SUSTAINABILITY AND EFFICIENCY. THE LVMH STRATEGY TO REDUCE ITS CARBON FOOTPRINT

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ABSTRACT

This research investigates efficiency in reducing the carbon footprint within the luxury sector, focusing on the LVMH group. It compares greenhouse gas (GHG) emissions, measured by CO2 outputs per IPCC standards, with overall revenue and corporate social responsibility (CSR) initiatives. The study identifies which CSR measures contribute effectively to environmental protection efforts. Findings are relevant beyond LVMH, offering insights applicable to other sectors. Achieving carbon footprint efficiency aligns with the UN's 2030 Agenda, which calls for sustainable and effective corporate strategies to combat climate change as part of broader CSR commitments.

RESUMEN

Para analizar la eficiencia en la reducción de la huella de carbono en el sector del lujo, se estudia el grupo LVMH, comparando sus emisiones de gases de efecto invernadero, medidas en CO2 según el IPCC, con sus ingresos y las iniciativas de responsabilidad social corporativa (RSC). Se identifican las medidas de RSC que más contribuyen a la protección ambiental. Estos hallazgos son extrapolables a otros sectores. La eficiencia en la huella de carbono se alinea con la Agenda 2030 de la ONU, que insta a las empresas a implementar estrategias sostenibles y eficaces para combatir el cambio climático.

1. Introduction

Luxury brands are precursors in sustainability (Osburg et al., 2021): they are the first to innovate in what other FMCG sectors will later adopt (Waller et al., 2015); and they are influencers for people's aspirations and behaviours - especially luxury fashion brands – (Bae, 2019). Such influence explains their key role the fight against climate change at the international level and in using sustainable development (Bae, 2019; Osburg et al., 2021). Additionally, sustainability-wise, luxury brands are a reference for the fashion industry (Choi, 2014). It has been found that the evolving economy –circularity- is a new global must that enables opportunities for sustainable solutions as offered by brands. Nowadays, sustainable luxury is seen by researchers to study aspects such as communication, supply chain and innovation in products, especially when paying attention to the impact of these activities on consumer behaviour (Kunz et al., 2020). Therefore, luxury tends to environmentally friendly and more ethical practices (Deloitte, 2023) to meet the growing expectations of younger audiences (Pencarelli et. al., 2020). These are very sensitive to sustainability and has an impact on their economic decisions. Today, brands are considering different targets and their behaviours; however, It is projected that by 2030, younger generations will account for 85% of luxury product sales (D'Arpizio et al, 2024).

That is why this paper wants to study how the largest conglomerate of luxury fashion brands LVMH (Deloitte, 2023), is facing climate change, this being is a highly considered challenge in society. Because, in the words of Bernard Arnault, Chairman and Chief Executive Officer of LVMH, "our position as a leader entails social and environmental responsibilities. We need to go further than simply meeting standards". Hence, according to LVMH (2023b), sustainability and, specifically, environmental protection, are integrated into its DNA because its business depends directly on the protection of the resources from which the raw materials are extracted to manufacture the group's different products, a fact common to the luxury industry where there is a common interest in producing products that last over time (Ki & Kim, 2016; Osburg et al., 2021; Ozdamar-Ertekin, 2019; Willersdorf et al., 2020).

And beyond that, at LVMH there is a concern to apply the highest standards throughout the company's value chain and its brands, so that sustainability, efficiency, and business go hand in hand (Lopez et al., 2023). As part of its sustainability policies, LVMH has an environmental roadmap called LIFE 360 (LVMH, 2023a) where it has already achieved milestones such as reducing CO2 emissions across the group. With a view to 2030, the holding company has set itself four major environmental objectives: protecting biodiversity, promoting the circular economy and transparency. Regarding the objective related to the reduction of CO2 emissions, the group has gone a step further and, beyond those linked to manufacturing, LVMH is focusing on reducing CO2 emissions related to product stages such as transport, purchase, and use.

In this regard, the goals of this paper are to analyze the evolution of LVMH's GHG emissions, as measures by CO2 emissions upon the IPCC methodology; as well as their business results over a consistent period to determine whether efficiency has been reached in fighting their carbon footprint. Understanding how luxury fashion brands may prove more sustainable requires detailed analysis, specially oriented towards efficiency, to exemplify others (Diallo et al., 2021; Osburg et al., 2021; Rukhaya et al., 2021). Upon that methodology we can conclude that there is a positive, direct, and proportional relationship between revenue and CO_2 emissions.

