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Review

Exploring the Direction on the Environmental and Business Performance Relationship at the Firm Level. Lessons from a Literature Review

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Abstract: The interest of scientists and companies in understanding the business implications of environmental investment is timely; however, a dilemma remains at the firm level: is the environment a "strategic competitive factor", as in the "Porter point of view", or is it a "luxury good", as in the "Wagner point of view"? Our research contributes to this debate through a review of the papers published in scientific journals between 2000 and 2015 that discussed the direction of the relationship between the environmental and business performances of enterprises. The objectives of the research are: (a) to verify if there is an agreement in the scientific literature of the last 15 years about the "Porter–Wagner dilemma" when focusing at the firm level; (b) to underline the prevalent cause and effect directions of the relationship between environmental and business performance; and (c) to investigate the reasons for any disagreements in this topic among the scientists. The results show that the main agreement regards the positive bi-directional relationship, as a virtuous cyclic approach with mutual effects between business and environmental performance; nevertheless, more complex hypotheses emerge, such as nonlinear and/or conditional relationship, that need to be further explored. On the other hand, the Porter–Wagner dilemma remains, and the main reason for the non-agreement among scientists can be due to the several non-homogeneous variables considered in the analyses. Thereafter, as lesson for scientists, the priority is to share univocal methods to measure firms' environmental and business performances.

Keywords: business performance; enterprises; environmental performance; literature review; Porter–Wagner dilemma

1. Introduction

The issue of environmental sustainability is of great interest for companies today [1,2]. The international community encourages companies to adopt cleaner production systems and technologies [3–5] and to understand the business implications of environmental investment [6–9]. The market seems to reward environmentally responsible organizations, and many companies around the world are increasingly interested in environmental issues and are introducing them as strategic variables in their businesses (see also [10–16]). Increasing environmental certifications and labeling can be understood to demonstrate that environmental improvement benefits firms' performance (see also [17–22]). On the other hand, we must recognize that companies with better economic/financial performance are often able to promote environmental initiatives and/or adopt cleaner production technologies (see also [23–26]).

The so-called "neoclassical" approach that considers the environment as a negative externality and focuses on the environment in terms of compliance with regulatory requirements is considered to be outdated [27–33].

The dilemma thus arises: is it beneficial for a company to invest in the environment, or is environmental commitment achievable only for enterprises with good economic performance? In other words, is the environment a "strategic competitive factor", such as in the "Porter point of view" [34–36], or is it a "luxury good", such as in the "Wagner point of view" [24,26]?

There is a longstanding debate regarding this topic, "like finding the Holy Grail" [37]. Nevertheless, the growing body of studies is often inconclusive in solving the "Porter–Wagner dilemma": does better environmental performance determine better business performance of companies or vice versa (see also [38–41])? Now, we are aware that the answer to this dilemma has important implications for business strategies and institutional policies (see also [30,42,43]).

Above all, the analysis of the relationship between environmental performance (EP) and business performance (BP) is even more relevant from the firms' perspective, since companies have great interest in learning about the economic benefits of environmental responsibility [44,45]. On the other hand, at the firm's level, the difficulty of quantifying the economic added value of the adoption of environmental strategies remains [46,47].

This paper contributes to this debate, through a comprehensive review of the scientific literature of the last 15 years, with the following objectives: (a) to verify if there is an agreement about the "Porter–Wagner dilemma" when focusing at the firm level; (b) to underline the prevalent cause and effect directions of the relationship between EP and BP of companies; and (c) to investigate the reasons for any disagreements in this topic among the scientists.

In this paper initially we summarize the literature background and underline the main literature gaps concerning the "Porter–Wagner dilemma". Coherently with these gaps, in Section 3 we define the research theoretical framework, including research questions and hypotheses, and the materials and methods adopted to conduct the systematic literature review. Hence, in Section 4, we summarize the research results, and we compare them among the research hypotheses. In Section 5, we discuss these results with the research questions. Finally, in Section 6, we conclude the paper with notable statements and future perspectives, both for managers, practitioners, and scientists.

2. Background

Many authors have extensively debated the relationship between EP and BP, both in empirical and theoretical studies, starting with the awareness of the complexity of the topic [48,49].

At the empirical level, the question "does it pay to be green" has been discussed by many authors across different disciplines, which has led to conflicting results, as pointed up in relevant literature reviews. Molina-Azorín et al. [50], in analyzing 32 quantitative studies, noted the different variables adopted by the authors, the different sectors and countries considered, and the different findings obtained. Horváthová [51], with a meta-regression analysis of 37 empirical studies, proposed a summary of the main reasons for the inconclusive results: the firm size, country location, environmental criteria and time coverage of the analyses were considerable factors that influenced the variation in empirical evidence. Dixon-Fowler et al. [52], according to a meta-analytical review of 71 papers concerning corporate environmental performance and corporate financial performance, focused on proactive and reactive environmental assets: they drew on some inconsistencies from the previous research, such as the inappropriate choice of variables and the different methodologies adopted to support the analysis. This lack was confirmed by the literature review of Guenther and Hoppe [53]. Albertini [54], with a meta-analysis of 52 studies, partially confirmed and partially extended this discussion: they revealed that environmental and financial indexes, regional differences, activity sectors and run time are the main moderator factors in the EP–BP relationship. Goyal et al. [55], according to a review of 101 research papers, demonstrated that the discussion about corporate sustainability performance and firm performance is still active and that feedback from previous

studies was not universally consistent about the direction of the relationship. Endrikat et al. [56], with a meta-analytic review of 149 studies, explored the direction of causality in the EP–BP link and demonstrated a positive and partially bi-directional relationship in proactive rather than reactive environmental strategies; however, they underlined the inconsistency of some previous studies.

From a theoretical point of view, notable studies gave convincing answers to the "Porter Wagner-dilemma". Lankoski [57] proposed an integrative synthesis of knowledge of the relationship between corporate responsibility activities and economic performance and pointed out that different corporate responsibility activities produce different economic output. Potts et al. [58] advanced the "co-evolutionary" model in which the dynamics of economic and ecological systems are connected by the business behavior. Orlitzky [59], with a comprehensive literature review of corporate social responsibility, discussed how different disciplines influenced different empirical results in the relationship between environmental, social and financial performance. Boons et al. [60] summarized the conceptual discussion in the research agenda of sustainable innovation and business models, emphasizing that environmental innovation supports business performance. Dües et al. [14] provided evidence that lean supply chain management practices benefit environmental performance and, in turn, green practices influence lean business. Van der Byl and Slawinski [61], with a comprehensive review of research on corporate sustainability, outlined previous studies' approaches of demonstrating the existence of a relationship between corporate environmental and social responsibility and firm performance and confirmed that the methodological approach of studying this relationship is still evolving.

From this overview, some significant elements emerge. Many authors confirm the existence of a relationship between EP and BP, although in some cases this relationship has not been strongly verified. Moreover, some authors underline the difficulty of verifying this relationship. Finally, even if a relationship between EP and BP exists, it is not clear what the direction of the relationship is. A new study to overcome some limitations of previous reviews is useful. First of all, the focus of the study must be on the companies, in all sectors and dimensions and worldwide. Then, it is important to analyze the papers that discuss the direction of the relationship, not simply the existence of the relationship. Moreover, it is necessary to analyze the papers assuming various possible types of cause and effect relationships, not only linear and not only one-way. Finally, it is relevant to compare the conclusions of the papers in order to underline what the prevalent cause and effect directions of the EP–BP relationship are, and to investigate the reasons for any disagreements among the studies concerning the different types of relationships.

To fill these literature gaps, the objective of this research is to determine whether there is agreement in the papers published in scientific journals regarding the direction of the relationship between the EP and the BP, focusing on enterprises. Consistent with this research objective, our research questions are: Is there a consensus in scientific papers on the direction of the relationship between EP and BP at the firm level? If so, what are the prevalent directions? If not, what are the reasons that do not lead the studies to a consensus view?

