



Green Innovation and Green Accounting on Financial Performance: Literature Review and Future Research Agenda

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Abstract: *This review synthesizes previous literature with the aim of describing and analyzing the state-of-art for evaluating green innovation and green accounting, primarily focusing on financial performance. In addition, it aims to identify institutions and journals that lead publications, theories used, and countries that have researched the most on the influence of green innovation and green accounting on financial performance. Through a systematic literature review (SLR), a search on publish or perish resulted in the receipt of 30 peer-reviewed papers published up to March 2023. Although there was no time limit, the oldest paper was published in 2003, indicating that research on the impact of green innovation and green accounting Financial performance is a topic that is still of great interest today. China, America, as well as the UK and Germany are the countries that publish the most on this theme. In addition, this paper outlines various research gaps on this topic, especially from a methodological point of view. This work has important meaning for industry in formulating policies and strategies to encourage the use of green innovation and green accounting in improving its financial performance. Based on the results, a research agenda for the future has been established.*



Introduction

Increasingly severe environmental damage along with industrial and technological developments has led leading scientists to conduct extensive research on how environmental protection interacts with economic growth (Borghesi, Cainelli, Mazzanti., 2015);(Song, Fisher, Kwon., 2019);(Xie, Huo, Qi, Zhu., 2016). The emergence of various regulations governing the environment has resulted in the non-identification of several problematic conditions, especially for organizations that have the potential to threaten ecological sustainability (Astuti & Datrini, 2021). Using many natural resources, the rapid development of industry around the world causes serious environmental damage, leading to a decrease and increase in ecological quality and global warming, respectively.

Organizations' focus on environmental sustainability has changed greatly in the last 30 years. Beyond the moral reasons for 'green' development (Alfred & Adam, 2009), demands for environmental management also come from various sources. From a managerial perspective, we can identify a combination of external social and internal business-related factors (Burrit & Schaltegger, 2010). On the one hand the call for green management arises from social forces outside the organization. Companies must demonstrate a material commitment to environmental sustainability to comply with 'green' regulations and avoid reducing their reputation, potentially resulting in lost sales (Alfred & Adam, 2009).

Green innovation based on the resource-based RBV theory, it can be seen as distinctive green capabilities developed from various organizational resources (Cheng, Yang, Sheu, 2014). Green innovation can change a company's original production modes and processes, allowing them to produce more effectively (Wijethilake, Munir, Appuhami., 2016), which in turn contributes to competitive advantage and business performance. Green innovation can be seen as a distinctive green capability developed from various organizational resources (Cheng, Yang, Sheu., 2014). Green innovation can change a company's original production modes and processes, allowing them to produce more effectively (Wijethilake, Munir, Appuhami., 2016), which in turn contributes to a company's competitive advantage and financial performance.

Research on the relationship between green innovation and corporate financial performance can provide valuable insights into sustainable innovation strategies for managers (Frempong, Mu, Yeboah, Hossin, Gyamfi., 2021). As the problem of environmental degradation attracts the attention of researchers, it also attracts widespread attention from companies and policy makers (Su, Guo, Song., 2021). As a result, more and more stakeholders are paying more attention to their financial benefits and contributions to society and the environment (Akbar, Jiang, Qureshi, Akbar., 2021). Consistent with these developments, the relationship between green innovation and corporate financial performance currently occupies a prominent position in the broad research community (Wang et.al, 2021; Ma et.al, 2021; Li et.al. 2021). However, although there is a lot of research on this topic, the findings show inconsistent results. Most research results state a positive relationship between green innovation and financial performance (Rezende et.al, 2019; Lin et.al, 2019). Green innovation not only brings benefits to consumers and companies, but also significantly relieves

environmental burdens (for example, in energy conservation, pollution prevention, waste recycling, environmentally friendly product design, and environmental management). However, other research shows that green innovation has a negative effect on company financial performance (Baah et al. 2021).

