

MAPPING THE FIELD OF ECO-INNOVATION STRATEGIES: A REVIEW

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Abstract. *Purpose* – the implementation of eco-innovation practices is observed in the micro-level of the company and the integration of these practices with the overall firm’s strategy is inevitable. We set forth to investigate at what level the field of eco-innovation strategies has been studied at the firm-level.

Research methodology – a review of the most influential articles in the field of eco-innovation strategies was conducted. A total of 929 scientific publications included in Web of Science (WoS) (Clarivate Analytics) database between 1990 and 2020 were taken into consideration.

Findings – the results of this study reveal the following: (1) the increasing trend of publications in the field of eco-innovation strategies; (2) the most influential articles related to the topic; (3) the gaps of extant research and future research directions.

Research limitations – this study uses citations as a measure of influence which might be deceptive due to the fact that some authors might be citing themselves and / or citing publications in a negative context.

Practical implications – findings provide relevant insights about the input and the output of eco-innovation strategies and serves as a guide for researchers and practitioners exploring eco-innovation strategies.

Originality/Value – this study enhances the body of knowledge on the field of eco-innovation strategies. This is the first study, which investigates the scientific publications related to firm-level eco-innovation strategies and develops an operative conceptual model for future studies.

Keywords: eco-innovation, ecological innovation, environmental innovation, green innovation, sustainable innovation, strategies, literature review.

JEL Classification: M10, M16.

Conference topic: Contemporary Organizations Development Management.

Introduction

The increasing global concern about environmental protection has led the industries to shift focus from solely on profit to sustainable development, green practices and pursue of environmental related innovations. The lifestyles of developed societies, economic and societal growth have consequences for public health, alter the quality of life, and increase the environmental and social issues. Therefore, the issues related to water and/ or air pollution and enormous quantities of waste have been observed in the scientific literature (Tamayo-Orbegozo et al., 2017). The changes of environmental regulations and growth of the consumers’ awareness of environmental change (Munodawafa & Johl, 2019) had forced the firms to adapt and take a different perspective on environmental innovations, such as: “energy-saving, pollution-prevention, waste recycling, green product designs and corporate environmental management” (Chen et al., 2012).

Environmental challenges have led to adjustments in global and local policies, and industrial initiatives such as establishment of Sustainable Development Goals (SDGs) by the United Nations (UN) (Lopes Santos et al., 2019; Moratis & Melissen, 2019) to address these challenges. In order to pursue SDGs through eco-innovations, the firms are being pushed to innovate, look more efficient processes and new materials (Tamayo-Orbegozo et al., 2017), develop new products, processes and managerial as well as organizational alterations (Albort-Morant et al., 2017). Environmental innovations have been acknowledged as both the antecedent and the way of solving many environmental issues

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(Franceschini et al., 2016). Therefore, the development of environment-friendly products is one of the most significant course in current environmental management (Luiz et al., 2016). The environmental innovations consolidate sustainable development by diminishing of non-renewable resource dependence, waste and hazardous materials production, as well as materials and energy consumption (Munodawafa & Johl, 2019). Notably, eco-innovation differ from other types of innovations and emphasizes the environmental aspect which makes it an ideal stimulant to the transformation to a circular economy, thus stimulating economic development without inducing irreversible damage to the natural environment (Munodawafa & Johl, 2019). Hence, the development of eco-innovations might be a solution for the firms that encounter a discrepancy between economic development and environmental protection (Chen et al., 2012).

The approach to sustainable development through adoption of environmental innovations, growth of environmental regulations and popular environmentalism has opened new horizons for establishment of new competitive rules in business. According to Shukla (2019), there is no theoretical basis for an agreement on environmental innovation or eco-innovation strategy in the literature. Therefore, we address this gap and set forth to enhance the body of knowledge on the field of eco-innovation strategies, rising the question: at what level the field of eco-innovation strategies has been studied at the firm-level?

