Big Data and Sustainability Innovation

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INTRODUCTION

This chapter presents the connection between big data and sustainability innovation. Understanding the connection between these two recent prominent topics is important because today, the need for sustainable innovation is increasing along with various global challenges faced both in terms of the natural environment and the social environment (Adams et al., 2016; Harsanto & Permana, 2021). Companies' innovations frequently have unanticipated consequences that degrade the environment on land, sea, and air. It also frequently harms the social environment, as evidenced by the growing economic divide between rich and poor.

This creates a sense of urgency for businesses to be able to innovate sustainably. Meanwhile, in terms of technology, the development of information communication technology is progressing rapidly, marked by, among others, big data and big data analytics, which help process large amounts of information and assist decision making, including decisions relating to innovation. These two major issues that are currently emerging, sustainability innovation and big data, which are the focus of this chapter. This chapter aims to better understand the link between big data and sustainability innovation. This achieved by exploring keywords form the scientific articles analyzed using bibliometric technique. This understanding is important because in the era of digitalization, companies need to rethinking about the ways they do business. Among the ways of doing business that business actors are starting to realize is the importance of achieving not only economic value but also social and environmental performance (Adams et al., 2016). Digital technologies such as big data regarded as a vital component to help companies achieve not only economic returns but also social and environmental benefits (Schneider, 2019). This chapter could be useful as a resource for academic and practical studies to maximize the use of big data to innovate sustainably and to serve as the foundation for future development.

BACKGROUND

Big data utilization has increased rapidly in recent years. Big data, which means huge volumes of data, when utilized carefully can help facilitate the organization in optimizing various business functions. For example, the use of big data can increase agility, which means the company's ability to effectively identify and respond to situations in its environment at speed (Ghasemaghaei et al., 2017). Sivarajah et al., (2017) suggested that big data can provide insight to enhance the decision-making process. these positive impacts can ultimately improve the company's performance, especially financial performance. Recent studies have found that increased profitability and reduced costs can be achieved with the effec-

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tive use of big data (Dana et al., 2022; Love et al., 2020; Müller et al., 2018; Silva et al., 2019). Müller et al. (2018) using panel data spanning 6 years involving more than 800 companies found that the increase in company productivity as a result of big data and analytics implementation was in the range of 3-7 percent. In a wider perspective, the use of big data also provides benefits for non-commercial usage such as education, smart city, or heritage management (Harsanto, 2021; Ozer et al., 2022; Wang, 2022; D. Zhang et al., 2022).

The focus of previous studies investigating the relationship between big data and operational or financial aspects of a company has prompted the question, how big data is related to non-operational or non-financial performance such as social or environmental aspects of the organization. As performance is determined by various traditional factors such as leadership or culture or other factors, it is interesting to find out the latest issues regarding the relationship between big data and performance, especially innovation performance (Azis et al., 2017; Harsanto et al., 2020; Widianto & Harsanto, 2017). This question is important because of the concern of various stakeholders towards business organizations to be able to provide economic benefits but more than that, it can also provide benefits to the environment and society (Nunan & Di Domenico, 2017). In this context, big data utilization is also no exception to this concern.

More specifically, the focus of this study is the sustainability of innovation as a specific form of innovation (Hansen & Große-Dunker, 2013; Harsanto et al., 2018; Harsanto & Permana, 2019). In general, sustainability innovation can be in the form of eco or social innovation (Gumbira & Harsanto, 2019; Hansen & Große-Dunker, 2013). A study from Calic & Ghasemaghaei (2021) shows that innovation is a mediator between big data and social performance. Although it does not directly discuss sustainability innovation, the study implies that there is a possible connection between the two. In a broader view, it is interesting to know the discussion about big data and its relation to sustainability innovation. The purpose of this paper is to explore this phenomenon and become the basis for further exploration.

This study contributes to the literature by providing an overview of big data connectedness and sustainability innovation which is still rarely studied in the literature. Previous studies have focused more on the technical aspects of big data or the relationship between big data and the company's financial performance.

METHOD

The approach used is a systematic search on the Web of Science database to then analyzed using bibliometric tecnhique. The keywords used are a combination of "big data" AND "sustainability innovation" in the topic, covering title, abstract, and keywords. The selection of keywords is carried out in a straightforward manner on two concepts that are the center of attention in this paper, namely big data and sustainability innovation. Indeed, there are several other synonyms of sustainability innovation that can be involved such as eco-innovation or social innovation and the like. However, these keywords are not used because these concepts are a subset of sustainability innovation and in this paper, we focus on the generic concept of sustainability innovation. The search results gave 386 documents. After a systematic search, the next two main steps were taken. First, capture descriptive statistics provided by WoS to find out various attributes of the obtained document. Second, exporting metadata in the form of plain text files for keyword occurrence analysis to determine the relationship between various concepts discussed in these two fields (Harsanto, 2020b; van Eck & Waltman, 2014). Further, the metadata is exported to MS Excel format to facilitate analysis and reading, especially the title, abstract, and other important information of the article. The step-by-step process is shown in Figure 1.