2. Literature Review

2.1. Corporate Social Responsibility and Sustainability

Corporate Social Responsibility (CSR) and corporate sustainability is generating increasing interest recently in the business and research fields, specifically measuring impacts and the efficiency of measures carried out by companies. Even though CSR aims to generate relevant impacts in the environmental and social and environmental perspectives of companies, companies are finding that they are being required to implement sustainable solutions in their CSR strategy as given the consequences of the global pandemic caused by COVID-19and the impact that climate change, among other risks (WEF, 2023). Hence, increased attention to CSR (Carroll, 2021) and the thirst to understand how companies promote efficiency in environmental and social issues, the accounting of such issues and

impacts (Barnett et al., 2020) and the need to provide best practices. All of this, together with the regulations affecting companies in terms of compliance an ESG requirements (environmental, social and governance).

The relevance of this matter has gathered interest not only from key players in the industry but rather from interest groups in general (Carroll & Buchholtz, 2014) specifically regarding consumers, strongly demanding behaviors that are more sustainable (Claro et al., 2013). Several researchers have identified this, stating that that sustainability is essential for consumers (Belz & Schmidt-Riediger, 2010) and that recent global changes has increased a perceived demand for brands in relation to sustainability (Charter et al., 2006). Additionally, the link between theory and practice in the field of luxury brands has been the object of some CSR and sustainability investigations to reach a better understanding (Amatulli et al., 2018; Gardetti, 2017). Further, considering that luxury brands have adverse media regarding sustainability (Li & Leonas, 2019), researchers have found that some luxury brands are taking actions following consumer expectations in order to adopt solutions in accordance with consumers (Cervellon, 2013; Khan & Ahmed, 2017). Therefore, there is a need for sustainability among luxury companies (Thomas, 2018).

Sustainability is linked to luxury only when companies have taken actions towards this matter, such as improving their value chain (Thorisdottir & Johannsdottir, 2020) and promoting sustainable consumption (Sun et al., 2021). Obviously, this is all included in the scope of CSR / sustainability reports, which increases transparency in terms of metrics. Furthermore, these reports long-term business strategies regarding sustainability and global trends (McKinsey & Company, 2020). In turn, the sustainability trends assumed by the fashion industry firms follow the recommendations established in the 2030 agenda approved by the United Nations, which 193 countries signed in 2015 to promote business sustainability. In this global agreement, companies around the world have voluntarily assumed to promote economic growth while being respectful of the environment and society. For this, the signatory companies take on the global challenges defined in the 17 sustainable development goals (SDG 1, no poverty; SDG 2, zero hunger; SDG 3, good health and well-being; SDG 4, quality of education; SDG 5, equality of gender; SDG 6, drinking water and sanitation; SDG 7, clean and affordable energy; SDG 8, decent work and economic growth; SDG 9, industry, innovation and infrastructure; SDG 10, reduction of inequality; SDG 11, cities and communities Sustainable; SDG 12, Responsible Consumption and Production; SDG 13, Climate Action; SDG 14, Life Underwater; SDG 15, Life on Land; SDG 16, Peace and Justice Strong Institutions; SDG 17, Partnerships to Achieve the Goal) (UN, 2015). To this end, the 2030 Agenda represents the roadmap for prosperity through global alliances and the signatory companies assume the global challenges defined in these 17 goals (United Nations, 2015).

In this context, participating companies have aligned with global institutions, to achieve sustainable development. Specifically, the objectives that affect luxury brands are summarized in the following SDGs: circular economy (SDG 8, SDG 12), technological and innovative materials (SDG 9, SDG 11, SDG 12), cleaner production and sustainable consumption (SDG 3, SDG 6, SDG 7, SDG 8, SDG 9, SDG 12) and transparency in its management (SDG 4, SDG 8, SDG 10, SDG 12, SDG 16) (The Manifiesto, 2019). Lastly, to know the level of progress in activities related to these SDGs, firms report the results in sustainability reports showing the scope of their actions in the global CSR strategy (Regenerate Fashion, 2020).

2.2. Carbon footprint and the luxury industry

Greenhouse gas emissions (GHG) emissions, including CO_2, have increased worldwide and generated an impact on climate change. International actions, like the 2015 Paris Agreement (UN, 2016) or the recent COP26 (UN, 2021) in November 2021, mean to set generally accepted objectives to fight the negative consequences of climate change. This is generating stricter regulation in more countries to protect the planet (Rukhaya et al., 2021).