The paper is structured as follows. In the next section, a brief review of eco-innovation concept and eco-innovation as a strategy are introduced. Later on, a detailed explanation of research protocol is presented in materials and methods section. The results section reveals the findings of this study with an intent to answer the research questions. Finally, discussion and conclusions are provided.

1. The concept of eco-innovation

The eco-innovation phenomenon has been investigated from a variety of perspectives and different fields. Therefore, there is a need to clarify the definition of eco-innovation before delving deeper into eco-innovation related investigations. The scholars who analysed eco-innovation interchangeably used the following terms: ecological innovation, environmental innovation, sustainable innovation and green innovation. Thus, the rest part of the chapter provides a brief review of other studies, widely cited definitions, differences and similarities of these definitions.

The term “eco” is often used as an abbreviation for “ecological”, which is common in various perspectives in different disciplines, some of the terms, such as: “eco-efficiency”, “eco-effectiveness”, “eco-design”, “eco-label”, “eco-performance”, “eco-materials”, “eco-agricultural”, “eco-industrial” and etc. To conclude, the scholars explored the ecological dimension of the researched phenomenon (Derwall et al., 2005; Alam et al., 2014; Pacheco-Torgal & Jalali, 2012; Nimon & Beghin 1999; Knight & Jenkins, 2009; Brécard et al., 2009; Kim & Stepchenkova, 2018; Luiz et al., 2016; Zabalza Bribián et al., 2011; Niero et al., 2017). According to Ruiz-Real et al. (2018), topics such as: “eco-innovation”; “eco-design”, and “waste management” attracted the most attention in academia.

Though numerous definitions on “eco-innovation” prevail, Schiederig et al. (2012) suggest that scientific studies should focus on the extent to which environmental issues are incorporated into the economic process. Thus, innovations with reduced environmental impact than relevant alternatives should be considered. Eco-innovation can be defined as novel (created or adopted) to the organization production, consumption or usage of a product, manufacturing processes, services, management or business methods that influence a reduction of negative environmental impacts as compared to relevant alternatives (Díaz-García et al., 2015). Subsequently, two ways in defining eco-innovation can be distinguished: (1) by the original intention of innovation; (2) by the effect on the environment. Tamayo-Orbegozo et al. (2017) describe eco-innovation as any solution that is implemented during any stage of product’s life cycle, which introduce a reduction in the negative environmental impact. Munodawafa and Johl (2019) emphasizes the organizational changes, which consist of development of new products and/ or processes that diminish environmental impact, simultaneously improving economic performance as well as the importance of new ideas, technologies and behaviours.

Organisation for Economic Cooperation and Development (OECD, 2010) distinguishes three main focus areas of eco-innovation: (1) its targets; (2) methods for introducing changes; and (3) the effects on environmental conditions. With current eco-innovation trend to focus on technological change, other non-technological innovations are adopted such as: new organizational and/ or new marketing methods (OECD, 2010).

Notably, “environmental innovation” is another popular term, which is found in the scientific literature across various disciplines. This term began to dominate the scientific debates despite the predominant term of “eco-innovation” (Díaz-García et al. 2015). According to Díaz-García et al. (2015), variety of factors drive environmental innovations, such as: government regulation, consumer pressure and cost pressure. However, Franceschini et al. (2016) argue that eco-innovation is an intersection between economic and environmental innovation, thus environmental innovation being any type of innovation that benefit the environment.

Yin et al. (2018) argues, that “green innovation” is aiming to adapt to the trends of environmental improvement and thus, sustainability must be taken into consideration. The scholars present three perspectives on green innovations: (1) green innovation is seen as an attempt to diminish effects on environment, introducing green behaviours,

products and processes that meet the need of ecological sustainable development; (2) green innovation is seen as innovation taking into consideration environmental performance; (3) green innovation is identified as an advancement of environmental performance and innovation. Green innovation introduces ecological thinking to economic strategy and might encompass the development of new products, markets and systems (Yin et al., 2018). Moreover, green innovations are at the very early stages of rapid development (Tekin & Kocaoglu, 2011). Albort-Morant et al. (2017) defines the concept of green innovation as an innovation with the main focus on mitigation or completely avoiding environmental damage simultaneously enabling companies to meet the demand of new consumer and create value. The scholars argue, that roots of green innovation are entrenched in field of environmental management.

