

# Environmental Performance and Leather Footwear: A Green Marketing Mix Approach for Sustainable Success

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## Abstract

In a cutthroat global marketplace, businesses need to implement tactics that improve sales, market access, and client retention. The footwear sector, like other industries, wants to increase its consumer base and determine whether green initiatives may help with this. The production of leather footwear has a positive impact on economic growth. but can have detrimental effects on the environment because of the water and chemical usage involved. The primary chemical of concern is basic chromium sulphate, which is frequently employed as a tanning agent and gives the final leather its outstanding technical performance. In order to produce finished leathers footwear with the same technical and aesthetic qualities as those from the traditional procedure, standardized life cycle assessments were applied to the manufacturing chains beginning with pickled skins. The new processes adopted in this study significantly reduce impacts in terms of water consumption and ecotoxicity (up to 32% and 46%, respectively). However, they also suggest an increase in terms of climate change (up to 51%).

This study is to assess environmental performance and how green marketing affects brand worth for an effective environmental sustainability. A structured questionnaire was used to gather data from 320 shoe buyers utilizing a quantitative and correlational design method. The partial least squares structural equation modeling technique was then used to evaluate the data. Additionally, brand worth demonstrated a positive and substantial impact on environmental sustainability (0.700), and green marketing mix sustainability product (0.146), promotion (0.153), and place (0.582) all demonstrated positive and significant effects. These results imply that integrating green practices into sales channels, marketing campaigns, and advertisements not only raises brand worth but also helps achieve sustainability objectives. For businesses looking to incorporate sustainability into their company plans and draw in eco-aware customers, this report offers insightful information.

**Keywords:** Environmental Performance, Leather footwear, Marketing Mix, Sustainability

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## INTRODUCTION:

Since the Neolithic era, when ancient Mediterranean societies realized that raw animal skins could be treated with plants to create durable fabrics, leather production techniques have been recognized (Wang et al., 2021). The goal of the process is still to turn a highly volatile chemical into a stable product today, but its overall structure is more intricate (Marrucci et al., 2022). High standards for finished leathers must be met in terms of their mechanical, chemical, and physical performance as well as their visual appeal and sensory appeal. Since raw hides and skins are composed of three-dimensional collagen fibers that guarantee flexibility, mechanical resistance, breathability, thermal insulation, and malleability, the final attributes mostly stem from their use as a starting point (Wang et al., 2021). To achieve the desired qualities and meet consumer demands, the tanning industry uses a variety of process procedures and recipes with a balanced combinations of chemicals and water (Black et al., 2013). As a result, there are now more varieties of leather, which makes it a material that may be utilized in a variety of industries, including footwear (De Rosa-Giglio et al., 2018).

With the capacity to manufacture over hundred million finished leathers and eight kilo tonne per year of sole leather, the Italian tanning industry leads the industry. More than 17,000 people work for 1200 enterprises in four industrial centers in Italy (Daddi et al., 2015), and more than sixty percent of the market is made up of premium brands (Oliveira et al., 2023). The tanning industry supports both domestic and international economic growth, but it also poses serious environmental dangers and jeopardizes worker safety (Tasca and Puccini, 2019; LWG, 2021). Potential issues may arise from any step of the entire production chain, including upstream and downstream operations (Marrucci et al., 2022). The primary cause of the environmental problems in the leather industry is the inherent need for chemicals and water, as some agents are overused to increase their penetration into the leather (Joseph

and Nithya, 2009). This results in significant emissions into the environment through wastewater (Black et al., 2013). The primary issue is with basic chromium sulphate (BCS), the most popular tanning chemical since it gives leather high-technical performance (Wu et al., 2022).

The production of leather footwear can be made more environmentally sustainable through a variety of measures. First of all, proper use of chemicals and water can reduce the amount of non-renewable resources used, prevent the discharge of dangerous materials into the environment, and guarantee safe working conditions (de Aquim et al., 2019). Reducing solid waste and wastewater is also essential; suitable tactics combine alternatives for recovery and reuse with process quality control (Sawalha et al., 2019).

The innovational tanning process can be carried out by using conventional tanning machines with limited consumptions of chromium and water (Vapetan, 2022)." The study presented here outlines the key features of these procedures and thoroughly measures how well they perform environmentally in comparison to the traditional approach. To model the implementation of the emerging methods at commercial scale (Tomatis et al., 2024), the inventory for creative scenarios used data from experimental activities that were subsequently processed using an ex-ante technique (Tsoy et al., 2020). Two types of finished leather that are used to make leather footwear were the subjects of the parallel analysis.