One of the largest contributors to GHG emissions is the fashion industry, or so it is seen as such (Rukhaya et al., 2021) specifically when it comes to strategies like burning the garments of excess production to protect a brand's exclusivity (Bae, 2019). Specifically, the fashion industry was accountable for 2.1 billion tones or 4% of total GHG emissions, according to 2018 data from McKinsey & Company (Berg et al., 2020). Some studies increase that percentage up to 10% (Brewer, 2019).

The sector is deemed as one of the most polluting one's due emissions and waste – such as water waste in the use of cotton (Chapagain et al., 2006; Rukhaya et al., 2021) or micro plastics reaching the ocean (Browne et al., 2011; Henry et al., 2019; Pirc et al., 2016; Rukhaya et al., 2021).

A key strategy in large conglomerates to fight this problem consists of the so-called vertical integration, in which they use eco-friendly materials, increase the life of products, invest on the second-hand or rental market (Willersdorf et al., 2020) or even reduce "emissions from upstream operations, reducing emissions from brands' own operations, and encouraging sustainable consumer behavior" (Berg et al., 2020).

Luxury brands are leading the response in the fashion sector (Osburg et al., 2021; Rukhaya et al., 2021). As a matter of fact, one of the key aspects for luxury brands is sustainability (Wadera & Kaur, 2019). New methods to measure environmental impacts and research in new materials are key pillars to respond to the demands of society (Wadera & Kaur, 2019; Willersdorf et al., 2020), which only explains agreements in the fashion industry like The Fashion Pact (2020).

Furthermore, customers are increasingly demanding more frequently sustainable and environmentally friendly products (Bae, 2019; Rukhaya et al., 2021). This consumer trend has increased the incorporation of sustainable actions (Osburg et al., 2021; Rukhaya et al., 2021) in three pillars: environment/planet, society/people, and profit (Bae, 2019; Wadera & Kaur, 2019). Buying fewer, better-quality clothes and wearing them longer, which represent the slow-fashion movement, is nowadays more common (Ozdamar-Ertekin & Atik, 2015), leading to the concept of circular economy, which promotes a second life to clothes by donating or recycling (McKinsey & Company, 2020; Olatubosun et al., 2021).

The following section shows how LVMH develops activities linked to sustainability and efficiency, following the Intergovernmental Panel on Climate Change (IPCC) methodology. After this, the results are explained, and some conclusions of the study are included in this paper.

3. Methodology

This study is based on different sets of data to know how this company measures its impacts. Then, two series of data are compared in the methodology contained in this research: (i) LVMH's carbon footprint using the IPCC method (Downie and Stubbs, 2013; Hertwich and Wood, 2018). This methodology is used by governments to estimate their greenhouse gas emissions and removals reporting the information to the United Nations Framework Convention on Climate Change (UNFCCC). And the second series of data, (ii) LVMH's economic results, as measured by revenue.

LVMH details its carbon footprint in its regular environmental reports (LVMH, 2024). Moreover, emitted CO_2 tons are the units of measure and they are accounted upon the IPCC method with three different scopes (BHP, 2020; IPCC Report, 2022): (1) scope 1 measures the CO_2 emissions from fugitive; (2) scope 2 measures purchased electricity, heat and steam; and (3) scope 3 measures purchased goods and services, business travel, employee commuting, waste disposal, use of products, transportation and distribution (upstream and downstream), investments and Leases assets and franchises.

It is relevant to highlight that Scope 3 includes concepts that are out of a company's control - i.e.: emissions generated by an investment prior to the purchase and, therefore, setting a non-accountable trace. Therefore, this research has avoided the used of scope 3 measurements.

Table 1. CO_2 emissions by LVMH for scopes 1 and 2 (tons)

2013	2014	2015	2016	2017	2018	2019
307.552,00	324.079,00	344.336,00	385.629,00	379.312,00	384.123,00	363.960,00

Source: personal elaboration based on information published by LVMH from 2013 to 2019.

CO_2 emissions by LVMH's business from 2013 to 2019 are shown in Table 1. They range from 307 thousand tons and grow steadily until 2016, reaching 385 thousand tons. We see a slight decrease in 2017 to 379 thousand tons to keep a regular level until 2019 – when it's even lower at 363 thousand tons.