3. Research Hypotheses and Methodology

3.1. Research Hypotheses

To answer the research questions, we formulated four sub-questions: (i) Which recent papers address the relationship between the EP and BP of enterprises? (ii) Is there a consensus among the authors to declare the existence of an EP–BP relationship? (iii) Is there a specific direction of the EP–BP relationship? (iv) Are there some reasons do not lead the studies to a consensus view in the direction of EP–BP relationship?

To analyze sub-question (i), we consider all of the papers published from 2000 to 2015 in the scientific journals available on web platforms that discuss the EP–BP relationship (in line with [51,56]).

To analyze sub-question (ii), we consider two alternative answers, corresponding to the following research hypotheses (Figure 1):

H0: There is a relationship between EP and BP of enterprises

H1: There is no relationship between EP and BP of enterprises

To analyze sub-questions (iii) and (iv), we allow hypothesis H0 and formalize five different types of relationships between EP and BP that are not necessary mutually exclusive (Figure 1) (in line with [37,41,53,56,62–64]).

H0.1: Better EP determines better BP (in accordance to the "Porter point of view")

H0.2: Worse EP determines worse BP (as a "negative Porter point of view")

H0.3: Better BP determines better EP (in accordance to the "Wagner point of view")

H0.4: Worse BP determines worse EP (as a "negative Wagner point of view")

H0.x: There is another possible EP–BP relationship (e.g., inverse, non-linear, U-shaped, and conditional)

3.2. Research Methodology

To verify the research hypotheses, we conducted qualitative research based on a systematic literature review, in line with Luederitz et al. [65], exploring the research topic in scientific papers published during the years specified. As synthesized in Table 1, the research was conducted in four steps, each one corresponding to a specific sub-question.

Step (I) To verify "which recent papers address the relationship between EP and BP at the firm level" (Table 1, sub-question (i)), a bibliographical survey was conducted with international databases (ISI Web of Knowledge and the main editors' libraries) using specific research keywords (as "environmental performance", "business performance", "firms", and "relationship" and their synonyms) (coherently with us, see also [51,52,56,66,67]). The time-period considered for this survey starts from 2000, when the scientific debate started (in line with [30,38,61,68]). In order to include in the literature analysis all the relevant papers, we selected them in two steps, coherently with the suggestions of Luederitz et al. [66]: (I-A) Data Screening, which concerns the search in the established databases through the established keywords; and (I-B) Data Cleaning, which concerns the evaluation of each papers selected in the previous (I-A) step, in order to decide their inclusion in the research sample, based on the coherency of the title, abstract and full text with the research sub-question (i).

Then, a descriptive analysis of the selected papers was conducted in terms of country, industrial sector, type of research, sample of companies, research goals, business and environmental variables considered to measure firms performance and research conclusions (in line with [37,50,65,67,69]).

In order to confirm or deny the existence of an EP–BP relationship (see Table 1, sub-question (ii)), we analyzed results, discussion and conclusions in all of the selected papers, verifying our two research hypotheses (H0 and H1) (similar to us, see also [51,66,70]).

In order to verify the direction of the EP–BP relationship (see Table 1, sub-question (iii)), we in depth compared results, discussion and conclusions of all of the selected papers with our directional sub-hypotheses (H0.1, H0.2, H0.3, H0.4 and H0.5) (in line with [53,57,71]).

Finally, in order to analyze the reasons for any disagreements among the studies about the direction of EP–BP relationship (see Table 1, sub-question (iv)), we discussed the not concordant results concerning the direction of EP–BP in the selected papers focusing on the main relevant factors that may have influenced the conclusions of these studies.

Table 1. Synthesis of the research steps, tools and methods.

Sub-Question of Research		Research Steps	Database Adopted in the Step	Type of Analysis	Research Keys
(i)	Which recent papers address the relationship between EP and BP of enterprises?	Step (I) Selection of papers related to EP and BP of enterprises (I-A) Data Screening (I-B) Data Cleaning	(I-A) Selection with International Database ISI Web of Knowledge and considering specific editors' libraries, as Emerald Insight, Science Direct, Springer Library, Wiley Library (I-B) Selection of the papers searched in Step (I-A)	Survey of papers published in scientific journals from 2000 to 2015	(I-A) Search of terms: "environmental performance" or "sustainable performance" or "ecological performance", and "business performance" or "economic performance" or "financial performance", and "relationship", and "firm" or "company" or "enterprise", in: title, abstract, keywords and/or text. (I-B) Analysis of the contents in the full text of each paper searched in (I-A), and evaluation of their coherency with the research sub-question (i)
		Step (II) Analysis of the papers related to EP–BP relationship	All papers selected in Step (I-B)	Analysis of the text to consider type and contents of each research effort	Comparison of papers in terms of: country of research, industrial sector considered, type of research conducted, sample of companies investigated, research goals, environmental and business variables considered to assess firms' performances, research conclusions
(ii)	Is there a consensus among the authors to declare the existence of EP–BP relationship?	Step (III) Verify if, within the selected papers, an EP–BP relationship exists	All papers selected in Step (II)	Analysis of all text to consider results, discussion and conclusions	Confirmation or denial of the research hypotheses: H0 and H1 (*)
(iii)	Is there a specific direction of the EP–BP relationship?	Step (IV) Verifying what type of EP–BP relationship there is in selected papers	All papers in Step (III) that confirm H0 hypothesis (*)	Analysis of all text to consider results, discussion and conclusions	Confirmation or denial of the research sub-hypotheses: H0.1, H0.2, H0.3, H0.4, and H0.x (**)
(iv)	What are the reasons that do not lead the studies to a consensus view in the direction of EP–BP relationship?	Step (V) Analyzing the reasons that lead to different conclusions in selected papers	All papers in Step (III) that confirm H0 hypothesis (*)	Discussion about the results of Steps (III) and (IV)	Research objectives and goals, research methodology, environmental and business variables considered to assess firms' performances, research conclusions

(*) Research hypotheses: H0: There is a relationship between EP and BP; H1: There is no relationship between EP and BP; (**) Research sub-hypotheses: H0.1: Better EP determines better BP; H0.2: Worse EP determines worse BP; H0.3: Better BP determines better EP; H0.4: Worse BP determines worse EP; H0.x: There is another possible EP–BP relationship (e.g., inverse, non-linear, U-shaped, and conditional).

4. Results

4.1. Selection of Papers Related to the EP–BP Relationship of Enterprises (Step I)

The first step of this research (conducted as specified in Table 1) was to identify the papers published from 2000 to 2015 that contained the terms "environmental performance", "economic performance", "enterprise" and "relationship" (or synonyms) in their titles, abstracts, keywords or texts.

Two hundred twenty-nine papers were initially selected in Step (I-A) Data Screening: this first selection represents all the papers published in ISI journals from 2000 to 2015 that include in their title, abstract, keywords, or full text our research keywords. In Step (I-B) Data Cleaning, deeper examination of the contents of these papers led us to exclude 182 papers because although they discussed EP and/or BP, they did not specifically explore the EP–BP relationship at the firm level. Specifically, the papers excluded from the research sample dealt with the following subjects: 22 papers analyzed the relationship between different environmental aspects, 14 papers discussed the business conditions and motivations surrounding the adoption of environmental practices, 30 papers proposed methods to measure EP and BP in a combined way, 27 papers discussed the relationship between environmental practices or strategies and business returns, 16 papers considered the relationship between environmental innovation or eco-design and BP, nine papers analyzed the relationship between EP and BP at the regional or national level (not at the company level), 40 papers considered the relationship between corporate social responsibility and BP, and, finally, 24 papers discussed specific environmental practices that were not related to BP.