Schiederig et al. (2012) identified and analysed four main terms of “sustainable innovation” and came to the conclusion that the following definitions can be used synonymously: “eco/ecological innovation”, “environmental innovation”, “green innovation” and “sustainable innovation”. Schiederig et al. (2012) argue that regarding to the content all four notions investigate the same topic and identify six important aspects, which summarise different definitions (see Schiederig et al. 2012, p. 182). Thus, four particular terms are used to define the type of innovation, which aimed at reducing negative environmental impacts (Yin et al., 2018; Franceschini et al., 2016; Albort-Morant et al., 2017; Díaz-García et al., 2015).

To conclude, various scholars agree that eco-innovation should have a positive impact on the environment. Referring to Schiederig et al. (2012), the researchers use the terms “eco/ecological”, “environmental”, “green” and “sustainable” interchangeably, defining innovation, which aims to diminish the harm of economic activities on the environment. However, a lack of studies on the phenomenon, especially from organizational management and strategic perspective is observed (Tamayo-Orbegozo et al., 2017). Therefore, this paper analyses the scientific literature on eco-innovation strategies from organizational management and strategic perspectives and considers four above mentioned definitions as interchangeable.

2. Eco-innovation as a strategy

The topic of sustainable development has increasingly attracted organizational attention, due to the potential for organizations not only satisfy the environmental needs, but also differentiate themselves from the competitors and gain sustainable competitive advantages (Albort-Morant et al., 2017). While the competition rises to the new level, the organizations are being pushed to compete in multiple dimensions, create new green business strategies and adapt to the stakeholders’ requests. Therefore, the investments in environmental management enhances production efficiency, development of new markets and increases R&D capabilities of the firms (Chen et al., 2012). Chen et al. (2012) argue, that the popularity of environmental trends influences one of the most important strategic tools in gaining sustainable competitive advantage – green innovation. The development of eco-innovations is assumed to be relevant for ecological differentiation strategies of the firms and reshape the competitive rules in achieving competitive advantages. The scholars suggest, that organizational resources must be directed towards environmental challenges and the environmental innovations can be a source of sustainable competitive advantage (Munodawafa & Johl, 2019). The companies need to develop eco-innovation as their main center of attention of the strategic planning in order to boost their strategic and economic performance (Bossle et al., 2016). According to Tamayo-Orbegozo et al. (2017), eco-innovations should be included in the firms’ long-term strategic plans, which consider environmental problems. Moreover, eco-innovations should be taken into account in the development of innovation and sustainability policies.

Though implementation of eco-innovation practices is observed in the micro-level of the company, the integration of these practices with the overall corporate strategy is inevitable (Wagner & Llerena, 2011) along with key resources and capabilities, such as qualified personnel, networking, absorptive capacity and green organizational identity (Díaz-García et al., 2015). Therefore, the integration of environmental practices in the company’s strategy requires leadership, visionary management, organizational culture and change management (Paraschiv et al., 2012). The study, performed by Qi et al. (2010) concludes, that “managerial concern is the most important driver for the adoption of green practices”. Therefore, it is safe to assume that adopting eco-innovation strategy is a long-term decision. Integrating environmental initiatives into a company’s strategy can boost the potential in creating a competitive advantage in several ways, for example: reducing cost and/ or environmental compliance as well as maintain the innovativeness and competitiveness of the organization (Munodawafa & Johl, 2019). Eco-innovation strategies origins from both cost-leadership and differentiation competitive strategies (Díaz-García et al., 2015). Notably, cost-leadership strategic approach motivates companies to develop eco-innovations in order to reduce energy, materials and taxation. Meanwhile, differentiation approach motives companies to obtain greater market share. Albort-Morant et al. (2017) suggest, that commercialization of sustainable products increases differentiation advantages. Environmental innovation has a positive relationship with competitive advantage and can enhance the value of product, improve corporate image and overall performance (Chen et al., 2012).

