



UNIVERSITÀ
DI PAVIA

DEPARTMENT OF ECONOMICS AND MANAGEMENT

MASTER PROGRAMME IN ECONOMICS, FINANCE AND
INTERNATIONAL INTEGRATION

Does ESG affect Market Value?

A Statistical Analysis of the Luxury Fashion Industry

ESG influisce sul valore di mercato?

Un'analisi statistica del settore della moda del lusso

Supervisor:

Prof. Paolo Stefano Giudici

Candidate:

Shirin Boroumand Lari

Academic Year 2023-2024

Acknowledge

I would like to express my deepest thanks to my gentil professor, who has provided me with endless supports during this research journey, offering endless support and guidance.

In addition, I would want to appreciate my family and close friends for the encouragement and support I have received from each of them in whole my life.

This work is dedicated to the brave people of my country, Iran, especially the incredible women who have been fighting for equal rights and freedom for years and years in an unjust battle and they never gave up. I'm so grateful for the chance to develop and learn that was given to me, knowing that any one of these incredible people deserves to be here in my place today. I hope for a world filled with freedom and peace. Women, life, freedom.

Contents

List of figures 4

List of tables 5

Chapter 1: Introduction 7

Capitolo 1: Introduzione..... 9

Chapter 2: Background and literature review 13

 2.1 Reputation 13

 2.2. Definition of ESG..... 13

 2.3. The History of ESG 15

 2.4. Sustainability and Luxury Fashion Industry 15

 2.5. Environmental impacts of texture and apparel industry..... 17

 2.5.1. Raw Materials use 17

 2.5.2. Water use 18

 2.5.3. Land use 19

 2.5.4. Greenhouse Gas Emissions 20

 2.6. Greenwashing..... 21

 2.7. Bloomberg and ESG measurement 23

 2.7.1. Bloomberg’s ESG scores..... 23

 2.7.2. ESG Score’s Structure 23

 2.7.3. ESG Score Framework and Structure 25

Chapter 3: Methodology..... 28

 3.1. Brand Selection 28

 3.1.1. LVMH 28

 3.1.2. Burberry 30

 3.1.3. Christian Dior..... 31

 3.1.4. Hermès 33

 3.1.5. PRADA 35

 3.1.6. Moncler 37

 3.1.7. Salvatore Ferragamo 38

 3.1.8. Hugo Boss 41

 3.1.9 Ralph Lauren 44

 3.2. Variables measurement..... 46

Chapter 4: EXPLANATORY DATA ANALYSIS 48

4.1. Evaluation of historical ESG trend of companies	48
4.1.1. Evaluation of historical ESG trend of LVMH.....	49
4.1.2. Evaluation of historical ESG trend of BURBERRY	50
4.1.3. Evaluation of historical ESG trend of CHRISTIAN DIOR	51
4.1.4. Evaluation of historical ESG trend of HERMES	52
4.1.5. Evaluation of historical ESG trend of PRADA.....	53
4.1.6. Evaluation of historical ESG trend of MONCLER.....	54
4.1.7. Evaluation of historical ESG trend of SALVATORE FERRAGAMO.....	55
4.1.8. Evaluation of historical ESG trend of HUGO BOSS.....	56
4.1.9. Evaluation of historical ESG trend of RALPH LAUREN.....	57
4.2. Trends in ESG scores and stock price for companies	58
4.2.1. Trends in ESG scores and stock price for LVMH	59
4.2.2. Trends in ESG scores and stock price for BURBERRY	60
4.2.3. Trends in ESG scores and stock price for CHRISTIAN DIOR	61
4.2.4. Trends in ESG scores and stock price for HERMÈS	62
4.2.5. Trends in ESG scores and stock price for PRADA	63
4.2.6. Trends in ESG scores and stock price for MONCLER.....	64
4.2.7. Trends in ESG scores and stock price for SALVATORE FERRAGAMO.....	65
4.2.8. Trends in ESG scores and stock price for HUGO BOSS.....	66
4.2.9. Trends in ESG scores and stock price for RALPH LAUREN.....	67
4.3. Cluster Analysis.....	68
Chapter 5: SUPERVISED DATA ANALYSIS	78
5.1. Descriptive Statistics	78
5.2. Linear Regression Model	79
5.3. Results of linear regression model	86
5.4. Conclusion.....	88
5.5. Limitations and Implications.....	88
Bibliography.....	89

List of figures

Figure 1. 1 Components of S&P 500 Market Value 8

Figure 1. 2 Componenti del valore di mercato dell'indice S&P 500 11

Figure 2. 1 The use of primary raw materials in the upstream supply chains of EU-27 household consumption domains in 2020 (million tonnes) 18

Figure 2. 2 Water use in the upstream supply chains of EU-27 household consumption domains in 2020 (million m³ (blue) water) 19

Figure 2. 3 Land use in the upstream supply chains of EU-27 household consumption domains in 2020 (million km²)..... 20

Figure 2. 4 Greenhouse gas emissions in the upstream supply chains of EU-27 household consumption domains in 2020 (million tonnes CO₂e)..... 21

Figure 2. 5 ESG Score Structure (Bloomberg Terminal, 2023) 25

Figure 2. 6 Heat Map of Governance Themes and Priorities 27

Figure 4. 1 Trend Analysis of ESG Scores for LVMH (2015-2022)..... 49

Figure 4. 2 Trend Analysis of ESG Scores for Burberry (2015-2022)..... 50

Figure 4. 3 Trend Analysis of ESG Scores for Christian Dior (2015-2022) 51

Figure 4. 4 Trend Analysis of ESG Scores for Hermes (2015-2022)..... 52

Figure 4. 5 Trend Analysis of ESG Scores for Prada (2015-2022) 53

Figure 4. 6 Trend Analysis of ESG Scores for Moncler (2015-2022)..... 54

Figure 4. 7 Trend Analysis of ESG Scores for Salvatore Ferragosto (2015-2022)..... 55

Figure 4. 8 Trend Analysis of ESG Scores for Hugo Boss (2015-2022) 56

Figure 4. 9 Trend Analysis of ESG Scores for Ralph Lauren (2015-2022) 57

Figure 4. 10 Trends in Normalized ESG Scores and Stock Prices for LVMH..... 59

Figure 4. 11 Trends in Normalized ESG Scores and Stock Prices for BURBERRY 60

Figure 4. 12 Trends in Normalized ESG Scores and Stock Prices for CHRISTIAN DIOR 61

Figure 4. 13 Trends in Normalized ESG Scores and Stock Prices for HERMES 62

Figure 4. 14 Trends in Normalized ESG Scores and Stock Prices for PRADA 63

Figure 4. 15 Trends in Normalized ESG Scores and Stock Prices for MONCLER 64

Figure 4. 16 Trends in Normalized ESG Scores and Stock Prices for SALVATORE F..... 65

Figure 4. 17 Trends in Normalized ESG Scores and Stock Prices for HUGO BOSS 66

Figure 4. 18 Trends in Normalized ESG Scores and Stock Prices for RALPH LAUREN..... 67

Figure 4. 19 Scatter chart of Correlation Coefficients of Initial Brand Pairs..... 70

Figure 4. 20 Scatter chart of Correlation Coefficients After First Grouping 72

Figure 4. 21 Scatter chart of Correlation Coefficients After Second Grouping 73

Figure 4. 22 The scatter chart of the correlation coefficient After third Grouping 74

Figure 4. 23 The scatter chart of the correlation coefficient After fourth Grouping..... 75

Figure 4. 24 The scatter chart of the correlation coefficient After fifth Grouping..... 76

Figure 5. 1 Residual Plot for ESG Scores against Residuals 86

List of tables

Table 2. 1 Environment Score Framework..... 26

Table 2. 2 Social Score Framework..... 26

Table 2. 3 Governance Score Framework 26

Table 3. 1 Revenue Breakdown LVMH based on data downloaded from Bloomberg, 2024 .. 29

Table 3. 2 Revenue Breakdown Burberry based on data downloaded from Bloomberg, 2024 31

Table 3. 3 Revenue Breakdown Christian Dior based on data downloaded from Bloomberg, 2024..... 32

Table 3. 4 Revenue Breakdown Hermes based on data downloaded from Bloomberg, 2024 . 35

Table 3. 5 Revenue Breakdown Prada based on data downloaded from Bloomberg, 2024 36

Table 3. 6 Revenue Breakdown Moncler based on data downloaded from Bloomberg, 2024 38

Table 3. 7 Revenue Breakdown Salvatore Ferragosto based on data downloaded from Bloomberg, 2024..... 41

Table 3. 8 Revenue Breakdown Hugo Boss based on data downloaded from Bloomberg, 2024 44

Table 3. 9 Revenue Breakdown Ralph Lauren based on data downloaded from Bloomberg, 2024..... 46

