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GREEN KNOWLEDGE MANAGEMENT - LITERATURE REVIEW AND OVERVIEW OF CONTEMPORARY STRUCTURAL MODELS

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Abstract: This paper addresses the topic of green knowledge management (GKM) with reference to the literature review in this field and the review of current structural models. For this purpose, a bibliometric analysis and a systematic review were carried out. 846 papers were analysed by searching the Scopus database of scientific and academic journals. From these, only those papers that examine green management through the prism of SEM and PLS structural models were extracted in order to systematise the structural models. The result of the research is that it is a topic that has a potential growing trend in citation and publication of articles. It can also be concluded that in all structural models a positive and statistically significant influence of most GKM (Green Knowledge Management) elements on the output variables was proven.

Keywords: green knowledge management, green knowledge management elements, structural models, literature review

1. INTRODUCTION

Knowledge management (KM) is an area of business management that has been considered a critical component for achieving better business performance for decades (Idrees et al., 2023). It is defined as the process of acquiring, sharing, storaging and handling data, materials and knowledge within an organisation to increase productivity and efficiency, reduce costs and improve performance to be achieved (Mehta & Tariq, 2020). Moreover, KM can be defined as a systematic process of knowledge management consisting of three basic dimensions: organisational learning, knowledge management technologies and intellectual capital (Pacheco et al., 2022). An appropriate focus on these three dimensions leads to acquisition, internalisation, transfer, utilisation and measurement to transform implicit into explicit knowledge.

In a study conducted by Ferreira et al. (2018), 92.2% of managers believe that a KM system can influence employee learning and organisational growth, while 66.2% say it helps them work together as a team. Considering the dynamics of the business environment and new environmental challenges, the field of environmental protection has expanded to KM (Chopra et al., 2021; Wang et al., 2022).

Sustainable development is a concept that was quickly accepted in corporate practise after its emergence. With the process business internationalization and the globalisation of the

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economy, the world's largest companies have realised that business based on short-term earnings does not represent a guarantee for survival in a competitive market (Hossain et al., 2022).

In order for a company to align the development of new products, services and processes with the needs of sustainability, it must have adequate knowledge, which is a critical factor in business performance (Pepple et al., 2022; Wang et al., 2022; González-Ramos et al., 2023). Only a company that relies on adequate knowledge management will be able to achieve a sustainable advantage in the market and maintain this position over time (Chaithanapat et al., 2022), while respecting environmental principles (Do Rosário Cabrita, et al., 2016; Shehzad et al., 2020).

Since the advent of sustainable development and the need to redefine many concepts, the massive greening of many aspects of management has led to the emergence of green knowledge management. Today, green knowledge management (GKM) is one of the crucial elements for the survival of organisations under conditions of increasingly intense environmental demands and pressure from stakeholders to apply the principles of sustainability.

Therefore, GKM is of great importance for any organisation that wants to survive under dynamic environmental conditions (Chopra et al., 2021; González-Ramos et al., 2023).

Since green knowledge does not exist in isolation on its own, but has implications for the sustainable competitiveness of the organisation or the environmental eligibility of the organisation, the aim of this paper is to provide an overview of current structural models that contain the GKM variable.

The first part of the paper refers to the literature review and literature analysis, while the second part of the paper presents current GKM structural models.

2. LITERATURE REVIEW

2.1. Green knowledge management - defining

In recent decades, the debate on environmental protection has led to a redefinition of many concepts and a massive greening of corporate management disciplines. The importance of environmental protection and sustainability has become an important aspect of business.

In the context of KM, it was concluded that it is of great importance to develop a comprehensive approach to understanding the process of creating, developing and applying green knowledge (Do Rosário Cabrita et al., 2016).

Thus, GKM was born, which is a new concept developed with the aim of integrating green or environmental aspects into all dimensions of traditional knowledge management (Yu et al., 2022; Shehzad et al., 2023). GKM is a proactive environmental phenomenon that is necessary for managing the companies (Abbas & Kumari, 2021). It is also a concept that can be presented as a fundamental driver of circular economy and eco-innovation (Do Rosário Cabrita, et al., 2016).