### **Green Price and Green Promotion**

The Sustainable Development Goals (SDGs), which offer a framework for ethical corporate practices, have made sustainability a crucial component. Businesses who support the SDGs not only improve their standing with the public, but also win over customers (Montera et al., 2024 & Patuelli et al., 2022). Businesses are adopting green marketing techniques, which incorporate environmental issues into the marketing mix, as a result of consumers' growing preference for companies that are dedicated to sustainability (Genc, 2021). Green marketing influences consumer behavior by increasing company visibility as ecologically conscious (Hafez 2021 & Wu & Liu, 2022).

The concept of the "green price" takes into account the costs to the environment incurred during the production and use of products and services (Banzhaf H, 2005). Prices typically do not account for external expenses, allowing overuse of natural resources and the ensuing harm to the environment. As a result, a green price means that the market price has internalized these external expenses (Nguyen TLT, et al, 2016). Determining external expenses precisely is one of the biggest obstacles to implementing green pricing. There are numerous examples of effective green pricing initiatives around the world, such as carbon taxes, where businesses pay for each ton of CO<sub>2</sub> emitted (Sehreen et al., 2019 & Shahzad et al., 2022). Nevertheless, quantifying and appropriately reflecting these costs in prices requires complex methodologies and accurate data, which can be challenging to achieve in practice. Studies indicate that buyers are prepared to shell out more money for goods with favorable environmental qualities (Lyu SO, 2024, Shi & Jiang, 2023).

Green promotion is the use of marketing techniques to convey the environmental advantages of a good or service. Green promotion is the term used to describe the tactics and procedures used by businesses and organizations to market and promote their goods, services, or projects in order to demonstrate their dedication to environmental sustainability (Rog et al., 2022, & Sharma, 2021).

### **Green Place and Green Product**

In the marketing mix, a "green place" is a company's or service's actual site that is intended to be sustainable and ecologically conscious. This tactic focuses on designing areas that encourage eco-friendly behaviors and reduce their negative effects on the environment. It refers to how environmentally friendly goods and services are distributed and made available in the market, which may entail adding green products to retailers' supply chains and having green product-focused retail locations (Tao et al., 2023). It takes into account the accessibility of nearby green spaces, including parks or natural regions, as well as nearby suppliers. In order to maximize energy efficiency, use recycled materials, install efficient air conditioning systems, and integrate green technologies like solar panels or rainwater collection, the space is built and designed using sustainable materials and ecological construction techniques [Lee et al., 2023, Hernandez-Lopez et al., 2022)

Green products minimize their influence on the environment through their design, production, and marketing. When sustainable materials, like organic cotton (Duarte et al., 2022) or ecological ingredients in cosmetics (Dlamini & Mahowa, 2024, Vallez-Gomis, 2021), are used in production, a product can be

considered green. Green product manufacturing can also result in lower waste and pollution emissions; technology that uses less energy and inputs lowers indicators like the carbon and water footprint.

### Effective Environmental Sustainability

Environmental sustainability is the capacity of an organization to conduct its operations in a way that, over time, conserves and safeguards ecosystems and natural resources. According to this theory, corporate operations are conducted to reduce their adverse effects on the environment and to encourage the preservation of natural resources. The circular economy is a fundamental component of environmental sustainability, aiming to reduce waste and optimize resource utilization by reusing, recycling, and recovering materials (Geissdoerfer, 2017).

This way of approach lowers operating expenses and creates new business opportunities. The company's reputation can be enhanced and customer connections can be strengthened by implementing ecologically sustainable practices. Customers that care about the environment are increasingly drawn to companies that show a sincere dedication to sustainability.