Therefore, we finally selected 47 papers published in 18 scientific journals from 2000 to 2015: these papers explored a deep relationship between the EP and the BP at the firm level. Figure 1 shows the trend of these papers between 2000 and 2015: the discussion about EP–BP relationship at the firms' level started from 2005, and most of the papers concerning this debate were published in the last years (45% from 2013 to 2015). We can also highlight that the debate regarding the EP–BP relationship is currently presented in several journals dealing with various disciplines, such as environment, management, business and ethics.

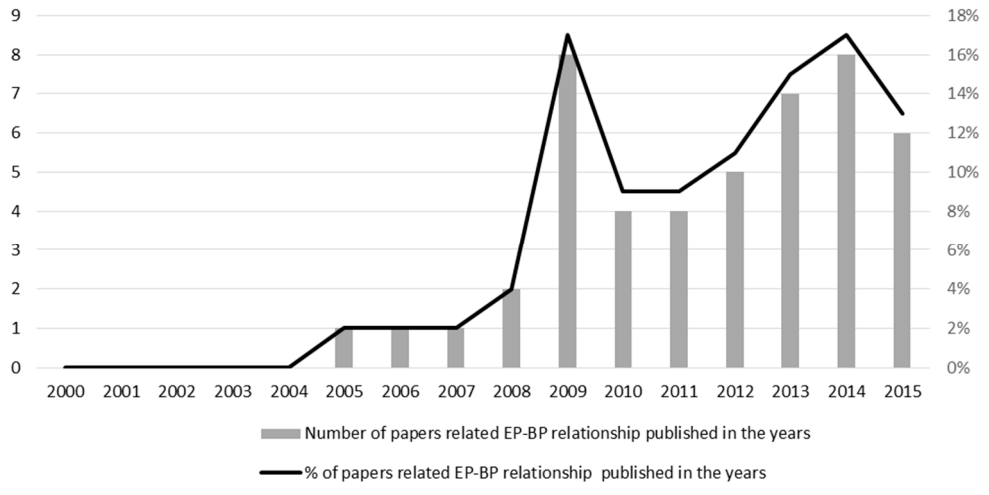

Figure 1. Trend of the papers published from 2000 to 2015 concerning the EP–BP relationship at the firms' level.

4.2. Analysis of the Papers Related to the Relationship between EP and BP of Enterprises (Step II)

The second research step (as specified in Table 1) called for comparing the 47 papers selected in terms of: the type of research conducted, research goals, variables considered to measure EP and BP and research conclusions. A summary of the results is given in Tables 2 and 3.

Table 2. Summary of the papers concerning the EP–BP relationship of enterprises.

Paper	Country	Industrial Sector	Research Type *	Sample of Companies
Wagner [25]	Germany, Italy, the Netherlands and UK	Paper industry	Survey using data from public database	37 firms
Earnhart and Lizal [72]	Czech Republic	Not specified	Survey using data from public database	2628 observations during 6 years
Kranjc et al. [73]	Slovenia	Food process	Multiple case study	1 beet sugar plant with 2 alternative optimization process designs
Galdeano-Gómez [74]	Spain	Fresh fruit and vegetables	Survey using data from public database	56 farming-marketing firms located in Andalusia (South of Spain)
Yamaguchi and van Kooten [75]	United States and Canada	Forest products industry	Survey using data from public database	21 companies
Boons and Wagner [37]	Not applicable	Not applicable	Literature review	Not specified
Iraldo et al. [76]	European Union	Not specified	Survey using data from public database	70 private organizations EMAS registered and 31 not EMAS registered
López-Gamero et al. [77]	Spain	Hotels and firms affected by the IPPC law	Survey with interviews	3900 hotels and 4187 firms affected by the IPPC law involved, 240 hotels and 208 firms respondent
Mazzanti and Zoboli [78]	Italy	Various sectors	Survey using data from public database	319 firms in 29 sector branches
Menguc et al. [79]	New Zealand	Various sectors	Survey with interview	325 firms involved, 150 respondent
Molina-Azorín et al. [80]	Not applicable	Not applicable	Literature review	32 papers until 2008
Molina-Azorín et al. [50]	Spain	Hotel industry	Survey with interviews	3900 hotels involved , 301 respondent
Yu et al. [81]	European Union	Various sectors	Survey using data from a previous European project	51 companies
Horváthová [51]	Not applicable	Not applicable	Literature review	37 empirical studies
López-Gamero et al. [82]	Spain	Various sectors affected by IPPC law	Survey using data from public database	208 firms
Wagner [83]	United States	Various sectors	Survey using data from public database	358 firms
Zeng et al. [84]	China	Manufacturing industry	Survey with interviews	500 companies involved, 125 respondent
Heras-Saizarbotoria et al. [85]	Basque region (Spain)	Various sectors	Survey using data from public database	All companies in Basque region
Iwata and Okada [86]	Japan	Various sectors with clean and dirty processes	Survey using data from public database	268 manufacturing firms
Salama et al. [87]	United Kingdom	Various sectors	Survey using data from public database	567 firms
Zeng et al. [88]	China	Various sectors	Survey with interviews	500 SMEs involved , 137 respondent
Figge and Hahn [70]	Worldwide	Automotive	Survey using data from public database	16 car makers worldwide
Horváthová [89]	Czech Republic	Various sectors	Survey using data from public database	136 firms
Lioui and Sharma [90]	Worldwide	Various sectors	Survey using data from public database	Approximately 3100 firms
Perez-Calderon et al. [91]	Worldwide	Various sectors except financial	Survey using data from public database	122 firms

Table 2. *Cont.*

Paper	Country	Industrial Sector	Research Type *	Sample of Companies
Tang et al. [92]	United States	Various sectors	Survey using data from public database	500 largest US enterprises
Albertini [54]	Not applicable	Not applicable	Literature review	52 studies
Apeaning and Thollander [93]	Ghana	Various sectors	Survey with interviews	76 companies involved, 34 respondent
Dixon-Fowler et al. [52]	Not applicable	Not applicable	Literature review	39 studies
Dragomir [94]	European Union	Various sectors	Survey using data from public database	77 large companies
Fujii et al. [63]	Japan	Various manufacturing sectors	Survey using data from public database	758 firms
Youn et al. [95]	Korea	Various sectors	Survey with interviews	400 companies involved, 142 respondent
De Burgos-Jiménez et al. [96]	Wales (United Kingdom)	Various sectors	Survey with interviews and using data from public database	2122 companies
Endrikat et al. [56]	Not applicable	Not applicable	Literature review	149 studies
Gallego-Álvarez et al. [97]	Worldwide	Various sectors	Survey using data from public database	855 multinational companies
Gotschol et al. [64]	Italy	Various sectors	Survey with interviews	Sample random selected , 240 respondent
Guenther and Hoppe [53]	Not applicable	Not applicable	Literature review	Not specified
Moon et al. [98]	United States	Various industrial sectors	Survey using data from public database	393 large US firms
Ortas et al. [99]	Worldwide	Various sectors	Survey using data from public database	3900 companies
Qi et al. [100]	China	Various industrial sectors	Survey using data from public database	39 industries
Wang et al. [101]	Australia	Various industrial sectors	Survey using data from public database	69 firms
Larrán Jorge et al. [102]	Spain	Various sectors	Survey with interviews	4860 SMEs involved, 481 respondent
Misani and Pogutz [103]	Worldwide	Carbon intensive industries	Survey using data from public database	127 global firms
Muhammad et al. [104]	Australia	Various sectors	Survey using data from public database	76 companies
Muhammad et al. [105]	Australia	Various sectors	Survey using data from public database	76 companies
Sánchez-Medina et al. [106]	Mexico	Pottery handicraft sector	Survey with interview and using data from public database	200 firms involved, 186 respondent
Trumpp and Guenther [71]	Worldwide	Various services sectors	Survey using data from public database	2361 firm-during 5 years

Note: * Research type: theoretical research, survey using data from public database, survey with interviews, single case study, multiple case study, literature review.

Table 3. Main contents of the papers concerning the EP–BP relationship of enterprises.