The above entails two different periods: from 2013 to 2016, with constant growth, and from 2017 to 2019, where there is stability. Additionally, our methodology also analyzes revenue generated by the sale of luxury goods, as seen below.

<div align="center">**Table 2.** Revenue by LVMH (US$mill)</div>

2013	2014	2015	2016	2017	2018	2019
21.761,00	23.297,00	22.431,00	23.447,00	27.995,00	32.078,77	37.468,00

<div align="center">Source: personal elaboration based on information published by Deloitte from 2013 to 2019.</div>

Revenue for LVMH for the same period[1], as seen in Table 2 shows a similar trend: there is a clear and non-stop trend of growth, starting at 21 billion US$ in 2013 and ending at 37 billion US$ in 2019. Still, the increase in the last three years (2017-2019) is larger than growth in the initial years of the period.

In summary, both data on revenue and CO2 emissions show a clear breaking point in 2017, at which point CO2 emissions stabilize, yet revenue increases at a higher rate. These results are analyzed in detail in the following section of this paper.

4. Results

Following the aforementioned methodology, the results of the analysis of the data at hand can be summarized in the following matrix:

Graph 1 shows a matrix comparing CO2 emissions and yearly revenue for LVMH from 2013 to 2019, therefore establishing the relationship for both variables. The horizontal axis represents CO2 emissions upon the IPCC methodology and scopes 1 and 2. The vertical axis details the revenue for the same conglomerate and the same period. Therefore, the above shows a positive, direct, and proportional relationship between CO2 emissions and revenue: when revenue increases, so does emissions. A trend graph shows this more clearly:

<div align="center">**Graph 1.** Relationship Matrix: revenue vs. CO_2 emissions (LVMH)</div>
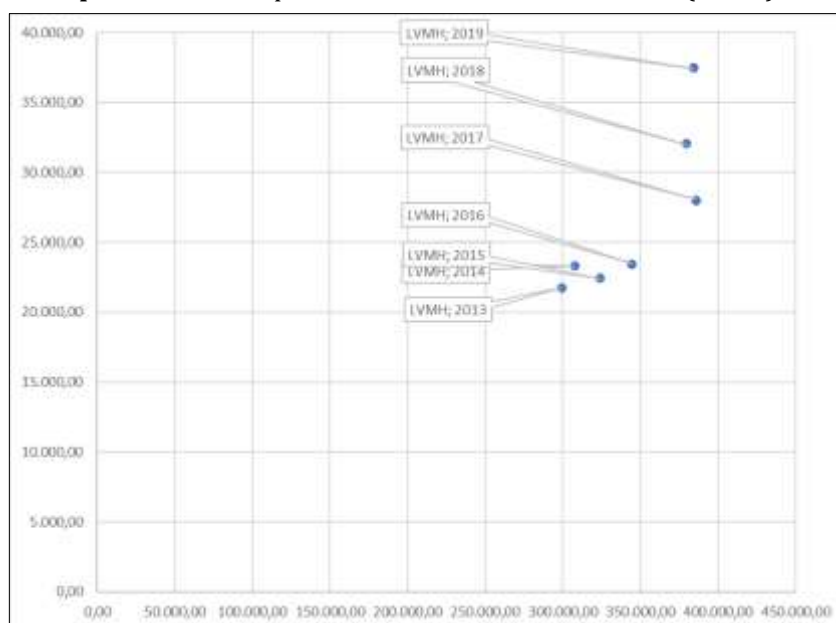
<div align="center">Source: personal elaboration based on Deloitte and LVMH from 2013 to 2019.</div>

Moreover, Graph 2 shows how there is a positive and growing trend in the graph (see dotted line), also proven by coefficient of correlation of the two variables[2], which amounts to 0,833[3]. This means

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[1] This information has been obtained from Deloitte's Global Powers of Luxury Goods reports for the period 2013-2019. 2018's data is not published by Deloitte, so it has been calculated upon growth reported by Deloitte in its 2019 Report. Apart from that, revenue has been obtained from data on Luxury goods sales and market share has been calculated as the fraction of Luxury goods sales.

[2] Ratio between the covariance of two variables and the product of their standard deviations. The closer to 1 (in absolute value), the more related two variables are.

[3] Upon the data in tables 1, 2, 3 and 4 as displayed in previous sections.

there is a very strong imitation between CO2 emissions and revenue: once one variable changes, the other one replicates, and the other way around.