To conclude, the desire of the firms to adopt eco-innovations is driven by external pressure, such as growing environmental regulations and stakeholders’ demands, or by the realization, that this can provide a competitive

advantage and increase economic performance by reducing costs and/ or improving reputation. (Díaz-García et al., 2015). Therefore, two types of eco-innovations are distinguished: proactive and reactive (Chen et al., 2012). Proactive eco-innovations are related to companies' initiative to innovate and develop new practices or products as compared to competitors, in other words to lead the market in order to gain competitive advantage. Reactive eco-innovations are related to the companies' compliance with environmental regulations and stakeholders' requests in order to respond to the changing environmental pressure and regulations, as well as competitors' actions. The firms, which develop their strategy and assets, capabilities, culture and knowledge in line with eco-innovations, can meet environmental regulations and create barriers to the competitors (Chen et al., 2012).

3. Materials and methods

Considering the importance of eco-innovation strategies, the aim of this paper is to investigate at what level the field of eco-innovation strategies has been studied at the firm-level. Aiming to achieve this aim, a literature review was conducted. In this section we present research design (Figure 1). and steps included in the research protocol, for this study PRISMA method was used (Moher et al., 2010).

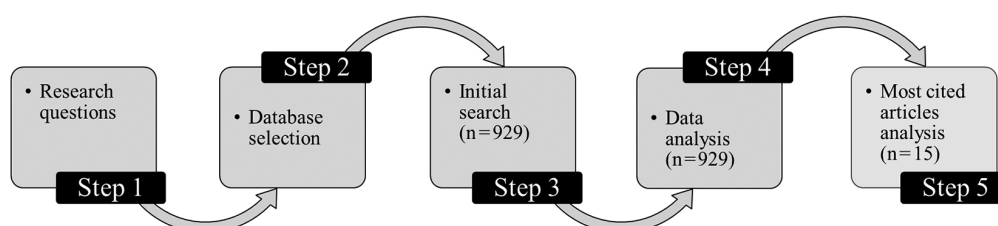


Figure 1. Research design (source: authors)

Step 1. Research questions. Aiming to achieve the aim of this study, the following research questions were formulated:

- (RQ1) which are the most influential articles in the field of eco-innovation strategies?
- (RQ2) how these articles investigate eco-innovation strategies?

Step 2. Database selection. For this study Web of Science (WoS) (Clarivate Analytics) database was selected, which is used by many published bibliometric studies (Maditati et al., 2018). Many studies have compared mainstream databases, such as: WoS, Scopus, Google Scholar, etc. and found that WOS and Scopus are interchangeable and provide similar results. However, in regard to social sciences and humanities, WoS is recommended due to its higher proportion of exclusive journals (Gao et al., 2020). The database also combines and involves several academic disciplines, as well as indexing of the most cited journals (Pedro et al., 2018).

Step 3. Definition of keywords. This paper analyses the scientific literature on eco-innovation strategies and considers four terms from Schiederig et al. (2012) study mentioned above as identical. The first search topic was designed to extract the eco-innovation terms mentioned above and the second topic was aimed at extracting the strategic dimension. Quotation marks and asterisk were included in the search in order to combine two keywords: ecology with innovation (e. g. environmental innovation), thus minimizing the risk that two keywords are used separately in the title or abstract. Asterisk help to extract the different word endings (e. g. strateg*), such as: strategy; strategies; strategic. Topic search includes: title, abstract, author keywords, and Keywords Plus. TOPIC: (“eco-innovat*” OR “ecolog* innovat*” OR “environment* innovat*” OR “green innovat*” OR “sustainab* innovat*”) AND TOPIC: (strateg*).

