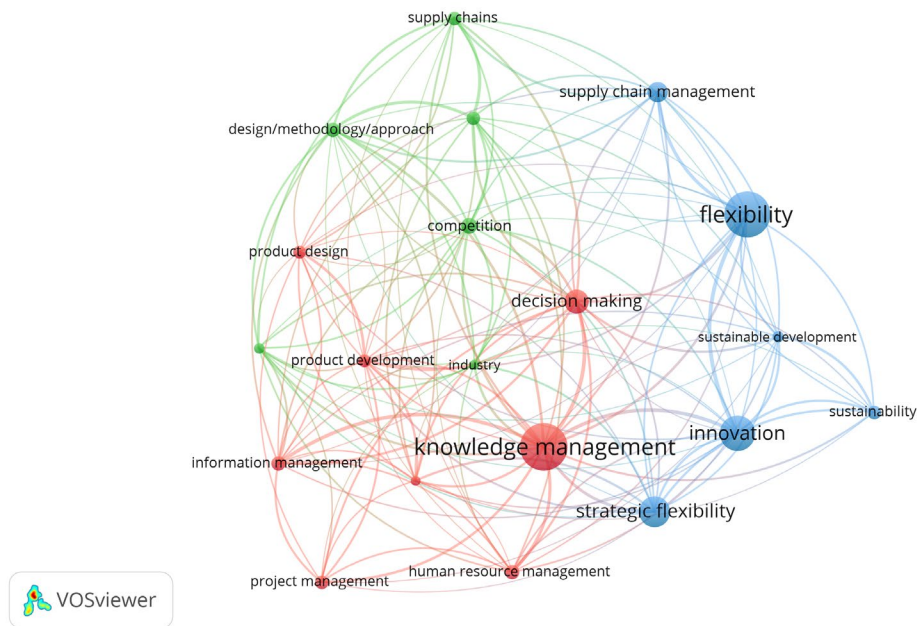


Figure 1: Bibliometric map of Keyword Coexistence Results from Scopus

2.2 Knowledge Management

Knowledge is the key resource of the organization constituting the source of sustainable differentiation, and thus competitive advantage. Knowledge in the enterprise combines capabilities and dynamic capacities, as well as information and technological practices, allowing the company to predict the nature and potential of changes in the organizational environment more accurately and determine the adequacy of both strategic and tactical operations (Wiklund & Shepherd, 2003). From the point of view of the organization, knowledge is not a resource collected solely in individual units that make up the organization, but is embedded in procedures, processes, or organizational structures, and social relationships created with stakeholders (Okreglicka, 2022). Organizations with a higher level of knowledge management capability are more likely to increase competitiveness by collecting, organizing, and transforming knowledge to achieve their organizational goals (Shujahat et al, 2019). The method, speed, and efficiency of using knowledge in management are the most important factors ensuring and maintaining the competitive advantage of the organization, and the inability to use it determines the obstacles to achieving and creating the competitiveness of the company, as well as its development (Omerzel & Gulev, 2011). According to Gao, Chai and Liu (2018), knowledge management can provide enterprises with the tools and techniques they need to overcome the overwhelming information they encounter and enable them to improve learning effectiveness and increase their competitive advantage. Moreover, the existing research suggests that a dynamic organizational capacity plays a crucial role in achieving organizational and business performance through knowledge management, including its detection, sharing, and reconfiguration (Antunes &

Pinheiro, 2020); and the capabilities in this area related to dynamic operations of enterprises in the business environment have a direct and indirect positive impact on the company's results (Lin & Wu, 2014; Li et al, 2020).

2.3 Organizational Flexibility

Flexibility, as a characteristic of the company, is desired by all organizations as it is an important factor determining its functioning. Organizational flexibility is primarily perceived as the ability that enables the organization to exist in the context of variable business conditions (Verdú & Gómez-Gras, 2009; Morgan et al, 2019). Therefore, the flexibility of operations means that entrepreneurs flexibly modify plans or decisions in a constant manner, adapting to changing circumstances of the company's functioning (Brettel, Mauer & Engelen, 2012). Unfavorable business environments currently require organizational flexibility from companies, i.e., the company's dynamic abilities to keep up with changes in the market and to respond rapidly to unpredictable and unexpected market conditions (Santos-Vijande, López-Sánchez & Trespalacios, 2012; Peng, Liu & Lin, 2015; Chatterjee et al, 2023). If significant changes occur in the organization's environment, the organization should respond to them to a greater extent. Changes introduced in the organization within the framework of flexibility may lead to a temporary change in the level of activity, which in turn may lead to the ultimate activity of the organization (Sharma, Sushil & Jain, 2010) and ensure a competitive advantage (Weaven et al, 2021). Sushil (2001) draws attention to the reflection of mutual relationships between flexibility in individual functional areas and the organization's flexibility as a whole. The flexible response of companies to unexpected changes in the environment, which are currently becoming common, is critical in the case of the impact on their organizational reactions. They require organizational discipline, consisting in adherence to principles when creating organizational structures and processes. On the other hand, organizational agility should be allowed, which can be expressed through creativity, improvisation, and adaptability of the organization (Volberda, 1997; Harrald, 2006).