This concept consists of 5 dimensions, namely green knowledge acquisition, green knowledge storage, green knowledge sharing, green knowledge application and green knowledge creation (Yu et al., 2022), although some authors mention fewer dimensions - knowledge acquisition, knowledge sharing and knowledge application (Shehzad et al., 2020).

Knowledge acquisition means gathering new ideas by synthesising different disciplines and discovering previously undiscovered information to create new processes, products and services (Pepple et al., 2022). Looking at knowledge acquisition from the perspective of ecology and ecological performance, knowledge acquisition turns green. This knowledge refers

to the acquisition, extraction and organisation of the company's knowledge related to environmental protection (Aboelmaged & Hashem, 2019).

Knowledge storage refers to both implicti and explicit knowledge and the process of its documentation in the form of databases, manuals or archives (Pepple et al., 2022).

Green knowledge sharing is the process of transferring or sharing green knowledge with colleagues, competitors, suppliers or other interested parties who want to develop new ways, methods and techniques that can reduce the harmful effects of business activities on the natural environment (Song et al., 2020). Green knowledge sharing occurs through the process of knowledge transfer between individuals, groups or departments of the company so that the knowledge is increased (Pepple et al., 2022).

The application of green knowledge means that the accumulated and newly acquired knowledge is applied to the production of environmentally suitable products or the services providing (Yu et al., 2022).

Green knowledge creation is the formation or acquisition of new knowledge, ideas or thoughts that explicitly relate to the environment.

2.2. Green knowledge management – literature analyse

Green knowledge management is attracting the attention of researchers and academics, and it is not surprising that the number of published papers dealing with green knowledge management shows an increasing trend. Data from the Scopus database, shows that the number of published papers on this topic of green knowledge management is on an upward trend (Figure 1).

The data refers to the period 2014-2023 and to the scientific fields of Ecological Sustainability, Engineering and Business, Management & Accounting. Figure 1 was created based on the keywords Sustainable Development, Sustainability and Knowledge Management on 21 March 2023.

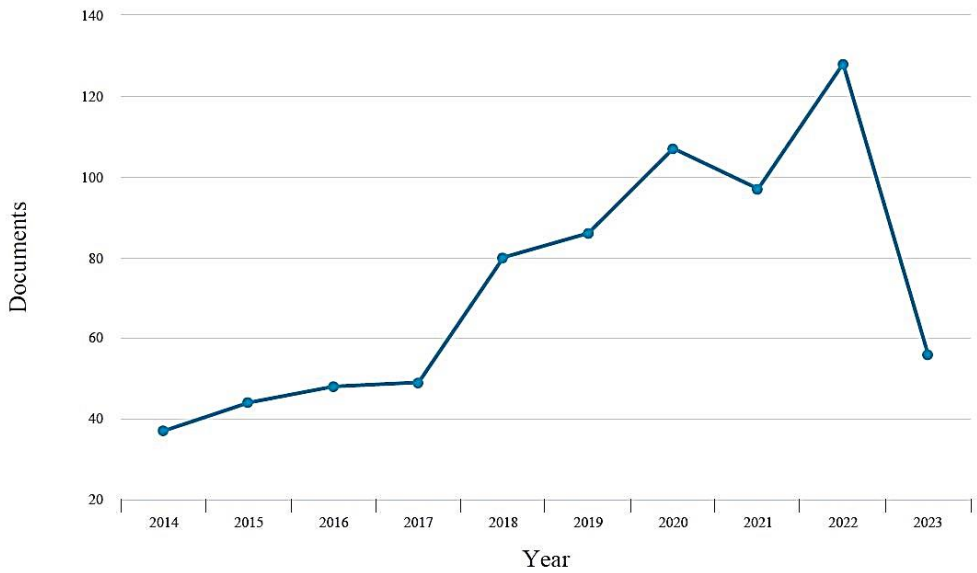

Figure 1. Green management knowledge documents from 2014 to 2023 (Scopus, 21st April 2023)

Based on Figure 1, it can be seen that 2017 is a turning point in the growth of the number of papers on this topic, after which there is a sharp increase. Furthermore, the number of papers

in April 2023 is similar to the number at the end of 2015, which speaks to the actuality of the GKM topic.