Paper	Environmental Performance/Variables Considered	Business Performance/Variables Considered	Conclusive Propositions
Wagner [25]	Emission of COD, SO_4, NO_x, Energy input, Water input (called "environmental performance")	Return on capital employed, Return on equity, Return on sales (called "business performance")	A predominantly negative relationship between environmental and economic performance is found for the emissions-based index. Whereas for the inputs-based index no significant link is found.
			The EP–BP relationship is more positive for firms with pollution prevention-oriented strategies.
Earnhart and Lizal [72]	Air pollutants (CO, SO_2, NO_x, PM) (called "environmental performance")	Production, Lagged profits, State ownership, Investment found ownership, Bank ownership, Portfolio company owner, Citizen ownership, Strategic investor ownership, Foreign investor ownership, Concentration, Invers Mills ratio (called "financial performance")	Since liquidity constraints limit investment in pollution reduction, subsidizing investments in environmental improvement technologies is beneficial.
			The results highlight the importance of using multiple measures of environmental and financial performance.
Kranjc et al. [73]	Climate change, Acidification, Eutrophication, Photochemical ozone creation, Human toxicity (called "environmental impacts")	Monetary values to environmental impacts, Raw material price, Energy price, Transport price (called "economic performances")	The same design plant option is preferable from the economic and environmental perspective.
			Energy minimization is one of the most important issues within the context of sustainability.
Galdeano -Gómez [74]	Annual expenditure on environmental practices over sales (called "environmental performance")	Sales margins, Market share (called "economic performance")	The environmental differentiation show a positive impact on profitability and market share and it implies greater environmental performance.
Yamaguchi and van Kooten [75]	Chemical pollutant (as H_2CO and CH_3OH) (called "pollution intensity")	Return on capital employed (called "corporate financial performance")	More successful firms, measured by profitability, innovate and invest in cleaner and more cost-efficient technologies.
			We cannot confirm that reductions in pollution intensity are associated with improvements in economic performance.
Boons and Wagner [37]	Environmental impacts of production and consumption (called "production and consumption system")	Costs and benefits at the individual firms, Proactive strategies and competitive advantage at the market level, Economic growth at the economic level (called "system levels")	The mixed results obtained from the literature review can be better understood if you analyze them in relation to different system boundaries: at the firm level, at the market level, at the economic level.
Iraldo et al. [76]	EMAS maturity, Environmental targets, Environmental improvement, Suppliers' environmental measures (called "characteristics of EMS")	Market performance, Innovation capability, Resource efficiency, Intangible assets (called "variables of competitiveness")	Environmental performance has a positive impact on innovations, but effects on other competitive variables are not strongly supported.
López-Gamero et al. [77]	Efficient use resource, Reduction of emissions, Reduction of residues, Reduction of acoustic pollution (called "environmental performance")	New firm resources, Competitive advantage, Financial performance as subjective perception (called "economic performance")	Firm's resources and competitive advantage act as mediator variables for a positive relationship between environmental protection and financial performance.
Mazzanti and Zoboli [78]	Emission intensity of value added (in terms of CO_2, CH_4, NO_x, SO_x, NMVOC, PM_{10} emissions) (called "environmental efficiency")	Value added per employee (called "productivity measure")	For most air emission categories there is a positive relationship between labor productivity and environmental efficiency.
			Services show a complementary relationship, while industry associates better labor productivity with lower GHG.
Menguc et al. [79]	Pollution prevention, Top management support, Customers' environmental sensitivity, Government regulations, Environmental dynamism (called "proactive environmental strategy")	Sales growth, Profit growth, Entrepreneurial orientation (called "firm's performance")	Proactive environmental strategy can benefit sales and profit growth.
			Government regulation increases the positive relationship between EP and BP.
			Consumer sensitivity had a direct effect in this relationship.
Molina-Azorín et al. [80]	Environmental management variables (as technical and organizational activities), Environmental performance variables (as environmental impacts and effects in the natural environmental) (called "environmental variables")	Financial performance (called "financial variables")	Results derived by many studies are mixed.
			Studies with a positive impact of environment on financial performance are predominant.

Table 3. *Cont.*

Paper	Environmental Performance/Variables Considered	Business Performance/Variables Considered	Conclusive Propositions
Molina-Azorín et al. [50]	Technical practices (such as energy and water saving activities), Organizational practices (such as quantification of environmental costs and savings, personal training in environmental issues) (called "environmental practices")	Occupancy rate per room, Gross operative profit, Gross operative profit per available room per day (called "firm's performance")	Environmental practices impact significantly on several performance variables.
Yu et al. [81]	Air pollutants emission (such as CO_2, NO_x, SO_x, VOC, and CH_4), Waste generation, Water use (called "environmental resources")	Sustainable value margin, Return to cost ratio (called "sustainable value")	Results do not find a positive relationship between EP and BP both for all the companies' sample both for the carbon-intensive sector.
Horváthová [51]	All the environmental variables adopted in the papers analyzed	Not specified	The portfolio studies tend to report a negative link between EP and BP.
			The positive link is found more frequently in common law countries than in civil law countries.
			It is fundamental the adoption of an appropriate time of coverage to establish a positive link between EP and BP.
López-Gamero et al. [82]	Operational aspects of environmental management, Technical aspects of environmental management (called "environmental management")	Competitive advantage on costs, Competitive advantage on differentiation, Growth in added value, Economic development, Financial profitability (called "competitive advantage and financial performance")	Environmental command-and-control legislation is a not significant influence on environmental management and managerial perception. Investment in proactive environmental management contributes to increase competitiveness.
Wagner [83]	Rating of corporate social responsibility and environmental management (called "environmental and social performance")	Tobin's q (called "economic performance")	The EP has a direct effect in the BP, and the corporate social responsibility has only moderate effect.
Zeng et al. [84]	Employee environmental consciousness, Waste reduction, Rules for cleaner production, Cleaner production policy, Recyclability, Packaging reducing, Energy efficiency, Clean technologies, Renewable resources use, durability of product, investment in environmental protection, technology innovation (called "indexes of cleaner production")	Profitability, Increased rate of net profit, Return on equity, Market share, Corporate reputation, Shareholders' confidence (called "business performance")	Results find an overall positive impact of cleaner production on firms' business performance.
			Low-cost cleaner production variables have a larger contribution to financial performance; high-cost cleaner production variables have a larger contribution to non-financial performance.
Heras-Saizarbotoria et al. [85]	ISO 14001 certification, ISO 14001 certification data (called "environmental performance")	Return on assets (called "financial performance")	Firms with better than average performance have a greater propensity to pursue accreditation but there is no evidence that improvements in performance follow certification.
Iwata and Okada [86]	Greenhouse gas emissions, Waste (called "environmental performance")	Return on equity, Return on assets, Return on investment, Return on invested capital, Return on sales, Tobin's q (called "financial performance")	Reduction of waste production does not generally have significant effects on financial performance.
			Greenhouse gas reduction lead to increase in financial performance in the clean industries, but it does not have significant effects on financial performance in dirty industries.
Salama et al. [87]	Investment in Community and environmental responsibility (called "environmental performance")	Market risk (called "firm risk")	A company's environmental performance is inversely related to its systematic financial risk.
			Market incentives for investment in environmental practices may complement regulatory alternatives.
Zeng et al. [88]	Contamination release, energy consumption, suppliers with environmental performance, environmental management system, cleaner production activities, staff training, environmental auditing (called "environmental performance")	Sales, Profitability, Inventory turnover, Return on equity, Market share, Sales region, Number of customers (called "economic performance")	Environmental performance is moderately correlated with financial indices, but not significantly with non-financial indices.
Figge and Hahn [70]	Environmental value creation (called "environmental performance")	Economic value creation (called "economic performance")	Using the opportunity cost based approach, companies adopt strategies that create economic and environmental value and maximize both environmental and economic performance.
Horváthová [89]	Amount of emissions (called "environmental performance")	Return on assets, Return on equity (called "financial performance")	There is not sufficient evidence about the intertemporal effect of EP on BP. The time-period is significant in the EP–BP relationship.
Lioui and Sharma [90]	Firms' environmental corporate social responsibility rating (called "environmental corporate social responsibility")	Return on assets, R & D, Tobin's q (called "financial performance")	The relationship between EP and direct BP (such as financial performance ROA and Tobin's q) is negative. However, the relationship between EP and indirect BP (such as R & D) is positive.
Perez-Calderon et al. [91]	Water consumption, Energy consumption, emissions to air (called "environmental performance")	Return on assets, Return on sales, Market-to-book ratio (called "economic and financial performance")	The companies, which show greatest efficiency in energy and water consumption, are also the ones, which achieved the best economic and financial profitability ratios.
			This relationship is not demonstrated in the case of non-environmentally sensitive companies and in the case of stock market index.