Table 4. 1 Historical LVMH ESG scores (2015-2022) 49

Table 4. 2 Historical Burberry ESG scores (2015-2022) 50

Table 4. 3 Historical Christian Dior ESG scores (2015-2022)..... 51

Table 4. 4 Historical Hermes ESG scores (2015-2022) 52

Table 4. 5 Historical Prada ESG scores (2015-2022)..... 53

Table 4. 6 Historical Moncler ESG scores (2015-2022) 54

Table 4. 7 Historical Salvatore Ferragosto ESG scores (2015-2022) 55

Table 4. 8 Historical Hugo Boss ESG scores (2015-2022) 56

Table 4. 9 Historical Ralph Lauren ESG scores (2015-2022)..... 57

Table 4. 10 Normalized ESG Scores and Stock Prices of LVMH..... 59

Table 4. 11 Normalized ESG Scores and Stock Prices of BURBERRY 60

Table 4. 12 Normalized ESG Scores and Stock Prices of CHRISTIAN DIOR..... 61

Table 4. 13 Normalized ESG Scores and Stock Prices of HERMES..... 62

Table 4. 14 Normalized ESG Scores and Stock Prices of PRADA 63

Table 4. 15 Normalized ESG Scores and Stock Prices of MONCLER 64

Table 4. 16 Normalized ESG Scores and Stock Prices of SALVATORE FERRAGAMO 65

Table 4. 17 Normalized ESG Scores and Stock Prices of HUGO BOSS 66

Table 4. 18 Normalized ESG Scores and Stock Prices of RALPH LAUREN..... 67

Table 4. 19 Historical ESG scores of the companies 68

Table 4. 20 Normalized ESG score table 69

Table 4. 21 The table of correlation between the companies 70

Table 4. 22 Updated normalized ESG score table.....	71
Table 4. 23 The correlations table	71
Table 4. 24 Updated normalized ESG score table.....	72
Table 4. 25 Updated Correlation Coefficients.....	73
Table 4. 26 Updated normalized ESG score table.....	73
Table 4. 27 Updated Correlation Coefficients.....	74
Table 4. 28 Updated normalized ESG score table.....	74
Table 4. 29 Updated Correlation Coefficients.....	75
Table 4. 30 Updated normalized ESG score table.....	76
Table 4. 31 Updated Correlation Coefficients.....	76
Table 4. 32 Updated normalized ESG score table.....	77
Table 4. 33 Final Correlation Coefficients of Brand Groups	77
Table 4. 34 The table of results of Cluster Analysis.....	77
Table 5. 1 Descriptive Statistics	79
Table 5. 2 Model summary table.....	80
Table 5. 3 The ANOVA (Analysis of variance) table	82
Table 5. 4 The Coefficients Table.....	83

Chapter 1: Introduction

Environmental, Social, and Governance (ESG) scores have emerged as crucial metrics to measure a company's sustainability and ethical practices. These scores, which are determined by providers such as Bloomberg, consider a wide range of environmental, social, and governance-related factors. Environmental pollution is a serious global problem, for which the fashion industry bears a large portion of the burden. The production of clothing uses a tremendous amount of energy, and water is one explanation for this. (Jia, Fu, Yin, Shiyuan, Chen, Lujie, & Chen, Xiaowei, 2020). Furthermore, the fast fashion business model, which emphasizes constant new styles and low prices, has led to increased waste and pollution (Guercini & Ranfagni, 2013).

In this thesis we focus on the fashion industry, and to be more specific, we chose luxury fashion industry. Despite the growing importance of ESG criteria, this profession has traditionally been slow to embrace such practices. This sector, known for its opulent image, has faced significant criticism for its environmental impact, including resource-intensive production processes, waste generation, and problematic labour practices.

The luxury fashion industry is gradually moving toward more sustainable and responsible patterns. It is evident that this shift in the fields of environmental, social, and governance not only relies on the necessity for companies to preserve their reputation in market competition but is also vital for their financial performances. Applying this trend attracts more environmentally conscious customers.

ESG scores have an important impact not only on the governance, but also on the financial performance of companies.

The advantages of Environmental, Social, and Governance (ESG) investing have been more widely discussed in recent years, which has led many investors to consider whether and how to include ESG into their own portfolios. ESG investing usually aims to enhance "responsible

investments" by enhancing risk management and generating enticing, long-term returns through the incorporation of ESG aspects into investment choices (WONGTRAKOOL, 2018).

Between 1995 and 2015, the percentage of intangible assets in the market value rose significantly from 68% to 84%. In July 2020, Ocean Tomo conducted an updated study on Intangible Asset Market Value (IAMV) to explore the economic impact of the COVID-19 pandemic. The study revealed that COVID-19 has accelerated the trend of increasing IAMV share, with intangible assets now representing 90% of the S&P500 market value. This growth in the value of Intellectual Capital Equity is evident when examining the market capitalization of the S&P 500 (Ocean tomo, 2024).

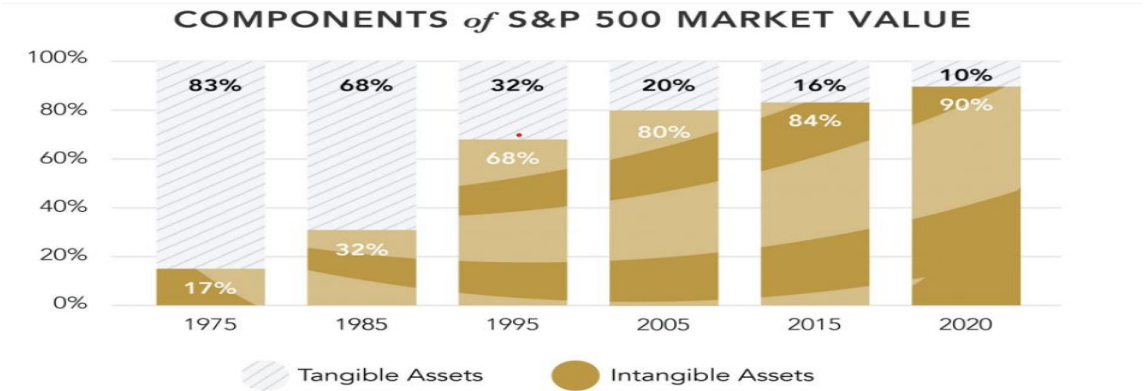


Figure 1. 1 Components of S&P 500 Market Value

Source: OCEAN TOMO, A PART OF J.S. HELD, INTANGIBLE ASSET MARKET VALUE STUDY, 2020

In this thesis we connect ESG factors with financial performance. Specifically, it seeks to explore the impact of ESG practices on the market value of companies within the luxury fashion industry. Despite the growing emphasis on ESG, there remains a lack of consensus on its direct influence on stock prices. In this research we did a historical statistical analysis from 2015 to 2022 on ESG data and stock price to figure out the relation of ESG disclosure and market value. The case studies are nine prominent luxury fashion brands, including LVMH, Burberry, Hermes, Prada, Moncler, Ralph Lauren, Salvatore Ferragamo, Christian Dior, and Hugo Boss.

From a methodological viewpoint, this research employs a quantitative approach, using stock prices as the dependent variable and ESG scores as the independent variable. Control variables such as Return on Equity (ROE), Total Asset Turnover, and Board Size are inserted to isolate the effect of ESG on market value. Data analysis includes normalization of variables, trend examination, and cluster analysis, and is ended with a linear regression model to test the hypothesis.

Preliminary analysis indicates that while ESG scores have shown varying trends across companies, governance tends to be the most stable component, with environmental scores showing significant improvements post-2018. The cluster analysis suggests the existence of 3 distinct groups of companies in terms of ESG adoption over time. The regression analysis indicates that ESG does not have a direct, statistically significant impact on stock prices within the luxury fashion sector. This result may depend on lack of standardization and greenwashing. Overall, the research in this thesis contributes to the ongoing debate on the effectiveness of ESG reporting and its implications for financial performance. It underscores the need for standardized and transparent ESG disclosure practices and highlights the challenges of measuring the true impact of sustainability in the luxury fashion industry.

Capitolo 1: Introduzione

I punteggi ESG (Ambientale, Sociale e Governance) sono emersi come parametri cruciali per misurare la sostenibilità e le pratiche etiche di un'azienda. Questi punteggi, determinati da fornitori come Bloomberg, prendono in considerazione un'ampia gamma di fattori ambientali, sociali e legati alla governance. L'inquinamento ambientale è un grave problema globale, di cui l'industria della moda si assume gran parte del peso. La produzione di abbigliamento utilizza un'enorme quantità di energia e l'acqua è una delle spiegazioni per questo. (Jia, Fu, Yin, Shiyuan, Chen, Lujie e Chen, Xiaowei, 2020). Inoltre, il modello di business del fast fashion,

che enfatizza stili costantemente nuovi e prezzi bassi, ha portato ad un aumento degli sprechi e dell'inquinamento (Guercini & Ranfagni, 2013).

In questa tesi ci concentriamo sul settore della moda e, per essere più specifici, abbiamo scelto il settore della moda di lusso. Nonostante la crescente importanza dei criteri ESG, questa professione è stata tradizionalmente lenta nell'adottare tali pratiche. Questo settore, noto per la sua immagine opulenta, ha dovuto affrontare critiche significative per il suo impatto ambientale, inclusi processi di produzione ad alta intensità di risorse, produzione di rifiuti e pratiche lavorative problematiche.