Step 4. Data collection and analysis. The search was performed and data collected in February 2021. The data search resulted in 929 publications. Only empirical scientific articles (document type: article), which investigate eco-innovation strategies, published between 1990 and 2020 were collected for this study. After initial search, the results were exported with full record and cited references in the “.txt” format. Before the data analysis, a general data processing was performed using MS Excel, during which, the missing data were manually entered from WoS database. For this study we used citation as a measure of influence.

Step 5. Article selection and analysis. After data collection, aiming to answer RQ1 the 15 most cited articles, matching the search criteria, were identified. Aiming to answer RQ2, these (top 15) most cited articles were analysed. The articles included for further analysis selected based on criteria (Table 1), and coherence with the research objective. The inclusion criteria describe the types of articles that are eligible for in-depth review (Petticrew & Roberts, 2006). “Mendeley Desktop” software was used to for article analysis.

This study presents the following results that are provided in the next section:

- Publications output and growth trend by each year (1990–2020);
- The top 15 most cited articles based on search criteria;
- Analysis of the 15 most cited articles.

Table 1. Article inclusion criteria (source: authors)

Nr.	Inclusion criteria
1.	Document type: article
2.	Language: English
3.	Timespan: 1990–2020
4.	Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI
5.	Is in the top 15 most cited articles matching the search criteria
6.	Investigate eco-innovation strategy/strategies at the firm level
7.	Investigate eco-innovation as an input and/ or output of firms' strategy/strategies
8.	Include a clear description of the fieldwork and the results deriving thereof

4. Results

This section presents the result of this study. Given the aim of the study and raised research questions, this study examines scientific documents on eco-innovation strategies including other eco-innovation terms, such as: ecological innovation; environmental innovation; green innovation; sustainable innovation; on 929 articles in the ISI Web of Science (WoS) database for the 1990–2020 period. The number of scientific documents produced in the field and growth trend, are important measures for assessing the development of a specific research field, therefore we study the publications output and growth trend by each year (Figure 2).

Although, this study examines the articles from 1990 to 2020, there was no publications until the year 1992. Article titled: “Strategy and the Environment” by (Barrett, 1992), was the first published document, based on search criteria that is listed in the WoS database. The number of publications from year 1992 until 2006 did not reach 5 publications or more by each year, until the year 2007 (n = 9), with an increasing growth afterwards. From 2008 (n = 8), we can observe that an increasing number of scientific papers are being published by each year. During the year 2011, total of 20 articles were published; year 2014 total of 39 articles were published and 2016 – total of 80 articles were published doubling the publication rate by every two years. An exponential growth can be observed from year 2017 (n = 79); year 2018 (n = 128); year 2019 (n = 163); year 2020 (n = 248). This study was performed in the February 2021 and it did not include publication results for 2021, because there is a possibility to distort the trend. We can observe, that for the last decade, publications related to eco-innovation strategies has been growing rapidly.

To answer *RQ1*, the top 15 most cited articles based on search criteria are presented (Table 2). The most cited article is by authors Schot, Johan; Geels, Frank W., published in 2008, has been cited 759 times with average citation per year n = 63.25. The second most cited article is by authors De Marchi, Valentina, published in 2012, has been cited 426 times with average citation per year n = 35.5. The third most cited article is by authors Chen, Yu-Shan, published in 2008, has been cited 413 times with average citation per year n = 34.4.