Figure 2 shows the percentage of papers by subject area. From this it can be concluded that the largest number of papers are from the three scientific fields mentioned above and with the majority of papers from the field of Environmental Science.

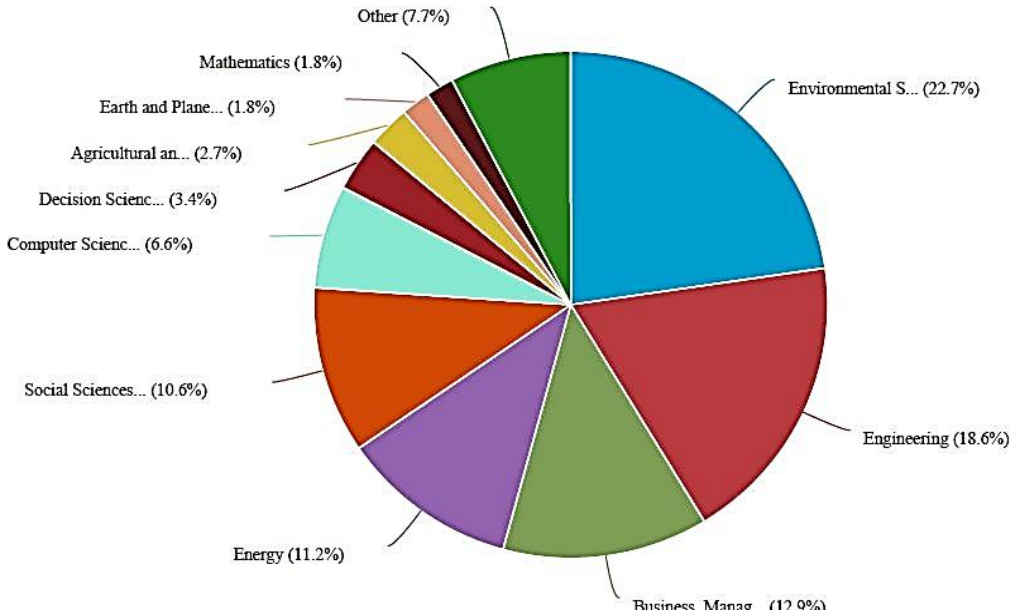

Figure 2. Green management knowledge documents by subject area (Scopus, 21st April 2023)

More than 19% of the total number of papers are in the subject area of Environmental Science, slightly more than 17% are in the subject area of Engineering and 11.9% of the papers are in the subject area of Business Management & Accounting. This indicates the topicality of the subject and justifies further research on a similar topic.

3. METHODOLOGY

Bibliometrics is the application of mathematical and statistical methods to books and other means of communication (Pritchard, 1969). In this paper, bibliometric analysis has been used as one of the best indicators of scientific productivity. It is an important and globally accepted method for evaluating science.

Bibliometric analysis is a method for the quantitative study of bibliographic records of human creativity. This method involves the application of quantitative analysis and statistics to publications such as journals and their associated citations. The basic bibliometric measure is the count of publications published in international journals.

In this particular case, by analysing the number of publications, a conclusion can be drawn about the contribution of GKM to science for the analysed period from 2014 to 2023. The bibliometric indicator was used for the analysis, i.e. the total number of papers in the observed period.

The representation of the research process can be seen in Figure 3. Based on the given criteria shown in Figure 3, 846 works were selected from the Scopus database, of which only those works containing structural models of green knowledge management were analysed. For the analysis of the works, data mining was also used as a technique to sort the works in

order to find suitable models in a large database. Data mining helps to identify what is relevant and later use this data as output. This work also relies on a qualitative analysis of the content of the papers.

Figure 3. Research process

In this context, certain research results were obtained by means of bibliometric analysis, data mining and qualitative analysis.

4. RESULTS AND DISCUSSION

Based on the literature review, Table 1 shows the current GKM structural models that were published in the period from 2020 to 2023.