L'industria della moda di lusso si sta gradualmente muovendo verso modelli più sostenibili e responsabili. È evidente che questo cambiamento nei settori ambientale, sociale e di governance non si basa solo sulla necessità per le aziende di preservare la propria reputazione nella competizione di mercato, ma è anche vitale per le loro prestazioni finanziarie. L'applicazione di questa tendenza attira clienti più attenti all'ambiente.

I punteggi ESG hanno un impatto importante non solo sulla governance, ma anche sulla performance finanziaria delle aziende.

I vantaggi degli investimenti ambientali, sociali e di governance (ESG) sono stati discussi più ampiamente negli ultimi anni, il che ha portato molti investitori a considerare se e come includere i fattori ESG nei propri portafogli. Gli investimenti ESG solitamente mirano a potenziare gli "investimenti responsabili" migliorando la gestione del rischio e generando rendimenti allettanti a lungo termine attraverso l'integrazione degli aspetti ESG nelle scelte di investimento (WONGTRAKOOL, 2018).

Tra il 1995 e il 2015 la percentuale dei beni immateriali nel valore di mercato è aumentata notevolmente, passando dal 68% all'84%. Nel luglio 2020, Ocean Tomo ha condotto uno studio aggiornato sul valore di mercato degli asset immateriali (IAVM) per esplorare l'impatto economico della pandemia di COVID-19. Lo studio ha rivelato che il COVID-19 ha accelerato

la tendenza all'aumento della quota IAMV, con gli asset immateriali che ora rappresentano il 90% del valore di mercato dell'S&P500. Questa crescita del valore del capitale proprio intellettuale è evidente se si esamina la capitalizzazione di mercato dell'indice S&P 500 (Ocean tomo, n.d.).

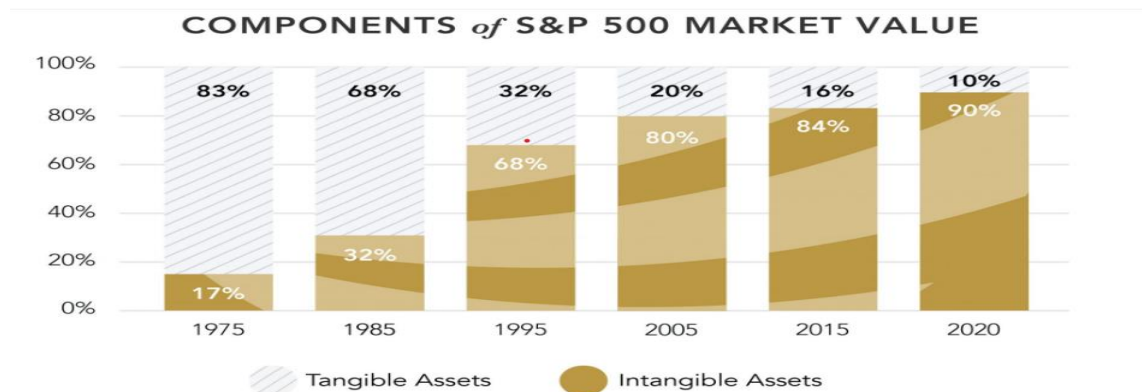


Figure 1. 2 Componenti del valore di mercato dell'indice S&P 500

Fonte: OCEAN TOMO, A PART OF J.S. DETENUTO, STUDIO SUL VALORE DEL MERCATO DELLE ASSET IMMATERIALI, 2020

In questa tesi colleghiamo i fattori ESG con la performance finanziaria. Nello specifico, cerca di esplorare l'impatto delle pratiche ESG sul valore di mercato delle aziende nel settore della moda di lusso. Nonostante la crescente enfasi sugli ESG, permane una mancanza di consenso sulla loro influenza diretta sui prezzi delle azioni. In questa ricerca abbiamo effettuato un'analisi statistica storica dal 2015 al 2022 sui dati ESG e sul prezzo delle azioni per capire la relazione tra la divulgazione ESG e il valore di mercato. I casi di studio riguardano nove importanti marchi di moda di lusso, tra cui LVMH, Burberry, Hermes, Prada, Moncler, Ralph Lauren, Salvatore Ferragamo, Christian Dior e Hugo Boss.

Da un punto di vista metodologico, questa ricerca utilizza un approccio quantitativo, utilizzando i prezzi delle azioni come variabile dipendente e i punteggi ESG come variabile indipendente. Variabili di controllo come il rendimento del capitale proprio (ROE), il turnover totale degli asset e le dimensioni del consiglio di amministrazione vengono inserite per isolare l'effetto dei

criteri ESG sul valore di mercato. L'analisi dei dati include la normalizzazione delle variabili, l'esame delle tendenze e l'analisi dei cluster e si conclude con un modello di regressione lineare per verificare l'ipotesi.

L'analisi preliminare indica che, sebbene i punteggi ESG abbiano mostrato tendenze variabili tra le aziende, la governance tende ad essere la componente più stabile, con i punteggi ambientali che mostrano miglioramenti significativi dopo il 2018. L'analisi dei cluster suggerisce l'esistenza di 3 gruppi distinti di aziende in termini di adozione dei criteri ESG nel tempo. L'analisi di regressione indica che i criteri ESG non hanno un impatto diretto e statisticamente significativo sui prezzi delle azioni nel settore della moda di lusso. Questo risultato potrebbe dipendere dalla mancanza di standardizzazione e dal greenwashing.

Nel complesso, la ricerca contenuta in questa tesi contribuisce al dibattito in corso sull'efficacia del reporting ESG e sulle sue implicazioni per la performance finanziaria. Sottolinea la necessità di pratiche di divulgazione ESG standardizzate e trasparenti ed evidenzia le sfide legate alla misurazione del reale impatto della sostenibilità nel settore della moda di lusso.

Chapter 2: Background and literature review

In this chapter, the definition, concept, framework, and literature review regarding reputation, ESG, the luxury fashion industry and its environmental impact, greenwashing, and Bloomberg are followed.

2.1 Reputation

A company's reputation is shaped by public perception and reflects how society, including customers, stakeholders, employees, and the public, views its operations and conduct. This perception is generally assessed qualitatively, ranging from "good" to "bad," rather than using a numeric scale due to its abstract nature (SICKLER, 2022).

business reputation is progressively becoming more essential to firms. A strong reputation may aid with client connections and enhance vendor relations and staff recruitment and maintenance (Fombrun & C. B. M. van Riel, 2004). In addition, other research have shown that good corporate reputation can have a positive effect on financial performance (Eberl & Schwaiger, 2005). Advocates of the resource-based perspective of the company have also argued that corporate reputation is a major competitive advantage. According to this study, reputation is a lasting competitive advantage since it is an intangible asset that is hard to replicate or mediate (Gatzert, 2015).

2.2. Definition of ESG

The term Environmental, Social, and Governance (ESG) is a set of non-financial factors which refers to any issue that might potentially affect a business, head of state, or individual's financial performance or solvency, either positively or negatively. (EBA, EUROPIAN BANKING AUTHORITY, 2021)

The term "**environmental**" considerations refer to elements of nature, such as the usage of renewable resources like solar energy, wind energy, and plants, as well as non-renewable

resources like coal, gas, and oil. **"Social"** elements are those that have the power to affect people's actions and way of life. These factors include education, neighbourhood ties, and human resources for society. The application of regulations and maintaining a balance between the interests of a company's management and shareholders are examples of **"governance"** elements. "Environmental" issues include deforestation, declining resources, air pollution, global warming, and others. Civil liberties, forced labour, hiring minors, working conditions, employment connections, etc. are among the issues with "Social." Tax planning, CEO remuneration, trade associations, bribery, and corruption are all considered aspects of "governance." The stability and smooth operation of a company's environmental, social, and governance systems are critical to its ability to generate long-term results. (Boffo, R. & R. Patalano, 2020)

The terms "sustainable finance" and "ESG" can also be used alternately to refer to financing that promotes economic growth while lessening environmental constraints to assist achieve environmental and climatic goals while taking social and governance considerations into account. Transparency on the risks associated with ESG issues that might affect the financial system is another aspect of sustainable finance, as is the reduction of such risks through adequate corporate and financial actor governance. (European Commission, 2021)

The data that businesses give investors regarding their ESG performance is referred to ESG disclosure. Data on a company's social policies, governance procedures, and environmental effect may all be found in this information. Among other things, trends and insights related to investor evaluation and equities research may be found by analysing ESG disclosure data. (Goloshchapova, Poon, Pritchard, & Reed, 2019) (Clarkson, et al., 2020) (Raman, Bang, & Nourbakhsh, 2020)

2.3. The History of ESG

ESG has its roots in the 1960s, and a wide idea of corporate social responsibility is held by many nations and their populations. Hence, financial tactics dubbed "ethical," "socially responsible," or "green" are nothing new. Due to certain business practices, stock market investors started to remove firms and whole industries from their portfolios in the 1960s. This included businesses that produced tobacco products, weaponry, and were members of the apartheid government in South Africa at the time. (Mitkow, Antczak, & Roszkiewicz, 2022)

The term ESG was first used in the well-known 2004 report "Who Cares Wins: Connecting Financial Markets to a Changing World," published in collaboration with the United Nations and the Swiss Federal Department of Foreign Affairs. In this report the incorporation of ESG factors into the financial sector, encompassing asset management, security brokerage services, and related research roles was promoted. (The Global Compact, 2004) Since then, the financial literature has seen a huge influx of ESG research. From 2460 in the five years between 2004 and 2008 to 18,000 in the years between 2018 and 2022, there was a six-fold increase in publications, according to a Google Scholar tabulation of publications. (Lim, 2024)

2.4. Sustainability and Luxury Fashion Industry

The goal of sustainability techniques is to satisfy current demands without sacrificing those of future generations. Governments, private organizations, and consumers are advocating for ecologically sustainable consumption and business models to address the growing population's need for limited natural resources and climate change's environmental impacts. Luxury fashion is an industry in the spotlight of sustainable business practices. (Franco, Dildar, & Mccoll, 2019).