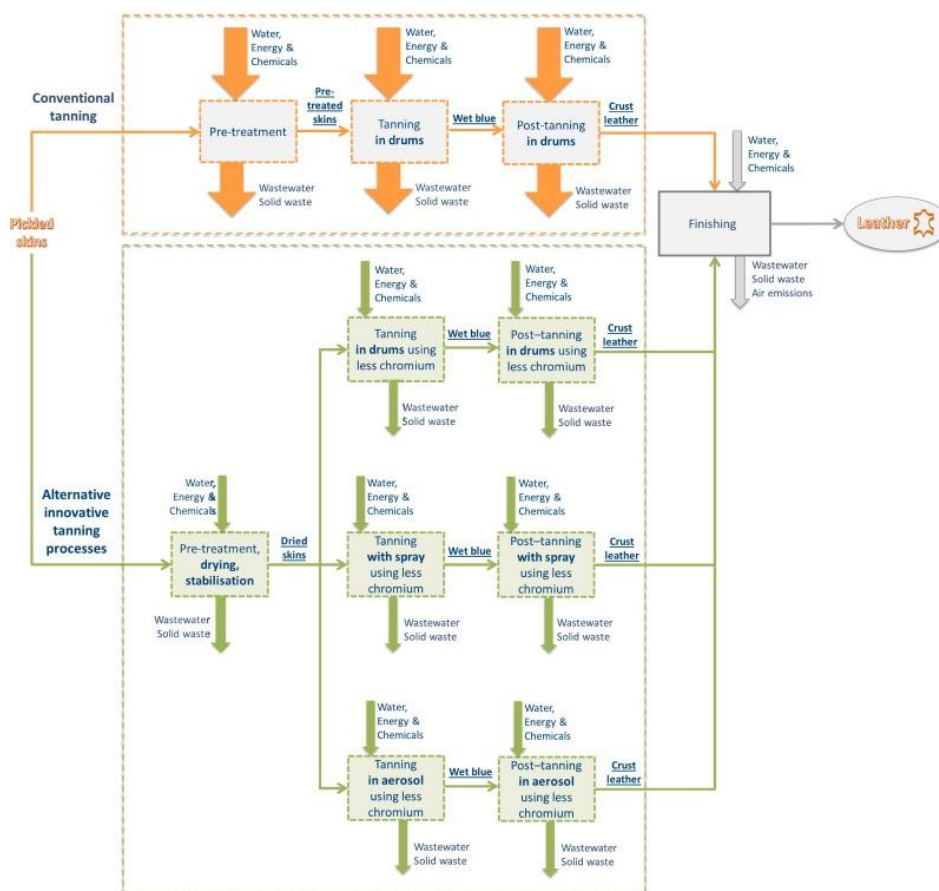


Fig.1: Conventional and Innovative Approaches to the tanning Process

### METHODOLOGY

According to De Rosa-Giglio et al. (2018), the life cycle of leather production (Fig. 1) can be schematically separated into three macro-stages: upstream, core process, and downstream. While raw hides and skins are transferred to tanneries immediately following a salting/drying step to prevent putrefaction during shipping, the upstream stage consists of animal agricultural operations up until their slaughter, when edible sections are separated, cleaned, and sold to food industries.

The core process is the most important aspect of the leather life cycle and the focus of most study (Kilic et al., 2023). A previous pickling step that lowers the pH of hides and skins, sterilizes them, and finishes their bating—which was initiated during beamhouse operations—improves the penetration of mineral tanning chemicals. Tanyard procedures are completed by the processes of draining, horsing, samming, setting, splitting, and shaving. This is done to control the moisture content and thickness of "wet blue" skins or hides, which are so named because of the color that the chromium tanning agents give them. For

certain purposes, post-tanning procedures seek to further stabilize tanned skins and hides and enhance their qualities.

Utilizing crucial data from process developers (Tsoy et al., 2020) and scaleup protocols suggested by Tomatis et al. (2024), LCA thus adopted an ex-ante approach to model the implementation of the emerging tanning procedures when applied at commercial scale. Since tanning processes heavily rely on the technical and aesthetic qualities needed for the finished products, the study must be deemed acceptable under the set of assumptions and conditions made for the two types of leathers used as references. The Life Cycle Inventory stage also involved a number of assumptions that were made in order to scale up the operations of new methods to a commercial scale. Using original data from process developers (Vapetan, 2022) and the methodological approaches recommended by the scientific literature (Piccinno et al., 2016; and Tomatis et al., 2024) have overcome this restriction.

### Effect of Marketing Mix on brand worth

Sustainable design and production of green products can have a big positive impact on brand worth. Prior research has demonstrated that items' ecological features enhance consumers' perceptions of a brand's exclusivity and quality (Chen, 2010). Customers tend to form a closer emotional connection with companies that provide eco-friendly items because they believe that these companies share their values and care about the environment, claim (Kang & Hur, 2012). The impact of green products on business reputation—a critical component of brand value—should also be taken into account. A better reputation draws in more customers and makes it easier to build positive connections with regulators, employees, and investors. Consumers view eco-friendly products as being of higher quality and worth, which enhances the brand's standing (Dangelico et.al, 2017). A suitable green price can enhance the perceived value of the brand by clearly communicating the superiority and uniqueness of sustainable products (Wang et.al, 2019).