Considering that innovation practice requires a high initial investment and is a high-risk activity, therefore good management is needed to plan and organize so that the green innovation process is able to produce quality innovation (Bibi and Narsa, 2022). Company management needs to apply appropriate accounting practices in identifying relevant measures of information related to the environment, thereby supporting business decisions (Derchi et.al, 2016). The application of green accounting will help companies or organizations make decisions by considering environmental aspects and environmental costs and increase long-term profitability (Hartiah and Pratiwi, 2022). However, company management considers this to be two sides of a coin which causes low industry awareness in implementing green industry through green accounting. On the one hand, the company believes that this will bring profits to the industry, but on the other hand, it seems as if it will lead to the potential for increased costs, through environmental costs. In fact, if we analyze more deeply, over a longer period of time, the implementation of green accounting will be very beneficial for all parties, including entrepreneurs, consumers and other stakeholders (Sunarmin, 2020).

Based on what was obtained from previous literature and keeping in mind the existing dilemma, this paper aims to describe and analyze the state-of-art for evaluating green innovation and green accounting, especially its impact on financial performance. In addition, it aims to identify institutions and journals that are leading publications with that theme. In other words, the main research question (RQ1) is: "How do green innovation and green accounting affect financial performance?" Followed by RQ2: "Are there any papers proposing the theory used?"

For this purpose, we conducted a systematic literature review (SLR) by analyzing 30 papers in peer-reviewed journals up to March 2023. We extracted papers from the Scopus database. Here we present an initial overview of the state-of-art theme. Our review proposes a conceptual framework for these themes and suggests key directions for future research. Researchers can consider these recommendations to focus efforts on relevant frontiers of knowledge.

Theoretical Construction

Resource Based View (RBV) theory was first pioneered by Wernerfelt (1984). The RBV theory views that company resources and capabilities are important for the company, because they are the main or basis of the company's competitive capabilities and performance. The assumption of the RBV theory is that how a company can compete with other companies, it must manage its resources to achieve the company's competitive advantage. A company tends to have competitive advantages related to the performance of differentiated strategies and the possession of superior competitive resources. These resources need to be used as a source of sustainable profit because they are valuable, rare,

irreplaceable, and cannot be competitively imitated (Berney 1991). They are also divided into three categories, namely tangible and intangible resources and human resource capabilities (Fahy and Smithee 1999). In this context, capabilities emphasize a company's performance choices, using available organizational resources. Wernerfelt explained that according to the RBV's view, companies will excel in business competition and obtain good financial performance by owning, controlling and utilizing assets, both tangible and intangible assets, especially those of a strategic nature.

Research Method

Based on the objectives of this research, the research methodology used is a systematic literature review. This approach makes it possible to identify, assess, and interpret research in a particular field by testing and analyzing concepts, theories, and practices (Rodrigues & Mendes, 2018). The literature review has two objectives, namely 1) mapping and summarizing the contents of previous research by identifying patterns, themes and research issues, 2) identifying the conceptual and contribution of research results to theory development. This systematic literature review is based on the steps proposed in the PRISMA Statement Flow Diagram proposed by (Moher et al., 2015) namely: 1. Defining the topic according to the criteria, 2. Determining the source of information, 3. Selecting appropriate/relevant papers, 4. Collecting papers and 5. Analyzing the papers. The complete SLR process is detailed in [Picture 1](#), which illustrates the steps to provide insight into the SLR process.

The database is collected until March 2023. As stated in the PRISMA flow which is supported by StArt software. StArt is an abbreviation for "State of the Art through Systematic Review". It is a supporting tool that helps researchers to apply SLR techniques (Hernandes et al., 2012). The keywords used are "green innovation", "green accounting", and "financial performance". Based on the results of searching for papers in databases using the Scopus data base using the publish or perish application, 290 papers were found that matched the search keywords. With so many articles, researchers only search and select articles that suit the topic. The determination of keywords is based on the research objective of analyzing the influence of green innovation and green accounting on company financial performance. The article selection process is carried out by applying predetermined restrictions and using keywords. The first step in selecting articles is to enter keywords in the title, abstract and literature keywords (TITLE-ABS-KEY). The next limitation is that the language of the article is chosen in "English". To increase the possibility of obtaining the appropriate amount of literature, the field is determined using all fields of science, and the year of publication is not limited. The type of display option is determined by the "open access" article. After checking for duplication, papers will be eliminated if they do not match the research title and abstract. So the papers selected to be used were 30 articles.