As luxury spending may be viewed as less necessary for daily living, it is especially subject to consumer scrutiny, in contrast to other industries with less impressive sustainability histories,

like oil or transportation (Franco, Dildar, & Mccoll, 2019). Several events, like Burberry's burning of unsold clothing and the BBC's "Fashion's Dirty Secrets," have put luxury fashion companies under fire for several environmental offences, including destroying unsold inventory as a marketing ploy, abusing animals for material testing, destroying large amounts of waste and pollution during the manufacturing process, and abusing their workforce, particularly those employed in developing nations' factories. Additionally, luxury fashion has come under fire for rejecting the circular economy, which bases manufacturing on well-thought-out restoration and regeneration as well as the reuse and recycling of resources (BBC NEWS, 2018) (Kerr & Landry, 2017).

Once exclusively available to the rich, luxury products and services are increasingly affordable to younger customers from all socioeconomic backgrounds; this trend is described as the "democratisation of luxury." (Truong, Simmons, McColl, & Kitchen, 2008) The democratisation of luxury has been propelled by fashion firms' introduction of reasonably priced brands like Polo Ralph Lauren, Calvin Klein, and Tag Heuer, which are offered online or in retail stores, in addition to the growing desire of consumers to acquire expensive labels. These companies frequently increase affordability by taking advantage of decreasing production costs. The term "masstige" has also been used to characterise contemporary luxury companies' wide market appeal while preserving an air of grandeur (Truong, McColl, R., & Kitchen, P. J., New luxury brand positioning and the emergence of Masstige brands, https://www.researchgate.net/publication/247478620_New_luxury_brand_positioning_and_the_emergence_of_Masstige_brands, 2009). Therefore, a wide definition of luxury items would be those that are able to fetch a substantially greater price than similar physical things.

However, negative press combined with the quick dissemination of information on social media has impacted consumers' perceptions of luxury fashion firms. Luxury fashion companies have

increased their attention on adopting more sustainable methods in response to stakeholder expectations. In a time when consumers have easy access to information and intense competition, luxury businesses must have a clear and totally sustainable business plan (Franco, Dildar, & Mccoll, 2019).

2.5. Environmental impacts of texture and apparel industry

After oil, the fashion industry is the second most polluting sector globally. The production and use of clothing have a profoundly detrimental effect on the environment and human welfare. The apparel business is a fantastic illustration of how the economic and social spheres are interconnected with the environment, as sustainability is not only about the environment.

The apparel lifecycle has a huge ecological impact, involving significant resource use, contamination of the water and land, high carbon emissions, and manufacture, transportation, and distribution in addition to consumer behaviour and care. (Europarl, 2020)

We have included the most recent (2023) estimates of the life cycle environmental and climate impacts in the EU from the European Environment Agency (EEA) to show the scope of the effects of textile consumption on raw material use, water and land use, and greenhouse gas emissions in comparison with other consumption categories.

(EEA, 2023)

2.5.1. Raw Materials use

The manufacture of textiles requires a lot of raw materials. The production of all apparel, shoes, and home textiles that EU consumers bought in 2020 required an estimated 175 million tonnes of basic raw materials or 391 kg per person. Clothing accounts for around 40% of this, followed by textiles used in homes (30%) and footwear (30%). When it comes to the principal usage of raw materials, textiles are the fifth-highest consumption sector in Europe. (EEA, 2023).

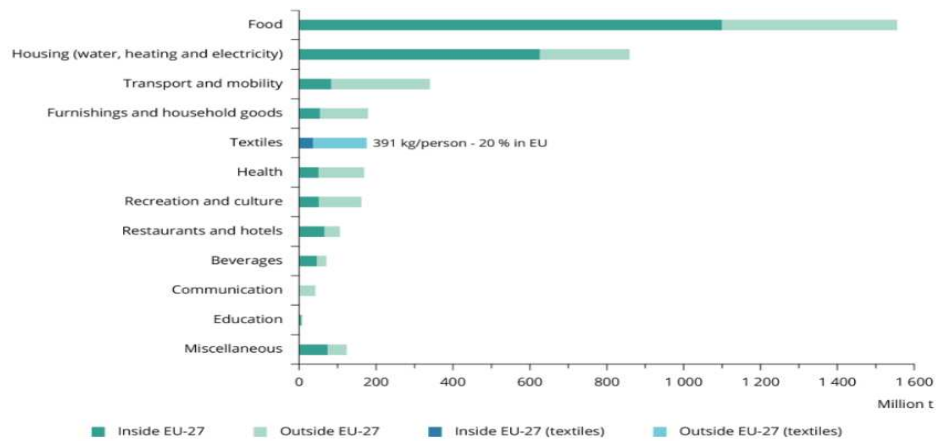


Figure 2.1 The use of primary raw materials in the upstream supply chains of EU-27 household consumption domains in 2020 (million tonnes)

Source: EEA and European Topic Centre for Circular Economy and Resource Use, based on Exiobase v3.8.1. <https://www.eea.europa.eu/data-and-maps/figures/the-use-of-primary-raw>

2.5.2. Water use

While 11 % of Europeans and 25 % of the world population is affected by water scarcity, making a single cotton shirt requires 2.700 litres of fresh water. This amount equals a person's drinking needs for 2.5 years. (Europarl, 2020) To manufacture all apparel, footwear, and household textiles bought by households in the EU during 2020, approximately 4,000 million m³ of blue water (comprising surface water or groundwater consumed or evaporated during irrigation, industrial processes, or household utilization) were utilized, averaging 9m³ per individual. This positions textile water consumption as the third highest, following food and recreation and culture. Moreover, roughly 20,000 million m³ of green water (rainwater stored in the soil, typically utilized for crop cultivation) were employed, primarily for cotton production, equating to 44 m³ per person. Blue water is distributed equally across clothing (40%), footwear (30%), and household and other textiles (30%). Green water is predominantly utilized in clothing (nearly 50%) and household textiles (30%), with cotton production being the most significant consumer (Hoekstra, Chapagain, Aldaya, & Mekonnen, 2011) (EEA, 2023).

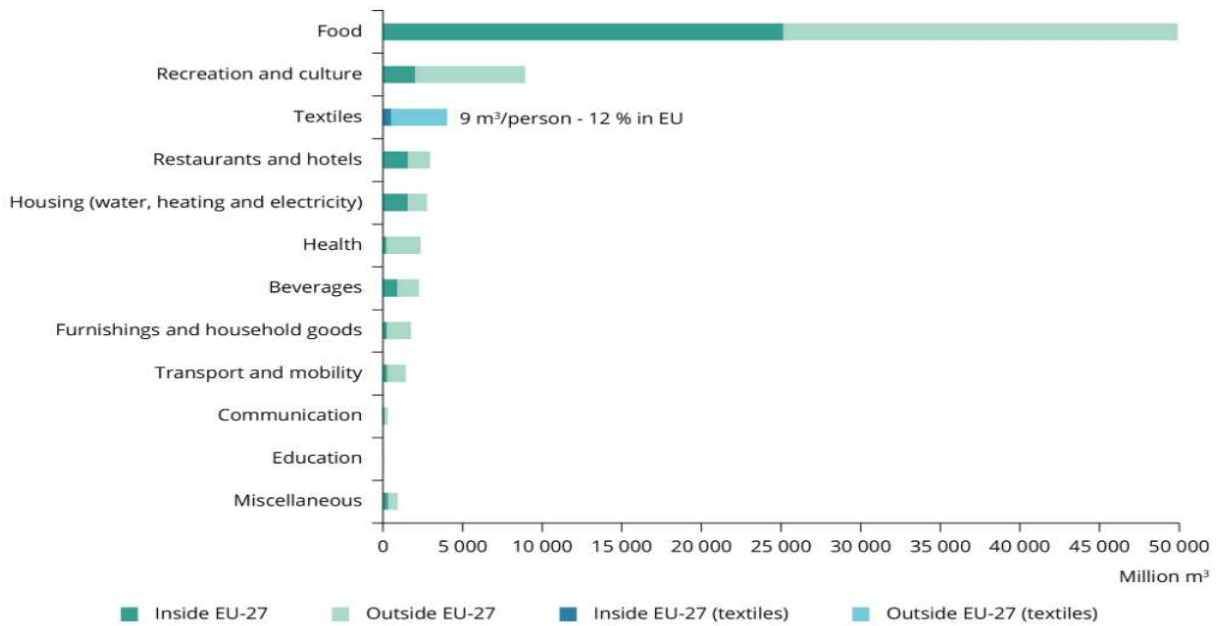


Figure 2. 2 Water use in the upstream supply chains of EU-27 household consumption domains in 2020 (million m³ (blue) water)

Source: EEA and European Topic Centre on Circular Economy and Resource Use, based on Exiobase v3.8.1.