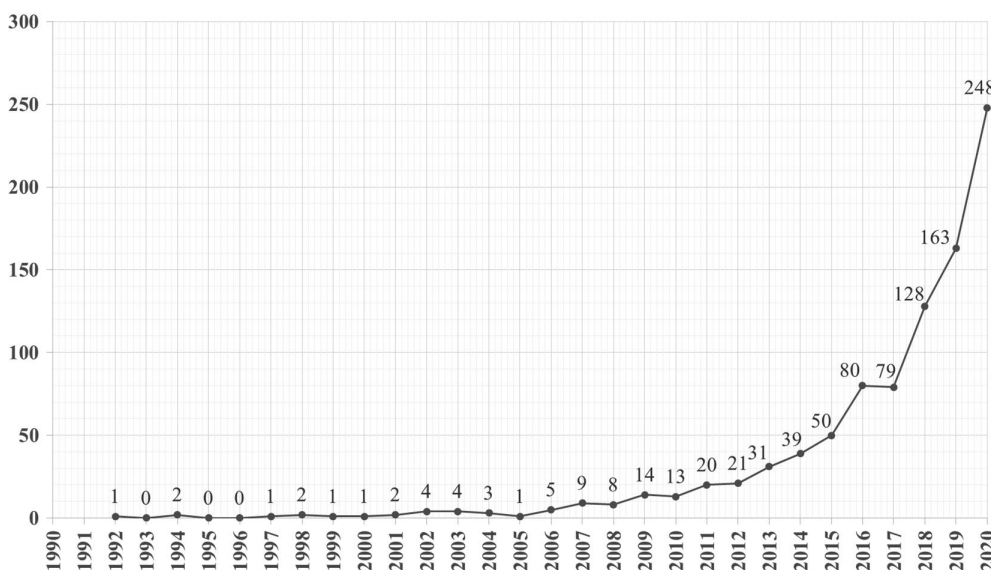


Figure 2. Publications output and growth trend by each year (1990–2020) (source: authors)

Table 2. The top 15 most cited articles based on search criteria (source: authors)

Publication Title	Author	Journal	PY/ TC*
Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy	Schot, Johan; Geels, Frank W.	<i>Technology Analysis & Strategic Management</i>	2008/759
Environmental innovation and R&D cooperation: Empirical evidence from Spanish manufacturing firms	De Marchi, Valentina	<i>Research Policy</i>	2012/426
The driver of green innovation and green image – Green core competence	Chen, Yu-Shan	<i>Journal of Business Ethics</i>	2008/413
Mainstreaming Green Product Innovation: Why and How Companies Integrate Environmental Sustainability	Dangelico, Rosa Maria; Pujari, Devashish	<i>Journal of Business Ethics</i>	2010/400
Sustainable Supply Chain Management and Inter-Organizational Resources: A Literature Review	Gold, Stefan; Seuring, Stefan; Beske, Philip	<i>Corporate Social Responsibility and Environmental Management</i>	2010/386
Suppliers and environmental innovation – The automotive paint process	Geffen, C. A.; Rothenberg, S.	<i>International Journal of Operations & Production Management</i>	2000/338
A Holistic Framework to Improve the Uptake and Impact of eHealth Technologies	van Gemert-Pijnen, Julia E. W. C.; Nijland, Nicol; van Limburg, Maarten; Ossebaard, Hans C.; Kelders, Saskia M.; Eysenbach, Gunther; Seydel, Erwin R.	<i>Journal of Medical Internet Research</i>	2011/322
Eco-innovation and new product development: understanding the influences on market performance	Pujari, D.	<i>Technovation</i>	2006/317
A Meta-Analysis of Environmentally Sustainable Supply Chain Management Practices and Firm Performance	Golicic, Susan L.; Smith, Carlo D.	<i>Journal of Supply Chain Management</i>	2013/284
Building capacity and sustainable prevention innovations: a sustainability planning model	Johnson, K; Hays, C; Center, H; Daley, C.	<i>Evaluation and Program Planning</i>	2004/242
Drivers of different types of eco-innovation in European SMEs	Triguero, Angela; Moreno-Mondejar, Lourdes; Davia, Maria A.	<i>Ecological Economics</i>	2013/242
Barriers and stimuli for ecodesign in SMEs	van Hemel, C.; Cramer, J.	<i>Journal of Cleaner Production</i>	2002/237
The Influence of Corporate Environmental Ethics on Competitive Advantage: The Mediation Role of Green Innovation	Chang, Ching-Hsun	<i>Journal of Business Ethics</i>	2011/228
Ecological modernisation: new perspectives	Jaenicke, Martin	<i>Journal of Cleaner Production</i>	2008/210
Green and competitive? An empirical test of the mediating role of environmental innovation strategy	Eiadat, Yousef; Kelly, Aidan; Roche, Frank; Eyadat, Hussein	<i>Journal of World Business</i>	2008/208