The review of literature provides evidence that organizational flexibility is crucial for creating value in operational, production, and technological strategies, as well as for developing competitiveness (Lyu et al, 2022; Bhupendra & Sangle, 2022) and innovativeness of enterprises (Abubakar et al, 2019). Therefore, it is important to perceive flexibility from the perspective of its dimensions (Dreyer & Grønhaug, 2004; Zhou, Wu, 2010; Khin, Ahmad & Ramayah, 2012). Combining partial flexibilities thus gives a synergy effect, and in the case of organizational flexibility, this synergy effect can be determined as the surplus of benefits resulting from the flexibility of individual levels of the organization compared to the flexibility of the entire organization (Kasiewicz, 2009), whereby the flexibility of individual elements of the organization affects the flexibility of the entire enterprise. Therefore, according to the observations of Sushil (2001), De Toni and S. Tonchia (2005), and Eapen (2009), it can be assumed that organizational flexibility consists of partial flexibilities and is of a mixed nature. Perceiving the flexibility of the enterprise through the logic of partial flexibilities has its advantages, which, among others, affect the precise capture of the degree (level) of the company's flexibility, resulting from the functions, processes, resources, and dimensions of the organization (Moroz, 2013, p. 55).

Based on the above arguments and observations of the business environment, the main hypothesis was formulated, which is: Hypothesis 1: A higher level of knowledge management in the organization influences an increase in the level of organizational flexibility of the enterprise.

3. Methodology

The main objective of the article is to examine the level of knowledge management in enterprises and its impact on selected dimensions of organizational flexibility in the areas of business activities. In order to test the main hypothesis, the pilot studies were conducted in 2021, and then data were collected from a sample of 355 Polish manufacturing companies. The main research was conducted in 2022.

The research process was carried out in stages, i.e., firstly, the review of literature was conducted, which allowed for the identification of the research problem and the formulation of the research hypothesis. During the literature review, some scientometrics techniques were used. The science mapping method was applied, including cluster analysis for the needs of bibliometric analysis (Van Eck, Waltman 2021). The VOSviewer software and data analysis tools available in the SCOPUS database were used for the analysis.

The survey questionnaire was subsequently developed. The questionnaire consisted of closed-ended questions in the groups of individual research areas on a 5-point Likert scale (Sheng, Zhou & Li, 2011; Peng & Luo, 2000),

where 1 indicated "definitely not" and 5 "definitely yes". This is a managerial approach, in which this tool is most often used in social science research.

During the further analysis, the level of knowledge management (KM) was examined based on the classification by Carrasco-Hernández and Jiménez-Jiménez (2016), in which five sub-variables were identified consisting of items allowing for the diagnosis of the studied area. On the other hand, the level of organizational flexibility of enterprises was diagnosed based on the approach by Yeniaras, Di Benedetto and Dayan (2021), who distinguished four dimensions of flexibility that make up overall organizational flexibility, i.e., operational (OF), financial (FF), structural (SF) and technological (TF), which were constructed with relevant items.

Subsequently, based on the convenient sample selection, the enterprises participating in the research were identified. Then, the incomplete and incorrectly completed questionnaires were rejected, and the collected data were analyzed to accomplish the research objective. Finally, in the group of the surveyed enterprises, manufacturing companies were identified, over 60% of which had been operating for over 10 years, including 43% of micro enterprises, 25% of small enterprises, 18% of medium-sized enterprises, and 14% of large enterprises operating in southern Poland.

4. Results

Firstly, during the analysis of the research results, the constructed research tool was subjected to reliability tests (Table 1). The reliability estimation method using the Cronbach's alpha coefficient was used (Taber, 2018; Christmann & Van Aelst, 2006). The conducted analysis showed that, for the organizational flexibility scale in its individual dimensions, the reliability was 0.812 in total, thus it was good reliability, whereas, for the knowledge management scale in its individual components, it was 0.933 in total, thus it was excellent reliability. It turns out that the research scales constructed in the tool meet the criteria and their use in quantitative research is justified according to the adopted classification by George and Mallery (2016, p. 240).