<https://www.eea.europa.eu/data-and-maps/figures/water-use-in-the-upstream>

2.5.3. Land use

A significant quantity of land is needed to produce textiles, especially natural textiles. One estimate puts the amount of land needed in the supply chain for textiles that European families might buy in 2020 at 180,000 km², or 400 m² per person.

Wool and other animal-based textiles have a major influence on land use as well (Lehmann, 2018). Thus, behind housing and food, the textile industry has the third-highest influence on land utilisation. Of this, clothing accounts for 43%, footwear (including leather shoes, which have a significant land usage effect due to the demand for cow grazing), and other textiles and home items for 35% and 23% of the total (EEA, 2023).

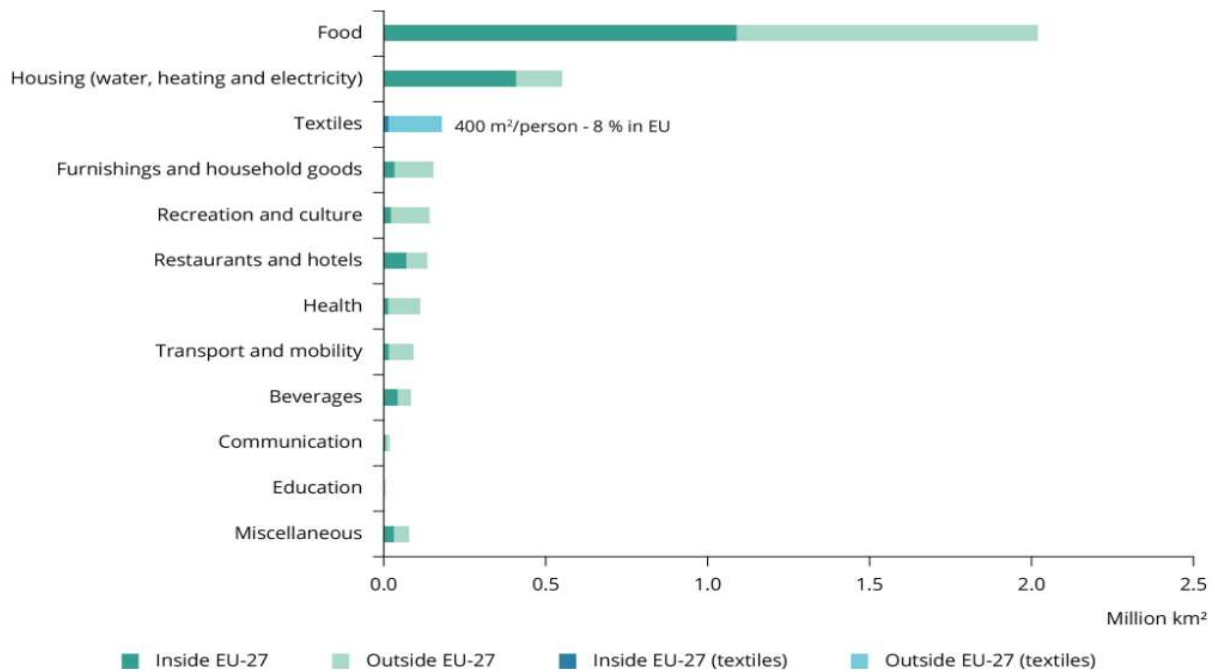


Figure 2. 3 Land use in the upstream supply chains of EU-27 household consumption domains in 2020 (million km²)

Source: EEA and European Topic Centre for Circular Economy and Resource Use, based on Exiobase v3.8.1.

<https://www.eea.europa.eu/data-and-maps/figures/land-use-in-the-upstream>

2.5.4. Greenhouse Gas Emissions

Greenhouse gas emissions are produced during the manufacture and use of textiles, mostly from obtaining resources, manufacturing, washing and drying, and the burning of waste. The production of textile items used in the EU resulted in greenhouse gas emissions totaling 121 million tonnes CO₂e, or 270 kg CO₂e per person, in 2020. Thus, behind housing, food, transportation and mobility, and recreation and culture, textile demand in homes accounts for the fifth highest influence on climate change. Apparel accounts for 50% of this, home and other textiles for 30%, and footwear for 20% (EEA, 2023).

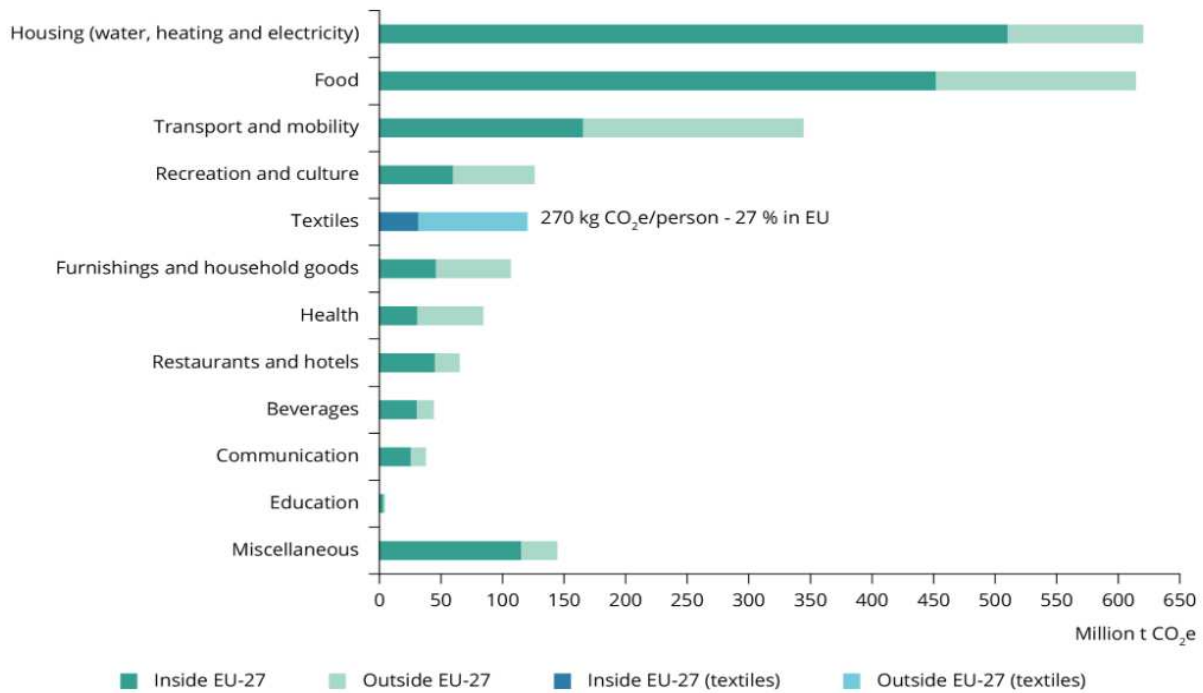


Figure 2. 4 Greenhouse gas emissions in the upstream supply chains of EU-27 household consumption domains in 2020 (million tonnes CO₂e)

Source: EEA and European Topic Centre for Circular Economy and Resource Use, based on Exiobase v3.8.1.

<https://www.eea.europa.eu/data-and-maps/figures/greenhouse-gas-emissions-in-the-1>

Dealing with unsafe procedures and unethical working conditions is one aspect of the social dilemma. Fashion businesses in the West primarily outsource their production to developing nations to avoid severe environmental restrictions and to benefit from low labour costs. It's typical to find low pay, long hours, and hazardous circumstances at work (Europarl, 2020).

2.6. Greenwashing

Greenwashing is a deceptive practice where companies falsely market their products or operations as environmentally friendly or “green.” This misleading tactic involves creating the impression that a product is more eco-friendly than it actually is, thereby deceiving consumers who are increasingly concerned about environmental issues. Companies may allocate resources to craft a green image without genuinely enhancing the sustainability of their products. This

misrepresentation leads consumers to believe they are making environmentally responsible choices when, in reality, they are being misled.

As environmental awareness grows, companies find opportunities in greenwashing to align with market demands for sustainability without compromising their market position. Consumers, motivated by a desire to support sustainable practices and willing to pay a premium for green products, become susceptible targets for these unethical marketing practices. Through misleading advertisements, companies can enhance their brand's public image and profitability by falsely portraying their products as eco-friendly (Earthday, 2024).