Brands that use a green pricing strategy can successfully set themselves apart from their rivals, particularly in crowded markets, according to a study by (Lin et.al, 2017). Long-term brand value can be enhanced by this distinction, which can result in a durable competitive advantage. But it's crucial to remember that the green pricing technique needs to be applied with caution. Additionally, green marketing is essential for informing customers about the advantages that products have for the environment, which can help a brand stand out in a crowded market. Brand value can be enhanced by green distribution, which includes environmentally friendly points of sale and distribution routes. According to studies, adopting green logistics techniques, like cutting transportation-related emissions and utilizing eco-friendly packaging, can enhance a brand's reputation and perceived worth (Zhu et.al, 2012). Organizations' efforts to be environmentally sustainable might be fueled by brand equity. High-value brands typically have greater funding and incentives to make investments in eco-friendly operations (Butt et.al, 2017). Research has indicated that powerful brands have the ability to sway consumer choices toward more environmentally friendly options, hence promoting environmental sustainability in general.

### Design

The relationship between corporate sustainability and green marketing tactics in the footwear industry is investigated in this study using a quantitative methodology and a correlational design. In order to comprehend social processes, the quantitative method makes it possible to collect and examine numerical data. A structured questionnaire was used as the data collection tool. This tool has 29 Likert-scale items, with 1 representing "disagree" and 5 representing "agree." The following describes how many items there are for each variable: Seven items for the two types of sustainability, including three for green products, two for green promotions, two for green prices, three for green places, and for goods for brand worth (Galvez Sanchez et.al, 2024). Fig.2 shows the research framework



Fig.2 - Research Framework

A total of 350 responses were filtered from total response of 472. The primary goal was to examine observational habits in a public context where participants engaged voluntarily and without the researchers' direct involvement. Multivariate analysis was used in the current study to examine the data

that was gathered. In particular, the Structural Equation Modeling (SEM) was used. A minimum value of 0.5 is advised for Cronbach Alpha and composite validity, which are metrics of a construct's internal consistency. The established hypotheses are tested by the calculation of direct and indirect impacts.

## RESULTS

This section presents the study's results, including participant demographics, validity testing, reliability, and evaluations of the direct and mediated impacts of the suggested model. 350 resident shoe buyers made up the sample used in the study. The participants' ages ranged from 18 to 67 years old, with an average age of 26.5 years. There were 160 (44.64%) men and 190 (55.46%) women among the participants.

**Table.1 Characterized results of innovative Tanning Process**

Footwear	Unit	CONV_drums	INN_drums	INN_spray
<b>Acidification</b>	mol H+ eq	0.07	0.05	0.05
<b>Land use</b>	Point			
<b>Ozone depletion</b>	kg CFC-11 eq	480	208	210
<b>Water use</b>	m <sup>3</sup> deprived	3.8	4.0	4.1
<b>Human Toxicity</b>	CTUh	1.2 * 10 <sup>-7</sup>	5.6*10 <sup>-8</sup>	5.5 * 10 <sup>-8</sup>

Using the Environmental Footprint 3.1 technique, environmental burdens measured during the LCI phase were processed to determine the impacts of systems under consideration (Andreasi Bassi et al., 2023). Table 1 reports the characterized tanning process results for each of the 16 midway groups. The majority of the examined environmental problems for at least five categories are improved by creative solutions, as Table 1 demonstrates. In the majority of circumstances, using INN\_Spray solutions yields the best environmental performance.

**Table.2 Results of Creative Technological Solutions**

Footwear Sector	Drums	Spray	Aerosol
<b>HTC</b>	- 40 %	- 43 %	- 50 %
<b>EF</b>	- 26 %	- 16 %	- 24 %
<b>WU</b>	2 %	- 10 %	- 10 %
<b>CC</b>	+30 %	+ 25 %	+ 13%

HTC -Human Toxicity., EF- Ecotoxicity, WU- Water Use, CC- Climate Change

Table 2 presents the results of the creative technological solutions, which are expressed as differences from traditional tanning methods. Improvements resulting from cutting-edge technological procedures progressively grow for HTC and EF categories as they switch from INN\_drums to INN\_aerosol solutions, with the latter offering the largest savings. WU results for INN\_drums solutions resemble those of traditional procedures, but they get better for INN\_spray. These findings verify that every creative method exhibits a positive performance. Overall, the findings suggest that future research efforts by scientists working to optimize novel solutions should concentrate on lowering the impacts resulting from their entire production chains and minimizing the quantity of chemicals used in the pre-treatment stage (for example, by raising internal recycling rates).