In some papers (Song et al., 2020; Aamir et al., 2021; Sahoo et al., 2022; Malik et al., 2023), the structural models refer only to specific elements of GKM, while other papers take a comprehensive approach and examine all elements of GKM (Shehzad et al., 2020; Hossain et al., 2022).

Moreover, some papers consider GKM or one of its elements as an independent variable (Song et al., 2020; Shehzad et al., 2020; Aamir et al., 2021; Sahoo et al., 2022; Malik et al., 2023; Wang et al., 2023), while others present GKM as a mediator variable. The mediator effect is the association of one variable with another in such a way that this correlation is determined by a third variable, while the moderator effect is actually an interaction effect.

A greater number of papers use SEM modelling, while certain research moves towards a combination of SEM-PLS models. The context in which the research is conducted is still territorially limited to a specific national level. Some industries or several different industries are studied. Moreover, all the mentioned models were created for specific industries that are not territorially limited to the territory of the Republic of Serbia.

Table 1. Review of GKM structural models

Authors and year of publication	Context	Model type	Dependent variables	Independent variables	Mediators	Moderators	Results
Song et al., 2020	Chinese manufacturing firms	SEM	Green innovation (GI)	Green knowledge sharing (GKS)	Absorptive capacity	Stakeholder pressures	GKS has significant impact on GI
Shehzad et al., 2020	52 organizations' sample of different industries	SEM-PLS	Corporate sustainable performance (CRS)	Knowledge management process (KMP)	Green innovation (GI)	Organization's agility	KMP has significant positive impact on GI and GI have significant positive impact on CSR
Aamir et al., 2021	295 respondents from different organizations	SEM-PLS	Sustainable Performance (SP)	Green knowledge sharing (GKS)	Employee Ambidexterity (EA)	NA	GKS has significant impact on SP due to the mediating impact of EA
Hossain et al., 2022	Bangladesh's textile garment industry	SEM	Corporate sustainability (CS)	Corporate culture, Transformational corporate leadership, Corporate structure and Social capital	Knowledge management (KM)	NA	All four independent variables have significant impact on CS through KM
Sahoo et al., 2022	Indian manufacturing sector	PLS	Corporate environmental performance (CEP)	Green knowledge acquisition (GKA)	Green technology innovations (GTI)	Resource commitment	GKM has a direct impact on CEP and a considerable indirect effect through GTI
Wang et al., 2022	Services and manufacturing firms in Turkey	SEM	Corporate sustainable development (CSD)	Green knowledge management (GKM)	Green innovation (GI)	Organization green culture (OGC)	GKM has positive significant impact on CSD
Malik et al., 2023	Pakistan firms	SEM	Sustainable competitive advantage (SCA)	Green project management practices (GPMP)	Green knowledge acquisition (GKA)	NA	GPMP has direct and indirect positive impact on SCA through GKA

Figure 4 and Figure 5 show some of the mentioned structural models for illustration.

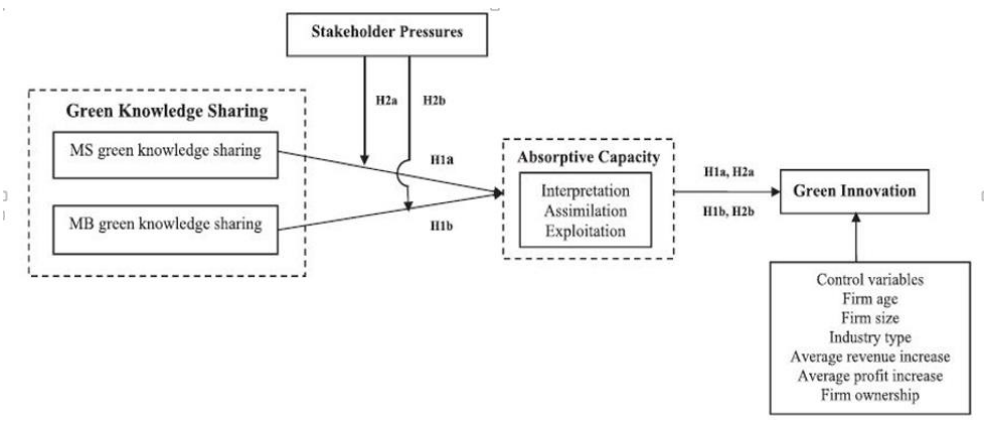

Figure 4. Structural model (Song et al., 2019)

Figure 4 shows the structural model proposed by Song et al. (2019), which shows the impact of green knowledge sharing on green innovation. This structural model proved that GKS has significant and positive impact on green innovation. The model has both moderator and mediator variable.