Greenwashing is the process of conveying a false impression or misleading information about how a company's products are environmentally sound. Greenwashing involves making an unsubstantiated claim to deceive consumers into believing that a company's products are environmentally friendly or have a greater positive environmental impact than they actually do. The phrase first appeared in the 1960s when one of the most obvious instances of greenwashing was created by the hotel sector. They posted notes in hotel rooms requesting that guests reuse their towels to protect the environment, while the hotels benefited from decreased laundry expenses.

In addition, greenwashing may occur when a company attempts to emphasize sustainable aspects of a product to overshadow the company's involvement in environmentally damaging practices. Performed through the use of environmental imagery, misleading labels, and hiding trade-offs, greenwashing is a play on the term "whitewashing," which means using false information to intentionally hide wrongdoing, error, or an unpleasant situation in an attempt to make it seem less bad than it is (Hayes, 2024).

2.7. Bloomberg and ESG measurement

Bloomberg L.P., founded in 1981 by Michael Bloomberg and his partners, is a privately held company based in Midtown Manhattan, New York City. It specializes in providing financial software, data services, and news to financial institutions through its flagship product, the Bloomberg Terminal (Kennon, 2022). Bloomberg L.P. also operates a comprehensive media network, including Bloomberg News, Bloomberg Television, and various digital and print publications (Langeland, 2010) (Enda, 2011). The company employs nearly 21,000 people across 159 locations worldwide (Bloomberg, 2024).

2.7.1. Bloomberg's ESG scores

Bloomberg's ESG scores assess a company's management of financially material environmental, social, and governance (ESG) issues that can impact financial performance, such as revenue, operating costs, and liabilities. These scores are based on publicly available data and consider both current risk exposure and management performance. Bloomberg evaluates performance within peer groups, with a focus on disclosure quality and the company's approach to managing ESG risks and opportunities. Scores are measured on a scale from 0 to 10, where higher scores indicate better management of these material issues (Bloomberg Terminal, 2023).

2.7.2. ESG Score's Structure

The ESG scores are structured into multiple levels: Headline Scores, Pillar Scores, Theme Scores, Issue Scores, Sub-Issue Scores, and Field Scores.

- **Headline Scores:**

Which are Aggregated from Environmental (E), Social (S), and Governance (G) pillars. Each industry assigns relative weights to E, S, and G issues, ranked from 1 (highest importance) to 5 and weights are translated into percentages based on industry-specific analysis. As the country-

and region-specific factors can be a more significant driver of governance than industry factors, G scores have been ranked 3 for all the industries, while the Environmental and Social issues are more crucial, and have a portion of 36.36% for each, Governance score has the effect of 27.27% in the total ESG score.

- **Pillar Scores:**

The pillar scores derive from Issue Scores using a weighted generalized mean. Issues with only binary fields have their weight reduced by 80%.

- **Theme Scores:**

Specifically for Governance, aggregated from related Issue Scores using a weighted generalized mean.

- **Issue Scores:**

It is a function which composed of two dimensions: Issue Performance Score and Issue Disclosure Factor (DF):

The Performance Score is a weighted generalized mean of Sub-Issue Scores. And the Disclosure Factor evaluates the extent and quality of disclosure.

- **Sub-Issue Scores:**

Sub-issue scores are aggregated from Field Scores based on the Fit/Quality attribute of the fields.

- **Field Scores:**

The last level, field scores, are based on attributes like fit for purpose and disclosure quality and are calculated using quantitative methods, considering data normalization and field type.

This structure ensures that each score reflects both the performance and quality of ESG data disclosure (Bloomberg Terminal, 2023).

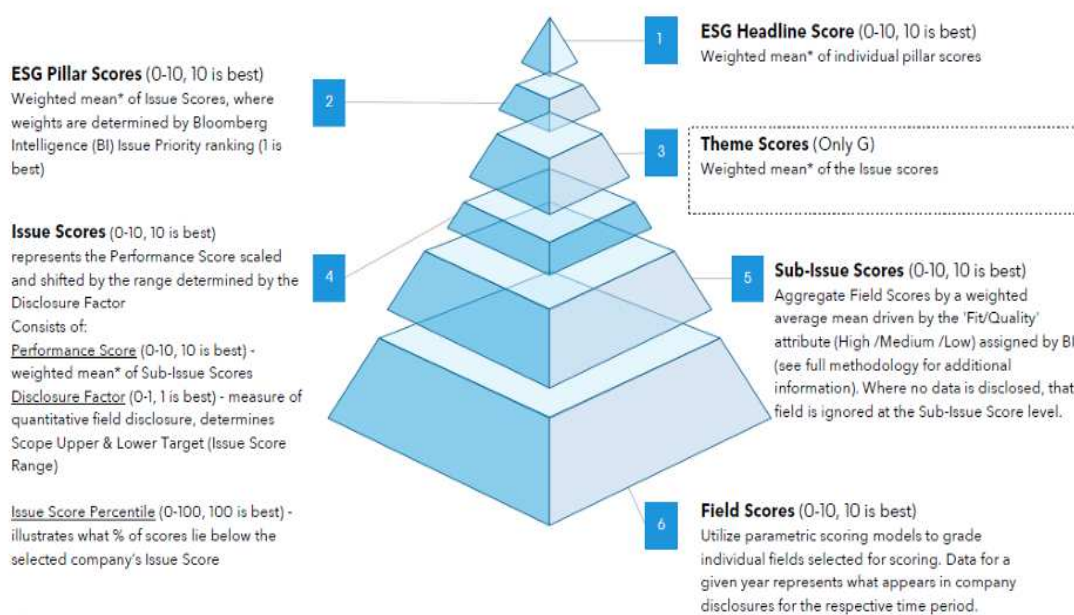


Figure 2. 5 ESG Score Structure (Bloomberg Terminal, 2023)

2.7.3. ESG Score Framework and Structure

Bloomberg’s ESG Scores are structured into: Pillars, Issues, Sub-Issues and Fields. Each Issue contains at least one Sub-Issue, which aggregates associated ESG data fields.

For each industry there are specific issues. Below a list of pillars and issues related to our category is indicated (All the tables below were extracted from the “Environmental, Social and Governance (ESG) Scores, Methodology and Field Information” guide PDF updated on Sept.2023 (Bloomberg Terminal, 2023)):

ENVIRONMENTAL	
Environmental Supply Chain Management	GHG Emissions Management
Supplier Environmental Compliance	GHG Emissions
Sustainable Sourcing	GHG Emissions Policies
	GHG Regulation
	GHG Scope 3
	GHG Target

Table 2. 1 Environment Score Framework

SOCIAL	
Data Security & Customer Privacy	Marketing & Labeling
Data Privacy & Content Management	Marketing Practices
Data Security	Product Labeling
Product Quality Management	Social Supply Chain Management
Product Quality & Safety	Supplier Social Compliance

Table 2. 2 Social Score Framework

GOVERNANCE			
BOARD COMPOSITION			
Director Roles	Diversity	Independence	Refreshment
CEO Roles	Age Diversity	Board Leadership Independence	Board Refreshment
Chair Roles	Gender Diversity	Board Independence	Chair Refreshment
Board Roles			
EXECUTIVE COMPENSATION			
Incentive Structure	Pay Governance	Pay for Performance	
CEO Incentive Plan Design	Compensation Board Oversight	Fixed Pay Alignment	
Executive Incentive Plan Design	Say on Pay	Variable Pay Performance	
Executive Pay Equity	Pay Policies		
Executive Pay Linkages			
SHAREHOLDER RIGHTS			
Shareholder Policies	Director Voting		
Takeover Defense	Director Terms		
Voting Rights	Director Support		
Director Election Policies			
AUDIT			
Audit Committee	External Auditor	Audit Outcome	
Audit Committee Meetings	Auditor Approval	Accounting Restatements	
Audit Committee Structure	Auditor Fees	Auditor Opinion	
	Auditor Tenure		

Table 2. 3 Governance Score Framework

Environment and Social scores have a long heat map of themes and priorities which is different for each industry, while for governance is almost the same and is illustrated below:

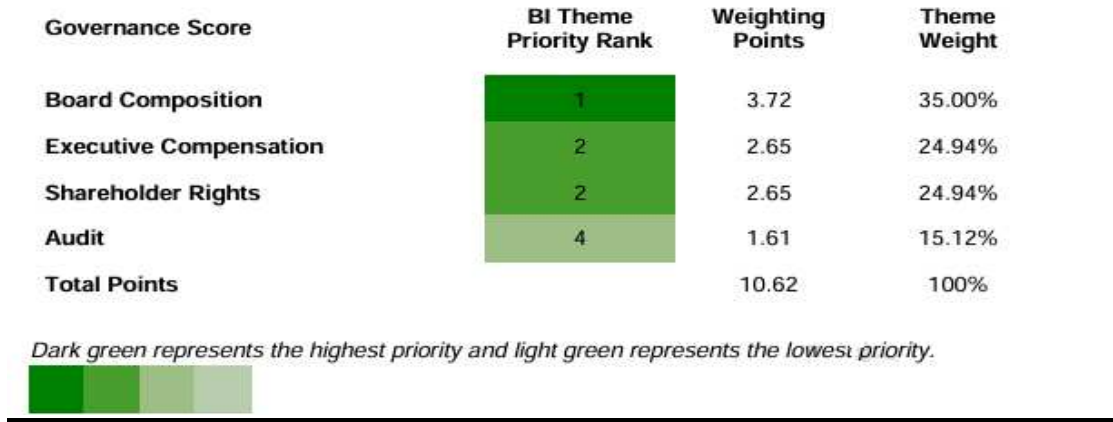


Figure 2. 6 Heat Map of Governance Themes and Priorities

Chapter 3: Methodology

Chapter 3 begins with the selection of the brands and an explanation of the policies and revenue breakdown of each company. In the following, measurement variables, such as independent, dependent, and control, and the procedure for applying them in the analysis are presented.