Table 3. *Cont.*

Paper	Environmental Performance/Variables Considered	Business Performance/Variables Considered	Conclusive Propositions
Tang et al. [92]	Climate change, Pollution, Product impact, Environmental stewardship, Environmental management (called "environmental governance")	Tobin's q (called "economic performance")	EP enhances green reputation, which improves corporate reputation and hence EP.
			EP is positively associated with customer satisfaction, which in turn improves EP.
Albertini [54]	All the environmental variables adopted in the papers analyzed	All the financial variables adopted in the papers analyzed	It is possible to confirm the positive relationship between EP and BP. The relationship is significantly influenced by EP and BP measures, regional differences, activity sector, time-period.
Apeaning and Thollander [93]	Energy efficiency measures, Energy efficient technologies (called "energy efficiency")	Access to capital, Hidden costs, Business risk, Imperfect information, Split incentives, Market related, Organizational and behavioral factors (called "barriers and driving forces to energy efficiency")	The most important factors inhibiting the energy efficiency are "luck of budget funding" and "access to capital".
Dixon-Fowler et al. [52]	Environmental strategy (called "environmental moderator")	Firm characteristics (called "economic moderators")	The positive relationship EP–BP exist.
			Moderator variables are: USA vs. international market, market-measures of BP, institutional vs. self-reported data.
			Moderator variables are not: small vs. large firms, proactive vs. end-of-pipe environmental strategies, different EP measures.
Dragomir [94]	Greenhouse gas emissions (called "environmental performance")	Return on assets (called "firm performance")	There is no definitive conclusion on the EP–BP relationship.
			Higher costs, but also higher revenues determine a neutral relationship between corporate social responsibility activities and firm financial performance.
Fujii et al. [63]	CO_4 emissions, Toxic chemical substances emissions (called "environmental performance")	Return on assets, Return on sales, Capital turnover (called "economic performance")	There is a significant positive relationship between CO_2 emissions reduction and financial performance.
			There is a significant inverted U-shaped relationship between return on assets and environmental performance.
Youn et al. [95]	Waste reduction, Recycling, Reuse, Material substitution, Internal environmental management, Eco-design, Energy consumption (called "environmental performance")	Organizational reputation, Market penetration, Profitability, Customer satisfaction and loyalty (called "business performance")	Strategic supply chain partnership facilitates the implementation of environmental supply chain management.
			The improved environmental performance determines the improvement of business performance.
De Burgos-Jiménez et al. [96]	Waste production (called "environmental performance")	Return on assets, Return on sales, Sales variation (called "financial performance")	The relationship between environmental strategy and financial performance is significant and positive.
			The EP–BP relationship is significant and positive.
Endrikat et al. [56]	All the environmental variables adopted in the papers analyzed	All the financial variables adopted in the papers analyzed	There is a positive and partially bidirectional relationship between corporate environmental performance and corporate financial performance.
			This relationship is stronger when the environmental strategy of firms is proactive rather than reactive.
Gallego-Álvarez et al. [97]	Greenhouse gas emissions by sales volume (called "environmental performance")	Return on assets (called "economic performance")	In time of economic crisis, the synergy between environmental and financial performance is higher and the companies continue to invest in sustainable projects in order to enhance relations with their customers and stakeholders which reinforces their economic activity.
Gotschol et al. [64]	Reduction of air emissions, Reduction of solid/liquid waste, Reduction of the amount of energy used, Reduction of consumption for hazardous/toxic materials, Decrease of frequency of environmental accidents (called "environmental performance")	Profit, Market share, Cost savings (called "economic performance")	Environmental performance has a positive impact on economic performance in the long run.
			Better economic performance has a positive effect on environmental performance also in the short run.
Guenther and Hoppe [53]	Strategic corporate environmental performance, Operational corporate environmental performance, Environmental reporting, Rating and ranking, Questionnaire-based (perceived) corporate environmental performance, Environment-related events (called "environmental categories")	Stock market, Stock market and account, Accounting, Questionnaire-based (perceived) corporate financial performance (called "financial categories")	The relationship between EP and BP is very complex.
			Authors propose a theoretical model to support the analysis of the direction of EP–BP relationship.

Table 3. *Cont.*

Paper	Environmental Performance/Variables Considered	Business Performance/Variables Considered	Conclusive Propositions
Moon et al. [98]	Environmental corrective actions, Toxic chemical emission intensity, Penalty index value (called "environmental performance")	Return on assets (called "economic performance")	Voluntary environmental programs had a positive effect on firm's economic performance.
			Pollution reduction and prevention helps promote the "green" image.
			Firm's poor environmental track record had a negative effect in its economic performance.
Ortas et al. [99]	Sustainable supply chain management (called "sustainable performance")	Margins/Performance, Profitability/Shareholder loyalty, Revenue/Customer loyalty (called "financial performance")	There is a significant, bidirectional causation between sustainable supply chain management and companies' margins and revenue.
			This remained true during the bull market but not during the financial crisis.
Qi et al. [100]	SO_3 emissions per unit of industry value added (called "environmental performance")	Return on assets, Shipment value growth rate, Assets/debt ratio (called "financial performance")	The EP–BP link is consistent with the industry-level analysis.
			The EP–BP relationship is stronger when level of slack resources is high.
Wang et al. [101]	Greenhouse gas emissions (called "environmental performance")	Tobin's q, Share price, Share quantities (called "financial performance")	There is a positive correlation between greenhouse gas emissions reduction and corporate financial performance in all industry sectors.
Larrán Jorge et al. [102]	Qualitative variables related environmental activities and performance (as perception of respondents) (called "environmental performance")	Qualitative variables related competitive performance, market performance image and reputation (as perception of respondents)	The development of environmentally friendly practices contributes to increase significantly competitive performance in SMEs.
Misani and Pogutz [103]	Greenhouse gas emissions, Environmental management, Climate change innovation (called "environmental performance")	Tobin's q, Return on assets, Return on equity, Return on sales, R & D intensity (called "financial performance")	Carbon performance improves financial performance up to a certain point, after which the marginal benefits of further reduction of carbon emissions do not offset the marginal costs.
Muhammad et al. [104]	Toxicity risk score (called "corporate environmental performance")	Firm market risk, Systematic risk, Downside risk (called "company financial risk")	EP helps firms to reduce their financial risk.
			EP is negatively associated with firm volatility and firm downside risk.
Muhammad et al. [105]	Toxicity risk score (called "corporate environmental performance")	Return on assets, Tobin's q (called "corporate financial performance")	A strong positive association between EP and BP is confirmed during the pre-financial crisis period.
			No relationship between EP and BP is demonstrated during the financial crisis period.
Sánchez-Medina et al. [106]	Water consumption, Energy consumption, Solid waste (called "environmental performance)	Return on assets, Market competitiveness, Personal satisfaction, Profits (called "economic performance")	There is a bidirectional influence between EP and BP.
			Environmental compliance and environmental innovation have a significant mediating role in this relationship.
Trumpp and Guenther [71]	Carbon performance, Waste intensity (called corporate environmental performance)	Profitability, Stack market performance (called "corporate financial performance")	There is a non-linear, U-shaped, relationship between EP and BP.
			Company's profitability is influenced by carbon performance and waste intensity both in manufacturing and service industries.
			Stock market performance is only affected by carbon performance in manufacturing industries.