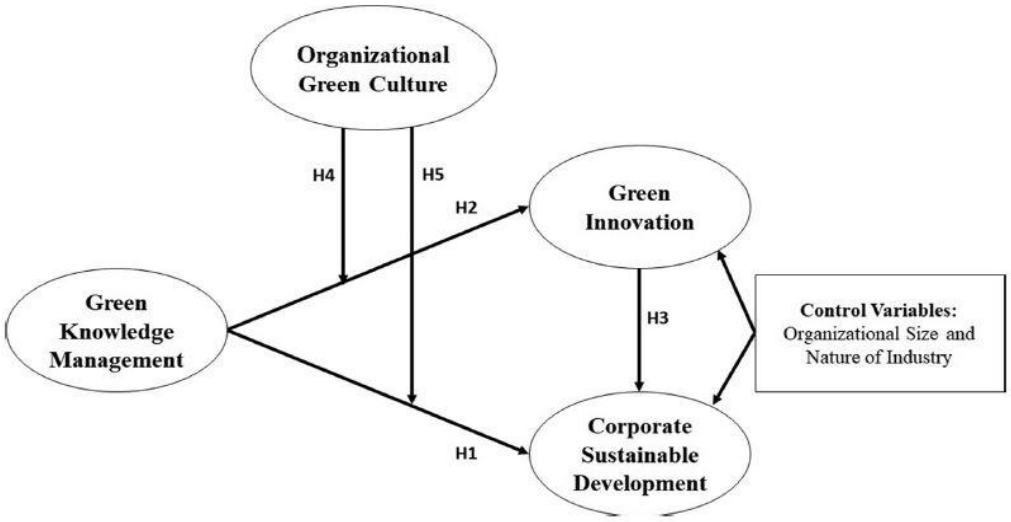

Figure 5. Structural model (Wang et al., 2022)

Figure 5 shows the structural model proposed by Wang et al. (2022). The structural model examines the impact of GKM on green innovation and corporate sustainable development.

5. CONCLUSION

Green knowledge management is extremely important to achieve the widely aspired performance of a sustainable enterprise, the principles of environmental protection and circular economy.

The aim of this paper was to provide a cross-section of the current relevant literature on green knowledge and the process of managing this concept, with special reference to the structural models. For this purpose, a bibliometric analysis was carried out based on certain predefined criteria and the research results were presented in a systematized way. GKM is an area of research with a potentially growing trend in citation and publication of papers, and it is expected that this topic will become even more prominent in the coming years to come.

This paper also discusses structural models that include the GKM concept as one of the variables (dependent, independent or mediator variable). Some structural models represent the GKM process comprehensively with all elements, while certain models only examine the influence of one of the GKM elements.

From the results of previous research, it can be concluded that in all structural models a positive and statistically significant influence of all or individual GKM elements could be demonstrated.

In the future period, more papers are expected that will prove similar hypotheses, because the review of the literature showed that in 2022 and 2023 there are research results that are at the level of questionnaire verification as a foundation for the future development of SEM and PLS models.

This work has certain limitations. First, the analysed results refer to the Scopus database. Second, the review of structural models is not complete, as more works are expected to be published in the future. The third review of structural models is focused on recent research.

The practical implications of this work include a systematized approach and insight into the current state of the narrow scientific field of green knowledge management. The structural models presented in this paper along with the relevant literature provide a good basis for research in other environments, countries in transition economies or countries that are candidates for EU membership. Also, considering that all the papers are based on research outside the territory of the Republic of Serbia, this work represents the starting point for further research on this topic in the national framework.

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