3.1. Brand Selection

Initially, we selected 50 top luxury fashion brands according to the website Men's Flair, in which the brands were ranked based on the quality of products and their value for money (THOMPSON, 2024). Then, due to the limitations, such as missing some data because of a lack of transparency in ESG scores and inconsistencies in the timing of their publication, our sample size was reduced to 16 companies. Subsequently, further constraints, including mismatches in the subset of ESG scores, we were forced to eliminate 7 other companies and continue our research based on the ESG of the 9 remaining brands.

In the following part we will briefly introduce each company and the table of their Revenue Breakdown according to Bloomberg:

3.1.1. LVMH

Moët & Chandon Louis Vuitton (LVMH) with its headquarters located in Paris, is a luxury goods specialist international holding company. The firm emerged in 1987 when the fashion brand Louis Vuitton (founded in 1854) merged with Moët Hennessy. Moët Hennessy was founded in 1971 because of the combination of the cognac maker Hennessy (founded in 1765) and the champagne producer Moët & Chandon (founded in 1743) (Press, 2000). LVMH surpassed the \$500 billion value threshold in April 2023, making it the first European corporation to do so (Reid, 2023). The business was placed 47th in the Forbes Global 2000 in 2023.

LVMH controls around 60 subsidiaries that manage 75 luxury brands. In addition to Louis Vuitton and Moët Hennessy, LVMH's portfolio includes Tiffany & Co., Christian Dior, Fendi, Givenchy, Marc Jacobs, Stella McCartney, Loewe, Loro Piana, Kenzo, Celine, Sephora, Princess Yachts, TAG Heuer, and Bulgari (LVMH, 2024). The subsidiaries are often managed independently, under the six main sectors: Fashion Group, Wines and Spirits, Perfumes and Cosmetics, Watches and Jewellery, Selective Distribution, and Other Activities. LVMH also contains companies like the wine estate Château d'Yquem (1593) which was founded even earlier. Bernard Arnault is the founder, chairman, CEO, and largest shareholder of LVMH, making him the world's richest person as of 2024.

We found it noticeable to mention that LVMH is a brand that has been respecting human values and the environment since the beginning. For instance, LVMH created its Environment Department in 1992 with the goal of monitoring the company's environmental performance, and it was the first company in the luxury industry to publish an environmental report in 2001. In addition, LVMH created the Ethics & Compliance Department and created the code for working conditions and the welfare of fashion models in collaboration with Kering and other industry experts in 2017 (LVMH;, 2023).

	Revenue Breakdown	Percentage (%)
LVMH	Apparel, Footwear	62.68%
	Other specialty retails	21.07%
	Personal Care Products	8.44%
	Alcoholic Beverage	7.81%

Table 3. 1 Revenue Breakdown LVMH based on data downloaded from Bloomberg, 2024

3.1.2. Burberry

Burberry Group plc is a British Luxury Fashion House founded by Thomas Burberry in 1856 with the principle that clothes should be designed in a way to protect people from the British weather. It is noticeable that Gabardine was invented by Thomas Burberry in 1879, and by patenting it in 1888, he caused a revolution in rainwear production and became famous in the luxury fashion sector.

Although Burberry was established in Basingstoke, in 1891 its headquarters were in London. Burberry was growing so fast, that in 1965 one in five coats exported from Britain was a Burberry product. In 2002, Burberry went public and started trading on the London Stock Exchange.

Burberry in 2010 as the first luxury brand joint the ethical trading initiative, and in 2016 was recognised as an industry leader in the Dow Jones sustainability index in the textiles, apparel, and luxury goods' sector (Burberry).

In July 2018, it was revealed that Burberry had destroyed over £90 million worth of unsold goods over five years to protect its brand (BBC NEWS, 2018). Also, according to Burberry's annual report, by the end of the financial year 2018, the company had destroyed goods worth £28.6m, an increase on the £26.9m from its financial year 2017 (Handley, 2018). Despite claiming the process was environmentally friendly, Burberry faced criticism from Greenpeace. By September 2018, Burberry pledged to halt this practice, also committing to stop using real fur in its products and phase out existing fur items (BBC News, 2018). Then, in 2021, the company announced that it would become "Climate Positive" by 2040, which is a higher standard than zero emissions. Additionally, the fashion business declared that it will raise its previous commitment from 30% in 2016 to a 46% reduction in supply chain emissions by 2030 (Cernansky, 2021).

Burberry and Vestiaire Collective worked together on a brand-new circular fashion initiative in October 2023. In order to encourage resale and lessen the amount of clothing wasted, this agreement would enable consumers to trade in their used Burberry handbags and clothes for a Burberry gift card that they could use to make other purchases from the company (Davis, 2023). In 2023, research conducted by Sheffield Hallam University, the social democratic party in the European Parliament, and other organisations charged Burberry with producing apparel using Uyghur forced labour camps supplied by Sunrise Manufacture Group Co. (Uluyol, 2023).

BURBERRY	Revenue Breakdown	Percentage (%)
	Apparel, Footwear, and Accessories Design	56.08%
	Apparel, Footwear, Wholesalers	36.36%
	Specialty Apparel	7.56%

Table 3. 2 Revenue Breakdown Burberry based on data downloaded from Bloomberg, 2024

3.1.3. Christian Dior

French fashion designer Christian Dior made incredibly successful designs after World War II, and his impact can still be seen in the fashion business today (Biography.com Editors- Christian Dior, 2021). Christian Dior and entrepreneur Marcel Boussac founded the Christian Dior fashion house on December 16, 1946, with three ateliers and eighty-five employees. In recognition of his important contributions to the textile industry and sartorial tradition, Christian Dior was awarded the French Legion of Honor. Maria Grazia Chiuri became the first female creative director of Dior in 2006. Through her collections, she advocates for the worldwide freedom of women and the unity of sisters. She breaks preconceptions and celebrates feminist ideas in her collections. She reimagines historical details and symbols in partnerships with artists, turning every Dior fashion show into an artistic statement about social responsibility (DIOR LA GALERIE, 2024). The products of the company include apparel, shoes, bags,

jewellery accessories, watches, perfumes, cosmetics, home furnishings, and decorations (DIOR Website, 2024).

Sustainability

The Dior Group was founded with a strong appreciation of the natural world and aims to produce classic symbols that are changeable, renewable, repairable, and recyclable. Through its Dream in Green initiative, a worldwide and regional collaborative approach, Dior is committed to preserving the environment. The group made up of representatives from every department within Dior, gathers once a month to assess and advance the House's efforts to achieve environmental excellence.

The Dream in Green is based on three pillars:

1. The protection of natural resources: applying ecological designs, circularity, and innovative recycling of high-quality fabrics are crucial for protecting natural resources like cotton, silk, wool, and cashmere.
2. Slowing climate change: by taking action to cut greenhouse gas emissions, such as remodelling stores and gaining environmental certifications.
3. The daily commitment of their employees: The goal is to inspire workers and the whole supply chain—from vendors to craftspeople—to get involved in projects by means of the My Dream in Green initiative (DIOR SUSTAINABILITY, 2024).

	Revenue Breakdown	Percentage(%)
Christian Dior	Apparel, Footwear	61.83%
	Other specialty retails	20.84%
	Personal Care Products	9.64%
	Alcoholic Beverage	7.69%

Table 3. 3 Revenue Breakdown Christian Dior based on data downloaded from Bloomberg, 2024

3.1.4. Hermès

Thierry Hermès established a harness workshop in Paris in 1837 with an emphasis on lightness and essentiality, and in 1867, his harnesses won prizes at the Universal Exhibition. Since 1837, Hermès has remained faithful to its artisan model and its humanistic values (Hermès History, 2024). The family-run company aims to maintain French production at 54 sites and expand its international distribution network to 300 stores in 45 countries. The products of the company include apparel, shoes, bags, jewellery accessories, watches, perfumes, cosmetics, home furnishings and decorations, and outdoor and riding pieces of equipment (Hermès Contemporary, 2024). Émile Hermès SAS, the active partner in the Hermès Group, is involved in the day-to-day management and administration of the business. The limited partners, or shareholders, provide funds and have certain rights (Hermès Partners, 2024).

Sustainable development

Because of the superior materials and extraordinary skill of its artisans, the firm, which employs up to 20,000 people, specializes in sustainable masterpieces with eternal elegance. Its adherence to artisanal, humanist, cultural, social, and environmental ideals guarantee a conscientious approach to development and production.