The study's findings demonstrated that, without compromising the quality of the finished goods, the application of the novel technologies can enhance the environmental sustainability of the leather footwear production process. The researchers who are optimizing the novel solutions ought to evaluate how well they work with other types of leathers, beginning with various either adopted in other market areas or as hides or skins. Future initiatives have to concentrate on lessening the impact of the chemicals required for the pre-treatment phase. Additionally, the suggested procedures' social and economic viability should be examined, always from a life-cycle viewpoint.

**Table 3 Multicollinearity Statistics**

VIF					
P1	1.436	P8	2.511	P15	1.301
P2	1.951	P9	1.520	P16	1.802
P3	2.421	P10	2.332	P17	1.931
P4	1.721	P11	2.871	P18	3.201
P5	2.610	P12	2.762	P19	1.227
P6	1.519	P13	1.703		
P7	1.432	P14	2.101		

Table.3 shows the results of the multicollinearity statistics. The study's findings shed important light on the intricate interaction that exists in the footwear industry between corporate sustainability aspects, brand value, and green marketing tactics. The study's unique approach of connecting brand value and the three pillars of sustainability—economic, environmental, and social—with decisions about green products, green promotions, and green places is what makes it distinctive. By addressing a gap in the research, this comprehensive approach offers empirical proof of the noteworthy and advantageous impact of brand value on sustainability parameters. The present study adopts a more detailed methodology, dissecting green marketing into its component elements. Distinct impacts on brand worth are noted when looking at green marketing tactics separately. This method enables us to talk about how each dimension functions in the Indian context while avoiding the invisibility of particular impacts.

Furthermore, the results emphasize the connection between brand value and green product qualities, underscoring the impact of context-specific factors. According to earlier research, green products have a positive and considerable impact on brand value, supporting the idea that eco-friendly items raise brand value. The result of (Nguyen-Viet, 2022) ( $\beta = 0.521$ ,  $p < 0.05$ ) are comparable to the favorable and significant impact that green promotion had on brand value ( $\beta = 0.723$ ;  $p < 0.001$ ). The findings reinforce earlier research by confirming the value of green promotion tactics in increasing brand worth. In line with earlier studies, the noteworthy impact of green promotion confirms its function as a crucial instrument for increasing perceived value.

**Table.4 Effects of the Variables**

	Original Sample	Standard Deviation	T Statistics	f <sup>2</sup>
Green product → Brand worth	0.142	0.052	0.138	0.022
Green Price → Brand worth	0.163	0.043	1.723	0.038
Green Promotion → Brand worth	0.720	0.017	0.531	0.001
Green Place → Brand worth	0.810	0.062	6.325	1.762
Brand value → Environmental Sustainability	0.547	0.057	11.761	0.556

Using a resampling technique, the significance of the effect between the variables was examined. As seen in Table 4, the majority of p-values were below 0.05 after 10,000 iterations, indicating that the values were significant. The study's findings shed important light on the intricate connection between brand value, corporate sustainability aspects, and green marketing tactics in the footwear industry. The current study is unusual because it takes a distinct method to relating brand value and the effects of green product, green promotion, and green site choices on the economic, environmental, and social facets of sustainability.

## CONCLUSION

The evaluated novel tanning techniques result in significant decreases in water consumption and ecotoxicity (savings of up to 32% and 46%, respectively). This outstanding performance is primarily due to novel procedures using less than 10% and 3% less waste water and solid waste, respectively. This

demonstrates how important the tanning and post-tanning phases are to enhancing the leather production chain's environmental performance. The study's findings shed important light on the intricate connection between brand value, corporate sustainability aspects, and green marketing tactics in the footwear industry. The current study is unusual because it takes a distinct method to relating brand worth and the effects of green marketing mix choices on the environmental sustainability. By addressing a gap in the research, this comprehensive method offers empirical proof of the noteworthy and advantageous impact of brand ownership on sustainability parameters. Through analyzing the distinct elements of green marketing and environmental performance, we have found subtle impacts that let us fully comprehend these dynamics in a developing market setting.

Moving from the solution with less water and chromium improves the environmental sustainability of new processes. The study's findings demonstrated that, without compromising the quality of the finished goods, the application of the novel technologies can enhance the environmental sustainability of the leather production process for footwear.

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