Regarding the countries (Table 2, second column), 24 papers presented research conducted in Europe, six papers in Asia, five papers in north central America, four papers in Oceania, only one paper focused on Africa, and seven papers analyzed the topic from a worldwide perspective. The industrial sectors analyzed (Table 2, third column) indicated that the scientific debate includes all of the industrial sectors, with both environmentally dirty and clean processes. Of the types of research (Table 2, fourth column), the most frequently used was the survey, conducted through a data analysis of databases (62% of selected papers) or a direct interview of companies (21% of selected papers). Fifteen percent of papers included a literature review, and only one paper uses a multiple case study. The samples of the companies considered were always large (Table 2, fifth column), which confirmed the relevance of the research results and conclusions for each paper.

The variables considered by the authors to measure firms' environmental performance and business performance were very different (Table 3, second and third columns). This lack of homogeneity was not always justified by different research goals or different research methodologies. For example, Eanhart and Lizal [72], Galdeano-Gómez et al. [74] and Yamaguchi and van Kooten [75], although they had similar research goals, employed different environmental and/or economic indicators to measure corporate performance. This was also true for the following studies: Menguc et al. [79], Molina-Azorin et al. [50], Yu et al. [81], López-Gamero et al. [82], Horvathova [89], Perez-Calderon et al. [91], Fujii et al. [63], De Burgos-Jimenez et al. [96], Qi et al. [100], and Sánchez-Medina et al. [106]. Moreover, this unjustified difference of performance variables was also present in studies with specific goals, such as papers with a greenhouse gas focus (see Dragomir [94], Wang et al. [101], Misani and Pogutz [103], and Trumpp and Guenther 2015 [71]) or papers that focused on a financial crisis period (see Gallego-Alvarez et al. [97], Muhammad et al. [104], Muhammad et al. [105], and Trumpp and Guenther [71]). Furthermore, with reference of specific industrial sectors analyzed (Table 3, third column), we recognize a non-homogeneity of variables considered to measure EP and BP (Table 3, second and third columns): e.g., López-Gamero et al. [77], Molina-Azorín et al. [50], and Trumpp and Guenther [71] in services sector; Zeng et al. [84], Figge and Hahn [70], Fuji et al. [63], and Sánchez-Medina et al. [106] in manufacturing sector; Kranjc et al. [73], and Galdeano-Gómez [74] in food sector.

The conclusions of the papers (Table 3, fourth column) were often different: some authors explained the direction of the EP–BP relationship (26 papers); some authors confirmed or denied an EP–BP relationship but did not explicitly describe a direction (15 papers); some authors stated other propositions about corporate environmental and business strategies (nine papers); and some authors demonstrated variables that affected the EP–BP relationship (16 papers). Almost all of the authors conducted statistical analyses to verify the correlation and declared the robustness of their research results.

4.3. Determining Whether There Is a Relationship between EP–BP of Enterprises in the Selected Papers (Step III)

The third step (conducted as specified in Table 1) was to confirm or deny the first two research hypotheses, H0 or H1. The second and third columns in Table 4 present a synthesis of these results.

Almost all of the authors found a relationship between EP and BP and broadly confirmed hypothesis H0, "There is a relationship between EP and BP".

However, in some cases, the relationship was weak (Iraldo et al. [76], Yu et al. [81], and Horvathova [89]) or was limited to specific variables or conditions (Horvathova [51], Lopez-Gamero et al. [82], Muhammad et al. [105], and Trumpp and Guenther 2015 [71]).

Table 4. Analyses of the papers concerning EP–BP relationship of enterprises with the research hypotheses.

Paper	H0 *	H1 *	H0.1 **	H0.2 **	H0.3 **	H0.4 **	H0.x **
Wagner [25]	True	False	True for firms with a pollution prevention strategy False for firms with end-of-pipe strategy	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Earnhart and Lizal [72]	True	False	Not analyzed	Not analyzed	True	True	Not analyzed
Kranjc et al. [73]	True	False	Not analyzed	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Galdeano-Gómez [74]	True	False	True	Not analyzed	True	Not analyzed	Not analyzed
Yamaguchi and van Kooten [75]	True	False	Not strongly supported	Not analyzed	True	Not analyzed	Inverted U-shaped hypothesis partially true
Boons and Wagner [37]	True	False	True at the market level. Not strongly supported at the firm level	Not analyzed	True at the market level. Not strongly supported at the firm level	Not analyzed	Not analyzed
Iraldo et al. [76]	Not strongly supported	Not strongly supported	False	Not analyzed	Not analyzed	Not analyzed	Not analyzed
López-Gamero et al. [77]	True	False	True with mediator variables	Not analyzed	True as mediator variable	Not analyzed	Mediator variables: firm's resources and competitive advantage
Mazzanti and Zoboli [78]	True	False	True	Not analyzed	True	Not analyzed	Inverted U-shaped hypothesis partially true
Menguc et al. [79]	True	False	True	Not analyzed	Not analyzed	Not analyzed	Mediator variables: government regulation and consumer sensitivity
Molina-Azorín et al. [80]	True	False	True	Not analyzed	True	Not analyzed	Not analyzed
Molina-Azorín et al. [50]	True	False	True	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Yu et al. [81]	Not strongly supported	Not strongly supported	False	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Horváthová [51]	True in common law countries	Not strongly supported	True in common law countries	Not analyzed	True in common law countries	Not analyzed	Not analyzed
López-Gamero et al. [82]	True in voluntary approach False in command-and-control approach	False in voluntary approach True in command-and-control approach	True	Not analyzed	True	Not analyzed	Not analyzed
Wagner [83]	True	False	True	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Zeng et al. [84]	True	False	True	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Heras-Saizarbotoria et al. [85]	True	False	False	True	Not analyzed	Not analyzed	Not analyzed

Table 4. *Cont.*

Paper	H0 *	H1 *	H0.1 **	H0.2 **	H0.3 **	H0.4 **	H0.x **
Iwata and Okada [86]	True	False	True in clean industries and on GHG reduction. False in dirty industries and on waste reduction	Not analyzed	Not analyzed	Not analyzed	Mediator variables: clean or dirty industry, firm growth rate
Salama et al. [87]	True	False	True	Not analyzed	True	Not analyzed	Not analyzed
Zeng et al. [88]	True	False	True for some variables. False for some other variables	Not analyzed	True for some variables False for some other variables	Not analyzed	Mediator variables: non-financial indexes related economic performance
Figge and Hahn [70]	True	False	True	Not analyzed	True	Not analyzed	Cyclic hypothesis: H0.3–H0.1–H0.3
Horváthová [89]	Not strongly supported	Not strongly supported	True in long-term. False in a short-term	Not analyzed	Not analyzed	Not analyzed	Mediator variable: time horizon
Lioui and Sharma [90]	True	False	True in indirect BP. False in direct financial performance	Not analyzed	Not analyzed	Not analyzed	Mediator variables: direct vs. indirect BP
Perez-Calderon et al. [91]	True	False	True in environmentally sensitive companies. False in not environmentally sensitive companies	Not analyzed	True	Not analyzed	Mediator variables: industrial sector, BP indexes, EP indexes, regions, time-period
Tang et al. [92]	True	False	True	Not analyzed	Not analyzed	Not analyzed	Mediator variables: customer satisfaction and corporate reputation
Albertini [54]	True	False	True	Not analyzed	Not analyzed	Not analyzed	Mediator variables: industrial sector, BP indexes, EP indexes, regions, time-period
Apeaning and Thollander [93]	True	False	Not analyzed	Not analyzed	True	True	Bi-directional hypothesis: H0.1 and H0.3 are true at the same time
Dixon-Fowler et al. [52]	True	False	True	Not analyzed	True	Not analyzed	Mediator variables: BP indexes, regions, institutional vs. self-reported data.
Dragomir [94]	True	False	Not strongly supported	Not analyzed	Not strongly supported	Not analyzed	Neutral hypothesis: better EP determines better BP but also increases costs