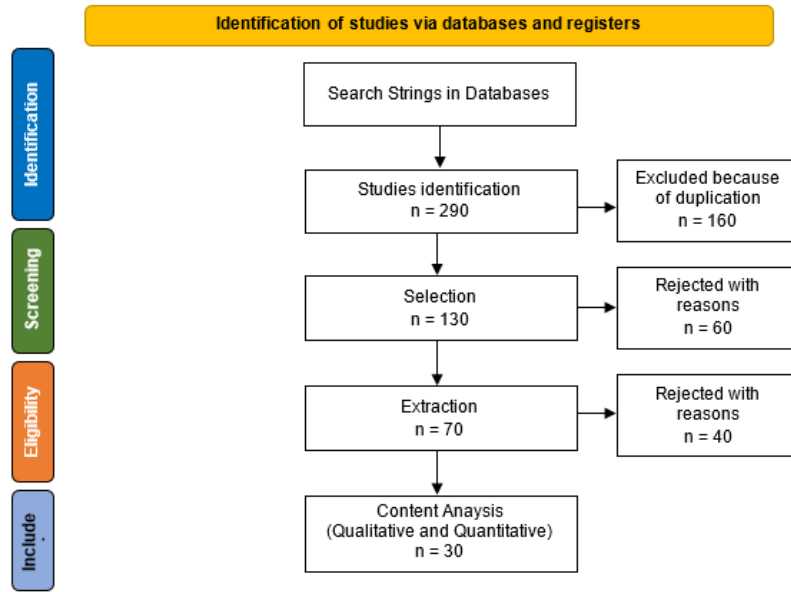


Figure 1. PRISMA model

Result and Discussion

The results of the analysis show that research related to the topic of financial performance which is influenced by green innovation and green accounting is dominated by China, followed by America and also the UK and Germany. This systematic literature review does not have a time limit for searching. Among the 290 papers initially searched, the oldest paper was published in 2003, followed by 2009, 2010, 2011, until 2023. As can be seen in Figure 1, SLR started with the 290 papers searched. Later, 160 were removed because they were duplicated. A further 100 were rejected on the grounds of incompatibility with the topic direction. Ultimately, 30 were accepted.

Table 1. The Ten Most Cited Studies

No	Writer	Number of quotes	Quotes per year
1	Calibri, 11 Lee (2015)	461	57.63
2	Xie (2019)	402	100.50
3	Aguilera & Caracuel (2013)	283	28.30
4	Zhu (2010) ; (Quartey et al., 2017)	262	20.15
5	Yu (2021)	258	129.00
6	Arfi (2018)	240	48.00
7	Tsai (2009)	210	15.00
8	Bhattacharya (2014)	194	21.56
9	Cao (2021)	167	83.50
10	Deegan (2013) ; (Grant & Yeo, 2018)	65	65.00

Source : Based on publication or perish (April 30, 2023)

Based on citation analysis, the initial step has been to determine the 10 most influential literature. According to previous literature (Milian et al., 2019; Paul & Singh, 2017), citation analysis not only shows which articles are the most popular, but also which articles have made the greatest contribution to their respective fields. The ranking given in Table 1 is based on the total number of citations. The review process showed that Lee (2015) and Xie (2019) were the top two studies with more than 300 citations. The author believes this research can serve as a foundation for future research.

Previous research considers the theoretical prediction motives of the relationship between green technology innovation and corporate financial performance. Previous researchers have proposed four dominant theories for studying relationships, namely the resource-based view (Russo and Fouts 1997), legitimacy theory (Preston and O'Bannon 1997), institutional theory (AguileraCaracuel and Ortiz-de- Mandojana 2013), and stakeholder theory (Weng et al. 2015), all of which have been used in the literature on these relationships. The resource-based view provides tools for environmental innovation researchers. This clarifies the relationship between internal resources, technological capabilities, and performance, which forms the basis for a holistic discussion on the relationship between green innovation and corporate financial performance (Cheng et.al, 2014; Tariq et.al, 2019; Johl and Toha 2021). In addition, legitimacy theory argues that disclosing environmental and social information to the public is a way to continue a company's existence or legitimize society (Gray et al. 1995). Scholars have suggested that environmental disclosure can positively or negatively influence financial performance and profitability by building on legitimacy theory (Neu et al. 1998).