Graph 2. Relationship Matrix: revenue vs. CO2 emissions (LVMH)
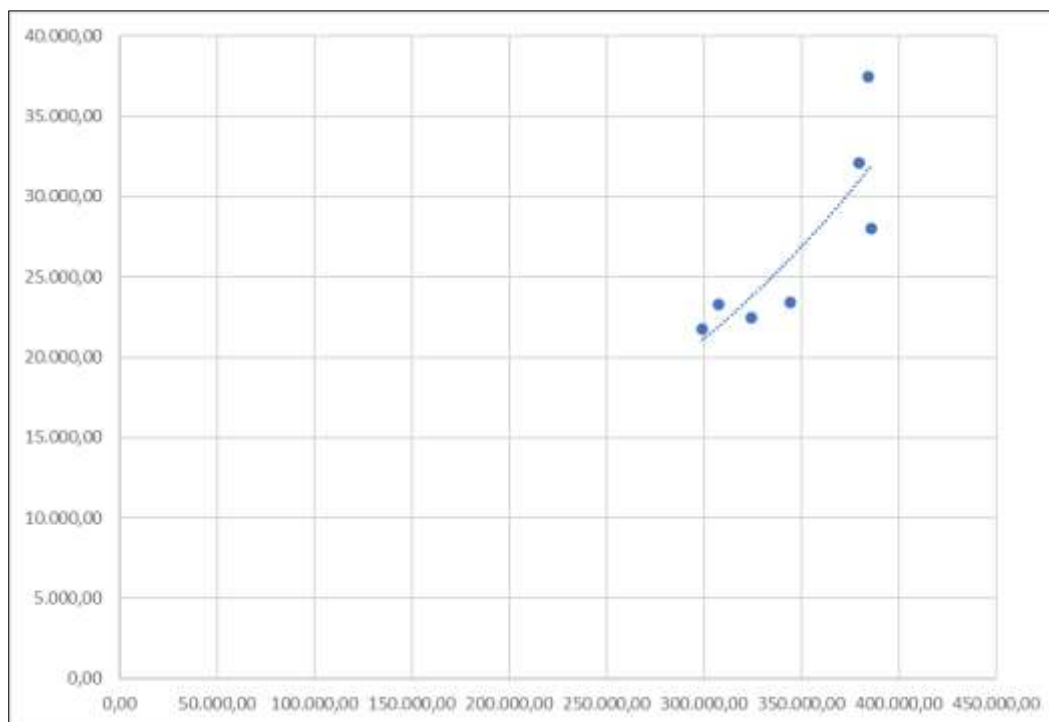
Source: personal elaboration based on Deloitte and LVMH from 2013 to 2019.

The logic behind the data shown in the above graphs is simple: the more you produce, the more you pollute. But this logic stops in 2017, when production increases at higher levels yet pollution, as measures by CO_2 emissions, stabilizes or even stagnates. This alone is a relevant result: it appears as if LVMH has reached a revenue level from 2017 that does not add pollution to the productive process. This would be environmental efficiency in its most simple definition: producing more without additional pollution. Or the other way around, managing to obtain more revenue out of the same pollution. Still, the data contains details that require further explanation.

Revenue, as a number of sales of luxury goods sales, contains information on how products may are sold and at what price: Revenue equals price times quantity. Therefore, revenues may increase because: (a) price has increased; (b) quantity has increased – meaning more goods have been sold; and/ or, (c) both prices have increased and more products have been sold.

Therefore, the data displayed in this section does not necessarily mean that LVMH has managed to produce and sell more luxury goods with the same level of pollution, given that its revenue increase, as exponential as it may be from 2017 to 2019, may be due to price increases as opposed to growing sales of luxury goods. Discussion on this matter is contained in the following section.

We deem it appropriate to state that environmental report by LVMH do detail, for the period 2017-2019, a string effort regarding the 2030 agenda as described previously in this research, especially in terms of SDGs. Specifically, LVMH states it has concentrated in actions like "working on increasingly stringent standards", "participating in major international programs", "reducing energy consumption", "optimizing the carbon footprint", "standardizing eco-design" and/or "designing long-lasting products"; all of them part of the SDGs that entail the 2030 Agenda.