Note: *PY/TC – publication year / times cited.

Notably, the search criteria have led to several articles included in the WoS database, which match the investigated phenomenon. Considering the accuracy of the search, the results might not fully reflect what is expected and thus, an in-depth analysis of the articles is almost always necessary. In order to have an in-depth understanding and to answer RQ2, most cited articles were analysed (Table 3). Out of 15 most cited articles based on search criteria, only 5 were included for further analysis. Three the most influential articles related in the field of eco-innovation strategies are: (1) De Marchi (2012) (n = 426 citations); (2) Chen (2008) (n = 413 citations); (3) Triguero et al. (2013) (n = 242 citations). However, these studies focus on the strategies through drivers and barriers and eco-innovations as the output. Meanwhile, eco-innovation as an input of organization's strategy is neglected (Table 3).

The studies conducted by Chang (2011) with total of 228 citations, and by Eiadat et al. (2008) with total of 208 citations, perceive eco-innovations as an instrument (i.e. eco-innovations as a mediator) contributing to competitive advantage and/ or business performance. Therefore, the results of this study let us generate the operational model of analysis (Figure 3).

Table 3. Analysis of the most cited articles (source: authors)

Author(s) and (Year)	Sample, Analysis	Examined phenomenon	Findings
De Marchi (2012)	6047 manufacturing firms from Spain, (PITEC), logit regression	Relationship between firms' R&D cooperation strategies and their propensity to eco-innovate	(1) internal R&D activities and R&D cooperation with external partners might be a substitution; (2) R&D cooperation is more intense for eco-innovators; (3) firm's characteristics and internationalization strategies affect eco-innovation propensity.
Chen (2008)	136 firms from information and electronics industry of Taiwan, regression analysis	The positive effect of green core competence on green innovation	(1) green core competences of firms have a positive effect on firms' product/process eco-innovation performance, and green images; (2) product/ process eco-innovation performance has a positive effects on firms' green images; (3) investment in the green core competence, product/ process eco-innovation performance is helpful to businesses performance.
Triguero et al. (2013)	4947 SMEs from 27 European countries, multivariate probit regression analysis	Supply-side, demand-side and regulatory factors driving different types of eco-innovation	(1) collaborative networks are essential driver for eco-innovation; (2) supply-side factors are more important driver for processes and organizational eco-innovations than for product eco-innovations; (3) cost-savings are solely significant for process eco-innovations; (4) anticipated regulations and access to subsidies does not affect firms' decision to eco-innovate.
Chang (2011)	106 Taiwanese manufacturing firms, structural equation modelling	Eco-innovation performance as a mediator between firms' environmental ethics on competitive advantage	(1) firms' environmental ethics is positively related to product/process eco-innovation; (2) firms' environmental ethics is positively influence firms' competitive advantage; (3) product eco-innovation is seen as mediator, given the positive link between firms' environmental ethics and competitive advantage, but process eco-innovation is not.
Eiadat et al. (2008)	119 firms from chemical industry in Jordan, structural equation modelling	Eco-innovation strategy as a mediating factor between stakeholders' pressures, managerial environmental concerns, governmental regulations and firms' business performance	(1) management personnel's interest in environmental issues is the strongest determinant of eco-innovation strategy; (2) government environmental regulation has a negative effect on adopting eco-innovation strategy; (3) there is no relations between anticipated stakeholder pressures and eco-innovation strategy; (4) there is significant positive relationship among eco-innovation strategy and firms' business performance.