Table 1: Reliability and Validity

Variables	Cronbach's α
Knowledge management	0.933
KM1	0.792
KM2	0.845
KM3	0.816
KM4	0.769
KM5	0.881
Organizational flexibility	0.812
OF	0.669
FF	0.769
SF	0.565
TF	0.801

Subsequently, the level of KM and organizational flexibility in Polish manufacturing companies in total was examined, as well as broken down by size of employment. The European classification of enterprises (number of employees) was adopted, i.e., micro, small, medium-sized and large companies (EU Commission Regulation No 651/2014). The data analysis showed that the average level of knowledge management in all companies was 3.516 on a 5-point Likert scale, and this level deviates from the average value by +/-0.849 points. The median value for the level of knowledge management indicates that at least 50% of the respondents rated KM at the level of 3.625 or less on a 5-point scale. At the same time, it can be seen (Fig. 2) that, in micro-enterprises, the level of KM is the lowest, whereas, in large enterprises, it is the highest. It is worth adding that the value of the chi-square statistic (Chi squared test=245.3945; df=19; p-value=0.00000) indicates a statistically significant relationship between the variables, i.e., the level of knowledge management and the size of employment in enterprises.

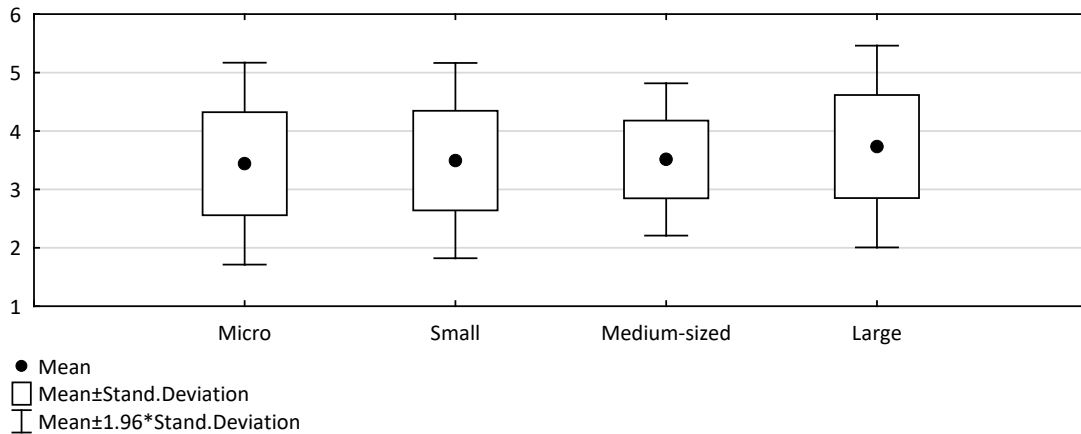


Figure 2: The Level of KM in the Manufacturing Company (n=355)

The further data analysis showed that the average level of organizational flexibility in Polish manufacturing companies was 3.735 on a 5-point Likert scale, and this level deviates from the average value by +/-0.699 points. At the same time, the median value for the level of organizational flexibility indicates that at least 25% of the respondents rated organizational flexibility at the level of 3.364 or lower on a 5-point scale. Interestingly (Fig. 3), small enterprises declare the highest level of organizational flexibility, and this level is the lowest in micro-enterprises, and the differences in the distinguished groups of companies are small and no statistical relationship.

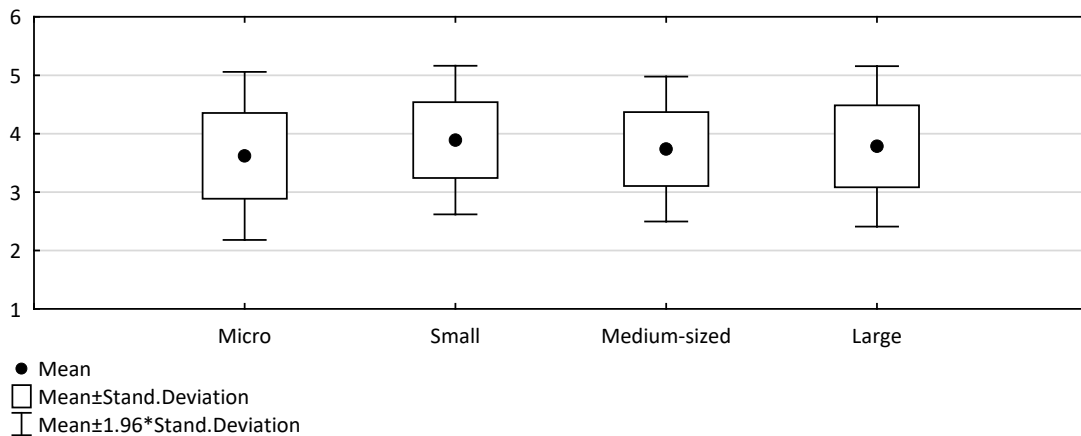


Figure 3: The Level of Organizational Flexibility in the Manufacturing Company (n=355)