Taking the above into account, it seems no coincidence that actions oriented to 2030 haven been carried out specifically in the period 2017-2019, the same period when LVMH has managed to maintain or even decrease its pollution, as measures in CO_2 emissions and increase its revenue. In short: whenever actions oriented to the 2030 agenda has been taken, a relevant shift or breaking point has occurred in the relation between revenue and CO2 emissions. The meaning of this results, together with the above preliminary conclusions set forth above, is assessed in the following section.

5. Conclusions & Discussion

Luxury brands are leaders when it comes to acting first before major society challenges, which only means that current environmental sensibility and climate change (Gardetti, 2017) is now a key pillar for the luxury sector. Luxury brands have accepted a responsibility to change its industry, given they generate a relevant environmental impact. This has led them to ensures the implementation of the highest market standards. In this context, the goal of this research is to demonstrate which specific actions implemented in the field of luxury manage to generate carbon footprint efficiency. In this sense, luxury brands reduce emissions and encouraging sustainable consumer behaviour (Berg et al., 2020).

Furthermore, luxury brands are leading the response in the fashion sector (Osburg et al., 2021; Rukhaya et al., 2021;). As a matter of fact, one of the key aspects for luxury brands is sustainability (Wadera and Kaur, 2020). New methods to measure environmental impacts and research in new materials are key pillars to respond to the demands of society (Wadera and Kaur, 2020; Willersdorf et al., 2020), which only explains agreements in the fashion industry like The Fashion Pact (2020).

LVMH (2023a) has made environmental care a growth factor for almost 3 decades. Its LIFE 360 roadmap represents its commitment to fight climate change by applying the highest standards to protect the environment it depends on to survive as a business. That is why, in terms of CO_2 emissions, LVMH is focused on improving emissions at all stages of its products' life cycle. That is why, the methodology in this paper states the comparison between revenue of luxury conglomerate LVMH and its GHG emissions. Upon that methodology we have concluded that there is a positive, direct, and proportional relationship between revenue and CO_2 emissions.

This would seem to imply that the more a luxury brand like LVMH sells, the more it pollutes. Yet we have found that once a high level of sales has been reached (which in this case occurs from 2017 on), pollution stabilizes or even decreases slightly. Therefore, it would appear as if an efficiency stage had been reached to a context in which more sales did not mean more pollution.

This initial conclusion matches that said by LVMH in its current CSR model: LIFE 360 (LVMH, 2023a), which states that CO_2 emission goals were already reached for scopes 1 and 2, and that their focus is now on "emissions that are not directly linked to product manufacturing, but result from other stages in the product lifecycle, including transportation, procurement and use". This shows that the conglomerate has understood that a threshold has been surpassed in terms of CO_2 emissions and that new controls and actions have to be implemented outside the scope of the conglomerate itself. However, there a week point: revenue is not only influenced by sales but also by prices. Therefore, it is possible that LVMH increase its revenue from higher prices but maintaining its sales and, therefore, explaining why pollution is maintained as well.

This possibility is the major discussion ahead of the conclusion in this paper: is revenue the proper output of pollution or are prices generating a bias in this analysis? Further analysis may answer this discussion with the use of variables alternative to revenue yet maintaining the comparison methodology in this research. Such alternatives should not be influenced by other factors like price and should be oriented to size of activity in the sector. They could be a measure of market share, for example, or the number of goods sold – although this alternative would not be the best variable for comparison given not all manufacturers in the sector produce the same product, especially in the luxury sector where exclusivity leads to constant uniqueness and differentiation.

Another discussion string is that of the influence of SDGs being implemented specifically in the same period (2017-2019) when the efficiency conclusion is obtained. Particularly, as stated in the environmental reports by LVMH, its action plan shifted towards the 2030 agenda in 2017-2018, when the conglomerate focused on actions like "working on increasingly stringent standards", "participating in major international programs", "reducing energy consumption", "optimizing the carbon footprint", "standardizing eco-design" and/or "designing long-lasting products". These actions are clearly oriented to efficiency – like standardization and common programs. Therefore, it cannot simply be a coincidence that these actions meet efficiency glimpses – so to speak - regarding revenue, given the pending discussion on price bias as described above. Further work should be based in the discussions set in this research. Still, one conclusion is undoubted: there is a glimpse of efficiency, in terms of pollution and business revenue, which deserves attention. Future research can be focused on the exploration of other companies and industries, to reveal why sustainability is a priority for the coming years with different effects for companies, the environment and society.

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