Table 4. *Cont.*

Paper	H0 *	H1 *	H0.1 **	H0.2 **	H0.3 **	H0.4 **	H0.x **
Fujii et al. [63]	True	False	True in the case of CO_2 emissions reduction	Not analyzed	Not analyzed	Not analyzed	Inverted U-shaped hypothesis partially true
Youn et al. [95]	True	False	True	True	True	Not analyzed	Not analyzed
De Burgos-Jiménez et al. [96]	True	False	True	Not analyzed	True	Not analyzed	Not analyzed
Endrikat et al. [56]	True	False	True	Not analyzed	True	Not analyzed	Bi-directional hypothesis: H0.1 and H0.3 are true at the same time
Gallego-Álvarez et al. [97]	True	False	True	Not analyzed	True	Not analyzed	Cyclic hypothesis: H0.3–H0.1–H0.3
Gotschol et al. [64]	True	False	True in the long run	Not analyzed	True also in the short run	Not analyzed	Not analyzed
Guenther and Hoppe [53]	True	False	True	True	True	True	Not analyzed
Moon et al. [98]	True	False	True	True	True	Not analyzed	Not analyzed
Ortas et al. [99]	True	False	True during bull markets. False during the financial crisis	Not analyzed	True	True during the financial crisis	Not analyzed
Qi et al. [100]	True	False	True	Not analyzed	True	Not analyzed	Cyclic hypothesis: H0.3–H0.1–H0.3 Moderator variable: available of slack resources
Wang et al. [101]	True	False	True in all industrial sectors	Not analyzed	Not analyzed	Not analyzed	Not analyzed
Larrán Jorge et al. [102]	True	False	True	Not analyzed	Not analyzed	Not analyzed	Mediator variables: image and relational marketing
Misani and Pogutz [103]	True	False	True	Not analyzed	True	Not analyzed	Inverted U-shaped hypothesis true
Muhammad et al. [104]	True	False	True	Not analyzed	Not analyzed	Not analyzed	Moderator factors: available technologies and environmental regulation
Muhammad et al. [105]	True during the pre-financial crisis period. Not true during the financial crisis period	False during the pre-financial crisis period. Not false during the financial crisis period	True during the pre-financial crisis period. False during the financial crisis period	Not analyzed	True during the pre-financial crisis period	True during the financial crisis period	Moderator variable: available of slack resources
Sánchez-Medina et al. [106]	True	False	True	Not analyzed	True	Not analyzed	Mediating variables: environmental compliance and innovation
Trumpp and Guenther [71]	True	False	True for companies with high EP	True for companies with low EP	Not analyzed	Not analyzed	U-shaped hypothesis true

* H0: There is a relationship between EP and BP; ** H0.1: Better EP determines better BP; H0.2: Worse EP determines worse BP; H0.3: Better BP determines better EP; H0.4: Worse BP determines worse EP; H0.x: There is another possible EP–BP relationship (e.g., inverse, non-linear, U-shaped, and conditional); H1: There is no relationship between EP and BP.

4.4. Determining the Type of EP–BP Relationship (Step IV)

In the fourth step, we analyzed the 47 papers to confirm or deny the research sub-hypotheses, H0.1, H0.2, H0.3, H0.4 and H0.x. In Table 4, in columns four through eight, we show the results of this step.

Except for Kranjc et al. [73], all of the authors had at least one hypothesis about the direction of the relationship between EP and BP (i.e., the papers investigated not only hypotheses H0 and H1 but also one or more directional assumptions, such as sub-hypotheses H0.1, H.02, H.03, H.04 and/or H.0x.. Fourteen papers studied one single-directional hypothesis, while other papers had two or more directional hypotheses.

In almost all cases, the authors claimed to confirm their hypotheses, completely or partially, with the exception of two papers that did not confirm their hypotheses (Iraldo et al. [76], and Dragomir [94]).

The most frequently hypothesis analyzed and confirmed in the papers was the H0.1 hypothesis "Better EP determines better BP". Moreover, nine papers asserted that the H0.1 hypothesis was not true (or false) in specific conditions. The second most-confirmed hypothesis was the H0.3 hypothesis "Better BP determines better EP". Hypotheses H0.2 "Worse EP determines worse BP" and H0.4 "Worse BP determines worse EP" were claimed to be true in five papers.

As synthesized in the eighth column of Table 4, more than 50% of the analyzed papers demonstrated other hypotheses about the direction in EP–BP relationship, as sub-hypothesis H0.x: starting from these papers we can underline some emerging threads.

Many authors demonstrated that the sub-hypotheses H0.1 and H0.3 were not necessary mutually exclusive: in two papers the "bi-directional hypothesis" H0.1–H0.3 is demonstrated; and three papers advanced a "cyclic hypothesis" in which better BP determined better EP that in turn determined better EP. These hypotheses may be considered to be an evolution of the "win-win approach" that was previously adopted by some authors to explain the positive two-way relationship between EP and BP [30,107].

In four papers, the "inverted U-shaped hypothesis" was partially confirmed, highlighting how the EP–BP relationship is positive up to a maximum point and then becomes negative. This hypothesis is coherent with another theoretical model, named the "environmental Kuznet curve", at the firm level [25,36]. On the other hand, in one paper the "U-shaped hypothesis" was confirmed. However, one paper demonstrated a "neutral hypothesis", in which better EP determined better BP but at an additional cost.

Finally, 15 papers discussed various "conditional relationships", i.e., directions of the EP–BP relationship conditioned by "moderator" and/or "mediator" variables, that contribute to support or reduce the relationship under specific conditions (such as firms' size, Country or region, run-time, market competition, available technologies, internal control processes, innovation, environmental regulation, macro-economic conditions, corporate reputation and customer satisfaction).

4.5. Analysing the Reasons for Any Disagreements in the Direction of EP–BP Relationship (Step V)

In the fifth step, we reconsidered all the papers that concluded with disagreements in the direction of EP–BP, with the aim of underlining the possible reasons and adding further considerations to the discussion in Sections 4.2–4.4.

With reference to the summary of the papers in Table 2, the studies regard different industrial sectors (with both environmentally polluting and clean processes), and with different environmental strategies (with both environmental management tools and legal environmental requirements). This heterogeneity of companies' samples may have led to some inhomogeneity in the results. On the other hand, the high number of companies' samples analyzed and the research methodology adopted, as direct observations of public data or interviews, support the strength of the statistical results obtained in the studies.

With reference to the contents of the papers shown in Table 3, the main criticism that we can reveal is the extreme heterogeneity of environmental and economic variables considered in the

studies. As discussed in Section 4.2, this inhomogeneity is generally not related to the industrial sector considered, neither to the Country nor to the research goals/topics. Even if it is possible to identify some "main" variables, which are adopted more frequently, especially with reference to the evaluation of BP, the great variety of variables selected by the authors is striking. Moreover, almost no author stated to refer to some international standards in defining the EP and BP measurement variables.

With reference to the analysis of the EP–BP relationship demonstrated by the papers, as shown in Table 4, the main disagreements concern some types of direction of this relationship, and, specifically, they indicate other possible EP–BP relationship, e.g., inverse, nonlinear, U-shaped, or conditioned by moderator factors. These results can be considered an evolution of the "Porter–Wagner dilemma", more than a lack of agreement among scholars.

5. Discussion

First, we discuss the results of sub-question (i): which recent papers address the relationship between the EP and BP of enterprises?

The relationship between EP and BP is a much-discussed and timely topic for the scientific community. From 2000 to 2015, 47 papers discussed this topic explicitly in different scientific journals, and nearly 50% of these papers were published in the last three years due to the financial crisis. The studies cover a range of industries and both developing and industrialized countries. The relationship between EP and BP has been studied both in large companies and in SMEs. The analyses were conducted primarily through surveys by statistical analysis of published data and through entrepreneurs' interviews.