Of the 30 pieces of literature, Resource Based Theory is the theory most widely used by previous research. Resource Based View (RBV) theory was first pioneered by Wernerfelt (1984). The RBV theory views that company resources and capabilities are important for the company, because they are the main or basis of the company's competitive capabilities and performance. Furthermore, Legitimacy Theory and Institutional Theory are also widely used by previous researchers. Followed by NRBV Theory, Signal Theory, Stakeholder Theory, Contingency Theory, Agency Theory, and Ecological Modernization Theory. The theories presented have been successfully used by the majority of research. The theory used in the literature review can be shown in Figure 2.

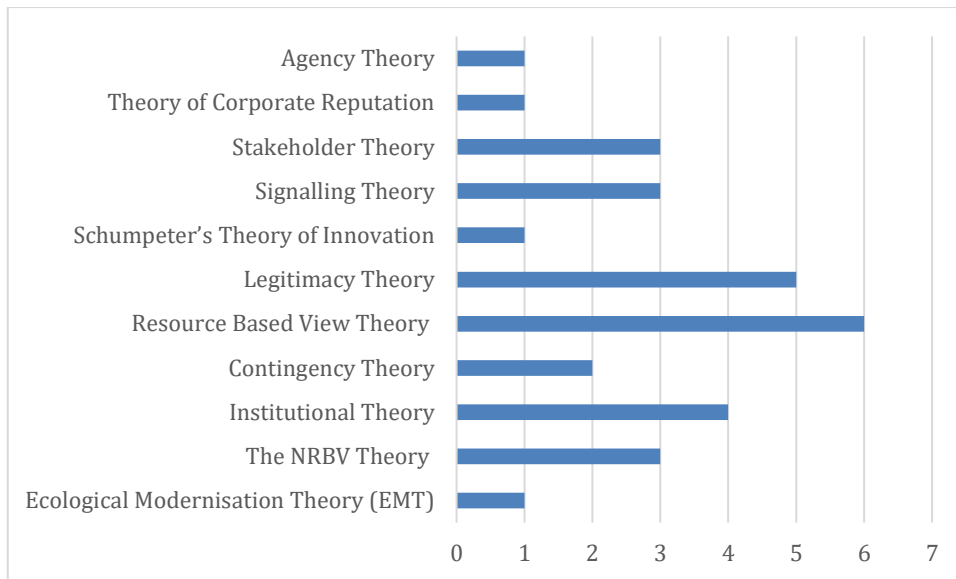


Figure 2. Theories used in previous literature

Thirty percent of papers use primary data, and seventy percent are secondary data. Most of the literature found is based on primary data. Therefore, this study suggests that future researchers conduct further research using primary data. Summarizes the results of the data types used in previous literature can be shown in Figure 3.