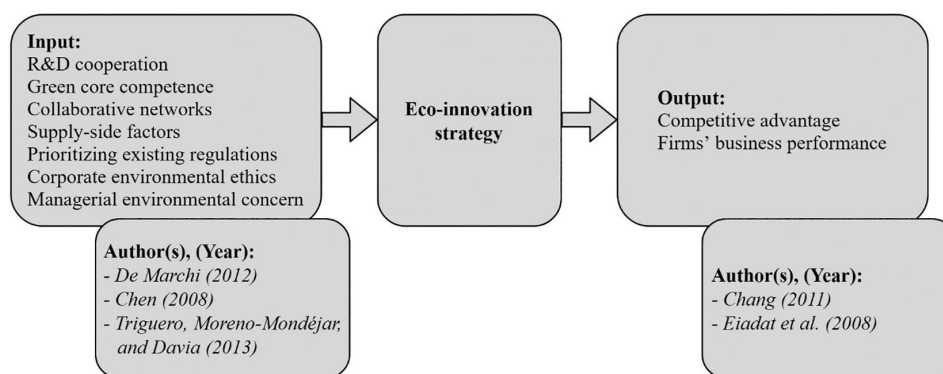


Figure 3. The operative conceptual model of analysis (source: authors)

Discussion

In this study, a review of most influential articles in the field of eco-innovation strategies was conducted. A total of 929 scientific publications in the ISI Web of Science (WoS) database published between 1990 and 2020 were taken into consideration. Key takeaways are summarised below.

The analysis of publication output and growth trend let us observe the growing interest in the field, especially in the last five years thus, the publication output represents exponential growth. The results are compatible with studies of Yin et al. (2018), and Ruiz-Real et al. (2018), who observed the same increasing trend of global green innovation and circular economy.

Though, out of 15 most cited articles only 5 were included for further analysis, this confirms the fact that, not always the results correspond to the phenomenon under study and an in-depth analysis of the articles is almost always necessary. The most influential articles in the field of eco-innovation strategies were identified, however only two

articles perceive eco-innovations as an instrument (i.e., eco-innovations as a mediator) of competitive advantage and/or business performance. Our results demonstrate that the research on eco-innovation strategies is rather recent and the obtained results let us draw conclusions, which are presented in the following section.

Conclusions

In the context of contemporary organizations' management, a research stream related to adoption of eco-innovation is very important and relevant. Therefore, we set forth to investigate at what level the field of eco-innovation strategies has been studied at the firm-level. This study discloses that the research on eco-innovation strategies is relatively new.

Considering the increasing social demand, governmental regulation and subsidies for reduction of environmental impact in contemporary organisations, we argue that the interest into eco-innovation strategies is constantly increasing and it will continue to do so. This is confirmed by the exponential growth of scientific publications in both developed and developing countries. However, current scientific literature analyses and focuses on the strategies through drivers and barriers and perceive eco-innovations as the output and not the instrument (i.e., eco-innovation as an input) of organization's strategy.

Though the study was performed on pre-planned methods, which minimize bias and random error, the literature reviews have some limitations. The first limitation of the study is related to the citation analysis. Notably, citations might be deceptive due to the fact that some authors might be citing themselves and / or citing publications in a negative context. The second limitation stems from the selected time line and constant update of WoS database. For example, if the same analysis was conducted in different time period, the results could be different.

Finally, we develop a future research direction, which should create a more holistic theoretical approach to eco-innovation strategies. We suggest that future investigations should investigate the process of eco-strategy development. Meanwhile, the input and the outcome of the eco-innovation strategies should be distinguished. Finally the future investigations could consider the development of a theoretical basis for definition and classification of eco-innovation strategies.

Disclosure statement

Authors declare no competing financial, professional, or personal interests from other parties.

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