A number of papers in recent years have discussed the relationship between environmental practices and firm performance in terms of environmental strategies, eco-design, innovation, and corporate social responsibility. In this paper, our focus was the relationship between EP and BP at the firm level, and for this reason, we excluded 182 papers: however it must be said that this abundance of articles on similar topics show that the link between environment and business is a "contentious issue" in scientific community [43], with great interest in many different fields.

Next, we discuss sub-question (ii): is there a sufficient consensus among authors to declare the existence of an EP–BP relationship?

All of the authors agree that there is a relationship between EP and BP; therefore, hypothesis H0 is confirmed. This agreement is notable because it includes different case studies in different countries and from different industrial sectors. However, some authors admit that this relationship is weak, at least for some variables.

Then, we consider sub-question (iii): is there a specific direction of the EP–BP relationship?

The two most studied sub-hypotheses are H0.1 "Better EP determines better BP" and H0.3 "Better BP determines better EP", corresponding to the "Porter–Wagner dilemma". These two hypotheses are also the most confirmed. However, several authors consider them to be complementary and not alternatives. Some authors indicate that hypothesis H0.1 is not confirmed and that hypothesis H0.2 "Worse EP determines worse BP" and H0.4 "Worse BP determines worse EP" are possible. The literature review revealed that other hypotheses have emerged to analyze the direction of the EP–BP relationship. The "cyclic hypothesis" and the "bi-directional hypothesis" confirm and extend the "win-win approach". The "inverted U-shaped hypothesis" proves to be an advanced solution in the decades-long debate. A "neutral hypothesis" remains valid in some studies.

Finally, we discuss the sub-question (iv): what are the reasons that do not lead the studies to a consensus view in the direction of EP–BP relationship?

First of all, we underline that in recent years there are new emergent hypotheses related to the EP–BP relationship, more complex and multi-factorial; however, the studies related to each emergent hypothesis are still few and for this reason in some cases they probably lead to different results. Therefore, we can confirm previous authors [41,58,61] in the hypothesis that the methodological approaches to study this relationship are evolving, as "empirical data in search of a theory" [108].

On the other hand, there has been a significant evolution in research about the EP–BP relationship regarding the analysis of "mediators" and "moderators" variables, and the number of papers that consider the factors affecting this relationship has increased in recent years; however, the results of these studies are very different and often conflicting. Thus, the inconsistency, previously underlined by many authors (e.g., [51,52,109,110]), seems to have grown.

Beyond these considerations, it is necessary to recognize that the main criticism in the debate related to the "Porter–Wagner dilemma" concerns the extreme heterogeneity of the variables used by the authors to measure/verify the EP and BP. This lack of homogeneity generally is not linked by different research goals or different industrial sectors investigated, but it originates from different choices of the scientists. This problem has been partially highlighted in previous studies (e.g., [19,32,84,86,89]). It is certainly linked to the complexity of the topic, as well as been shown in [2,38,43,48,66,111]. However, it demonstrates that no consensus has yet been reached, despite numerous studies conducted in recent years [104,112]. Moreover, this inhomogeneity may be due to the fact that many studies related to the analysis of EP–BP relationship at the firms' level consider business cases, and consequently the choice of indicators for measuring EP and BP are affected by the availability and relevance of data for specific case studies analyzed. Then, being the business studies potentially very different among each other, it follows that the variables considered may be not comparable, and the conclusions may be not in agreement [113].

Overall, it is difficult to summarize the prevalent direction in the relationship between EP and BP, not only because of the different results obtained in the testing of hypotheses but also because of the diversity of the variables considered in the studies. This gap represents a great disadvantage that still prevents scientists from supporting practitioners and enterprises in the strategic management of sustainability, through an agreement of comprehensive and effective assessment methods and tools [112–116]. Therefore, we remark that the priority of the scientific debate on "Porter–Wagner dilemma" is to share univocal methods to measure firms' performance. Coherently, it is important to share standardized information tools to support scientists, practitioners and managers in measuring the benefits of sustainable policies and practices [112,115,117].

6. Conclusions and Future Perspectives

In the debate regarding the business implications of environmental investment, the recent literature discusses the "Porter–Wagner dilemma": is the environment a "strategic competitive factor" or a "luxury good"? Our research aims to delve into the type of the relationship between EP and BP focusing in particular at the firm level. Through a systematic literature review of scientific papers published from 2000 to 2015, the research goals are: first, to determine what the prevalent cause and effect directions of EP–BP relationship are, and, secondly, to investigate the reasons for any disagreements in this topic among the scientists.

With this aim, two research hypotheses were elaborated to verify whether the EP–BP relationship exists, and five sub-hypotheses were expressed to investigate the potential directions of this relationship.

The results of our research confirm the relevance of this topic in different disciplines, with an increasing number of papers published in more recent years. Moreover, there is substantial commitment among the authors to demonstrate the existence of a relationship between the EP and the BP of companies in different countries and across industrial sectors. However, in some studies, this relationship is not verified for all of the environmental or economic variables considered.

In analyzing the direction of the EP–BP relationship, the two most confirmed sub-hypotheses are that "better EP determines better BP", as a "Porter point of view", and that "better BP determines better EP", as a "Wagner point of view". These hypotheses resulted to be complementary and not alternative, as in a "bidirectional" or "cyclic" approach. Other hypotheses are also emerging, as "U-shaped", "inverted U-shaped", "neutral", and "conditional" relationship, sometimes with contradictory results.

In discussing the reasons leading to disagreements among the scientists, we can remark that the debate on EP–BP relationship at the firms' level is very current today, with a continuous evolution in terms of types of relationships considered and variables adopted to measure the performance. However, we underline the urgency of standardization methods and tools to measure individual performance of companies, in order to enable the comparison of case studies results and to clearly lead the entrepreneurships in their efforts toward sustainable business.

The main limitations of this research concern the methodological choices adopted in the literature review. First, the sample of papers selected for the analysis is limited to the English papers publish in ISI journals, and does not consider other type of scientific documents, such as conference proceedings or books, and papers in non-English language. Second, our review includes papers considering all types of firms, both small/medium and large enterprises: it would be interesting to deepen the analysis of EP–BP relationship distinguishing based on the size of the firms, with the aim to confirm or deny the obtained results. Third, we have investigated exclusively the relationship between EP and BP, however, in recent years, the literature debate is also lively concerning corporate social responsibility (CSR), which includes both EP and BP performance: a relevant research perspective should consider the extension of the research to other CSR parameters.

From these results, we can derive some statements and future perspectives for managers, practitioners and scientists.

For managers, our study indicates that the relationship between EP and BP is bidirectional: consequently, for firms it is necessary to systematically consider the environmental implications of business strategies and vice versa, in a mutual positive correlation. This issue is so important that an understatement of this relationship may result in negative consequences for business performance.

For practitioners, we can affirm that a mutual negative correlation between EP and BP is possible, but the empirical evidences are still limited; therefore it is crucial to promote other studies in order to better define the mechanisms of the correlation between worse EP and worse BP.

For practitioners and scientists, other interesting types of relationship between EP and BP are emerging, more sophisticated and in line with the complexity of the topic. Thus, it is important to study in deep these hypotheses, e.g. combining U-shaped and inverted U-shaped models, and different mediator and moderator variables.

From this research, we can also underline an important lesson for the scientists: it is not possible to find an answer to the "Porter–Wagner dilemma" as long as the studies, even in their methodological rigor, lead to incomparable results because of the adoption of different indicators. In the future, collaboration between different disciplines and the sharing of comprehensive methods and tools to measure and relate to each other firms' EP and BP should be a priority to give clear and straightforward answers to enterprises, which are increasingly asking for evidence of the economic benefits associated with environmental commitment.

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