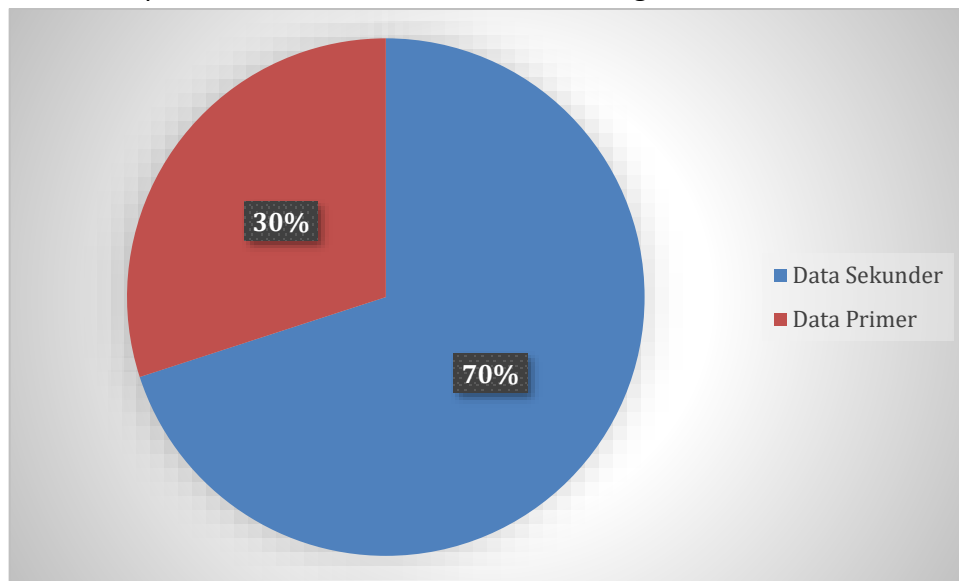


Figure 3. Types of data used in previous literature

Impact of Green Innovation and Green Accounting on Financial Performance

Previous research examining the effect of green innovation on financial performance shows different results. Some researchers argue that green innovation is risky and requires a lot of costs to invest, resulting in a direct decline in financial performance (Horváthová, 2012). On the other hand, other researchers argue that according to the resource-based view (RBV), green innovation can be seen as a distinctive green capability developed from various organizational resources (Cheng et.al, 2014). Green innovation has a positive relationship with financial performance. Green innovation can change a company's original production

mode and process, thereby enabling them to produce more effectively (Benito, 2005; Wijethilake et.al, 2018) which in turn contributes to the company's competitive advantage and financial performance. In addition, green innovation can protect companies from environmental protests and penalties (Xie et.al, 2019), indirectly protecting companies from environmental damage and risks.

Companies that implement green accounting are able to demonstrate good environmental performance, which has an impact on good financial performance as well. The effect of green accounting on financial performance can be observed in terms of income and costs. Increasing the implementation of green accounting in manufacturing companies can maximize potential revenue and increase efficiency in terms of costs. On the cost side, there are many benefits that companies gain as a result of increasing efficiency, avoiding potential liabilities, being better positioned to meet or exceed standards, and creating barriers to entry for potential competitors. This will increase the social trust of stakeholders such as the public and consumers, which in turn will be able to improve financial performance (Endiana et.al, 2020).

Conclusion

This research shows how to evaluate green innovation and green accounting, especially focusing on financial performance. Researchers with the most publications are in China, followed by America, UK, Germany. These researchers tend to collaborate with other researchers in the same country and even at the same institution. China is the most productive country and has proven to have more partnerships with other countries. Based on the SLR findings, the first conclusion is that evaluating the influence of green innovation on financial performance is a theme that has become increasingly popular in recent years, and not many people have researched the influence of green accounting on financial performance. Of the 30 pieces of literature, Resource Based Theory is the theory most widely used by previous research. Furthermore, Legitimacy Theory and Institutional Theory are also widely used by previous researchers. Followed by NRBV Theory, Signal Theory, Stakeholder Theory, Contingency Theory, Agency Theory, and Ecological Modernization Theory. A total of 16 previous researchers used a sample size of 101 – 500. In most papers the type of data used is secondary data, using primary or mixed data may be possible for future research. Although there are more papers that show the impact of green innovation and green accounting on financial performance, this SLR shows evidence that it does not have the greatest impact on the Asian continent. Further investigation is recommended to fill this gap.

All research presents limitations, and this study is no exception. However, these limitations can serve as a guide to further avenues of research, allowing knowledge flow to build knowledge in the field. The main limitation of our study is the limited number of papers of 30 articles. The practical implications of the findings of this research offer a wider research gap and become a future research agenda, both theoretically and empirically. These findings provide a gap for further research regarding financial performance through implementing green innovation accompanied by green accounting practices. Because the research only uses

the Scopus database in retrieving articles, further research can expand the reach of the article database, so that the study and assessment of research in this field becomes comprehensive

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