In the next step, it was examined whether there was a linear relationship between the variables, for which the Kendall's tau-b correlation coefficient was used (Table 2). Initially, the correlations between the level of KM and individual dimensions of organizational flexibility (OF, FF, SF, TF) were identified, as well as between KM and the overall level of flexibility. The analysis showed that the correlations between the variables are statistically significant for $p < 0.05$ and can be described as moderately positive, ranging from $t = 0.306$ to $t = 0.483$.

Table 2: Correlation Analysis (n=355)

Dimensions of organizational flexibility	Management of knowledge (t)
OF	0.306*
FF	0.349*
SF	0.341*
TF	0.416*
Total organizational flexibility	0.483*

*Kendall's tau correlation ($p\text{-value} < 0.05$)

5. Discussion

The obtained results confirm the research by Carrasco-Hernandez and Jimenez-Jimenez (2016), which shows that knowledge management is important and positively related to organizational flexibility, and thus the higher the level of knowledge management the higher the level of organizational flexibility demonstrated by the studied companies. As indicated by the research by Tippins and Sohi (2003), in an extremely turbulent environment scenario, knowledge is considered the most important strategic resource in the organization, and therefore the knowledge management process is considered critical to improving the performance of the organization. However, organizational performance is not possible without the flexibility of dynamic actions. Organizational performance and flexibility together drive the development of enterprises in turbulent business environments, but this hypothesis cannot always be confirmed in a stable environment (Phillips, Chang & Su, 2018). Therefore, organizational efficiency, perceived as the flexibility of action, affects the performance of the organization in terms of delivering products and/or services, operations of related organizations, and plays a significant role in relation to customers and business partners (Stokes, Schneider & Lyons, 2010; Yusuf et al, 2014). The review of literature also shows the research results indicating a positive impact of knowledge management on the results of enterprises (Holsapple & Jones, 2005). Organizational flexibility regarded in this way includes the mix of formal and informal mechanisms that may arise within or outside the organization. Management practices can affect employee actions, strategic behavior, and the company's results and may include the use of financial control systems, recruitment and engagement of resource managers, implementation of human resource practices, decentralization of power, and increased management engagement (Dekker et al, 2013).

6. Conclusions and Future Research Directions and Limitations

To sum up, the conducted analysis based on the research results showed that the level of knowledge management in manufacturing companies depends on their size and is linked to their organizational flexibility. This applies to all dimensions of organizational flexibility studied, and thus operational, financial, structural, and technological flexibility. Furthermore, the higher the level of management in manufacturing companies the higher the organizational flexibility, which determines the functioning of companies in extremely difficult business environment conditions. Moreover, the research results indicate the direction of dynamic actions in the field of knowledge management, which enhance the flexibility of enterprises, among others, through acquiring knowledge from the environment and from the organization members, distributing information and its interpretation, as well as organizational memory.

The conducted research is not free from limitations. Firstly, it results from the COVID-19 pandemic, which disrupted the activities and production processes of companies and their functioning in extremely turbulent and unpredictable economic conditions. Secondly, the war beyond Poland's borders distorted the needs and expectations of both companies and their customers, and the need for flexible actions was not always adjusted to the resource capabilities of enterprises. Thirdly, the study was conducted on a selected group of companies, and a wider research group selection would reveal a wider range of organizational needs and interactions. In the future, the author plans to continue the analysis by expanding it to a model and factor analysis, as well as to broaden the research to companies from different sectors of the economy operating in a different business environment.

7. Theoretical and Practical Implications

The study has several implications for practitioners. Recommendations in the area of operations for strengthening the organizational flexibility of manufacturing enterprises, which becomes the basis for functioning in an extremely variable business environment, should focus on activities that influence an increase in the level of knowledge management. Undoubtedly, the ability to acquire knowledge from the environment, as well as internal knowledge, should be intensified. The interpretation of acquired knowledge and its distribution among the organization members is of great importance. Companies should focus on strengthening teamwork, where members know and share a common goal. Organizational memory, which consists in proper management of databases available to the enterprise, is also important. Strengthening these areas of activity under knowledge management will allow for an increase in the level of organizational flexibility in various dimensions, and the synergy effect will enable strengthening the overall level of organizational flexibility of enterprises.

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