Sustainability of objects

High-quality and versatile designs that come from extraordinary expertise are what make Hermès so famous. The sustainability of these items, which acquire patina with time, is conserved by the house's repair operations around the globe. 2022 saw the restoration of 202,000 Hermès items. In addition to investigating novel materials, Hermès is dedicated to lean production and the integration of the integration of circularity concepts into its manufacturing process.

Sustainability of employment

In addition to teaching its craftsmen and producing fresh job opportunities every year, Hermès has been giving certificates from its own apprentice training facility since 2021. The organization promotes diversity and a positive environment within its workforce by encouraging internal mobility.

Sustainability of local anchoring

Hermès manufactures 76% of its products, including 100% leather items, in 54 production and training locations spread over 11 of the 13 regions of France. By building factories in key regional hubs, supporting local social and cultural ecosystems, and upholding sustainable construction standards, the firm actively revitalizes these areas.

Sustainability of partnerships

Hermès has maintained a nineteen-year relationship of loyalty with its industrial suppliers, guaranteeing the safety of the group's supplies and material traceability. Based on common principles, this loyalty pushes Hermès and its partners to advance their CSR commitments by establishing third-party certification goals for every channel of purchase.

Sustainability of natural resources

Hermès is an ethical business that values local supply chains, transparency, and security while honoring the environment and its resources. They also manage the use of energy and water, the carbon footprint, and environmentally friendly building practices. As a cornerstone of their foundation, Hermès is dedicated to protecting biodiversity and actively pursuing sustainable development (Sustainability, 2024)

HERMES	Revenue Breakdown	Percentage(%)
	Apparel, Footwear	96.34%
	Personal Care Products	3.66%

Table 3. 4 Revenue Breakdown Hermes based on data downloaded from Bloomberg, 2024

3.1.5. PRADA

Mario Prada established the upscale Milanese fashion firm Prada SPA in 1913 and named it for his family name. Its specialties include ready-to-wear, footwear, travel items, leather purses, and other fashion accessories. Then in 1919 by obtaining the title of official supplier of the Italian royal house, the brand became a benchmark for Italian aristocracy and upper-middle class (PRADA, 2024).

In 1978, Miuccia Prada, Mario's granddaughter became the owner of the company. At that time, Prada was primarily a leather goods manufacturer facing financial struggles, partly due to competition from brands like Gucci. Miuccia Prada revitalized the brand, transitioning it towards haute couture and significantly influencing women's fashion (Admin, 2021).

By the 1990s, Prada was recognized as a luxury brand due to its original designs. To expand the business, Miuccia Prada founded the subsidiary Miu Miu. Additionally, Prada partnered with LVMH to acquire a joint stake in Fendi and assisted LVMH in its unsuccessful takeover of Gucci (wikipedia, 2024). It also purchased 51% of Helmut Lang's company (Fashion, 2022), whole the Jil Sander A.G., and 83% of Church & Company (Cowell, 1999). In the 2000s, the growing rate and acquisitions slowed down due to the debts of the company, so that because of the pressures of the bankers, the company was forced to sell his share of Fendi to LVMH with the price of just US \$295 million. By 2006, the Helmut Lang, Amy Fairclough, Ghee, and Jil Sander labels were also sold.

According to the Fashion United, the global directory of top B2B fashion brands, in the fiscal year ending January 2015, Prada recorded a turnover of 3,551.7 million euros, a 1 percent

increase from the previous year. However, the brand's gross operating profit (EBITDA) fell by 16.5 percent to 954.2 million euros, and its net profit decreased by 28.2 percent to 450.7 million euros (Gonzalez-Rodriguez, 2015).

In July 2016, Prada began selling its clothing online through Net-a-Porter and Mytheresa to adapt to changing consumer preferences and reach a wider audience. This strategic move allowed Prada to leverage e-commerce expertise, reduce overhead costs, and maintain its luxury brand image. By March 2018, Prada's sales turned positive after a decline since 2014, and its stock jumped 14%. Despite losing about 60% of its value since its peak in 2013, Prada's share price surged in 2018, trading at 34 times that year's expected earnings, compared to rivals LVMH and Kering, which traded around 21 times (Sanderson, 2018).

Declaring in 2019 that it would be "focusing on innovative materials will allow the company to explore new boundaries of creative design while meeting the demand for ethical products," Prada said that as of 2020, fur will no longer be available in all house brands or the collection of this brand, including Miu Miu, Church's, Car Shoe, and Prada itself (Prisco, 2019).

In 2022, the Prada Group achieved a record annual revenue of €4.2 billion (\$4.4 billion), a 21% increase from the previous year, surpassing its 2013 peak. Retail sales rose by 24% to €3.7 billion (\$3.9 billion), and operating profit surged by 59% to €776 million (\$821 million). This growth was driven by strong consumer demand for Prada and Miu Miu brands. The company saw increases across all categories: leather goods by 18%, ready-to-wear by 27%, and footwear by 29% (Fashion;, 2023).

PRADA	Revenue Breakdown	Percentage(%)
	Apparel, Footwear	68.21%
	Specialty Apparel	31.79%

Table 3. 5 Revenue Breakdown Prada based on data downloaded from Bloomberg, 2024

3.1.6. Moncler

The French luxury goods company Moncler was founded in the alpine hamlet of Monestier-de-Clermont, which is close to Grenoble. The firm was formed in 1952 by René Ramillon and André Vincent, and it produced well-known down jackets for workers. Italian businessman Remo Ruffini purchased the brand in 2003 and launched a worldwide development plan in the luxury goods market. Listed in 2013 on the Milan Stock Exchange, Moncler is the biggest success story in modern European history. Stone Island was acquired by Moncler in 2021, and by blending two brands, Moncler and Stone Island, the Moncler Group was founded. The three categories of Moncler's collections are Moncler Collections, Moncler Grenoble, and Moncler Genius. Shapes, functionality, materials, and details are highlighted in the collections. For customers who enjoy sports, Moncler Grenoble provides cutting-edge style and technology. Co-creators' ingenuity is expressed in genius collections. The brand's products also include eyeglasses, fragrances, purses, backpacks, accessories, and footwear.

Strategy

There are four pillars supporting the Group strategy.

1. Become a leader in the new luxury segment

By emphasizing community, diversity, and experientiality, The Moncler Group is embracing a new definition of luxury. By understanding shifting cultural conventions, they want to solidify their position in the emerging luxury market.

2. Build a global group able to fully enhance its brands' potential at global level

The key objectives of Moncler's growth strategy are to become a worldwide brand, communicate with customers more directly, and share expertise and information in order to maximize growth potential while preserving its distinctive identity.

3. Develop all distribution channels with an omnichannel approach, supported by a strong digital culture

The Group focuses on understanding customers' expectations, fostering connections with them at every touchpoint, and developing distinctive in-store experiences. They understand that thinking digitally is critical to their future success and are following an integrated development strategy for distribution channels.

4. Follow a sustainable growth path to create value for all stakeholders

Moncler and Stone Island are incorporating sustainable and responsible growth into their plans by considering five strategic areas: climate action, circular economy, fair sourcing, enhancing diversity, and giving back to local communities.

Governance framework

A corporate governance framework that prioritizes ethical business practices and social responsibility has been implemented by Moncler S.p.A. The Board of Directors and the Board of Statutory Auditors are its two corporate entities. The Board is primarily responsible for making strategic and financial decisions as well as for approving the company's plans for environmental and sustainable problems. An internal strategic committee, compliance and internal audit departments, and a supervisory body supervise the internal control and risk management system (ICRMS) (Moncler Group, 2024).

MONCLER	Revenue Breakdown	Percentage(%)
	Apparel, Footwear	100%

Table 3. 6 Revenue Breakdown Moncler based on data downloaded from Bloomberg, 2024

3.1.7. Salvatore Ferragamo

The Salvatore Ferragamo Group has experienced substantial expansion and development throughout its history, positioning it as a significant player in the global luxury industry. The

parent company of the Salvatore Ferragamo Group, a world leader in the luxury market, is Salvatore Ferragamo S.p.A. The business was founded in 1927 and currently manufactures jewellery, watches, eyeglasses, shoes, leather goods, clothing, silk items, and perfumes for both men and women. Their goods have a distinctive design that blends Italian workmanship, creativity, originality, and innovation. Through businesses that serve the European, American, and Asian markets, the firm has a presence in Italy as well as other countries. High-level multi-brand department stores, stores run by third parties, and direct-operated outlets are how they distribute their goods. The organization is active in more than 90 nations globally (SALVATORE FERRAGAMO History, 2024).

Sustainability approach

Salvatore Ferragamo is a brand that is deeply rooted in its region, culture, and community and places a great emphasis on creativity, innovation, and workmanship. Beyond the bounds of national and international legislation, the brand is dedicated to safeguarding its operations and personnel. Ferragamo's inclusion in Euronext's MIB ESG index, which ranks the top 40 Italian blue-chip businesses with the greatest environmental, social, and governance standards, is indicative of the company's dedication to sustainability. The company plan for the brand makes this dedication to sustainability clear. The brand's business approach makes clear its dedication to sustainability (SALVATORE FERRAGAMO SUSTAINABILITY, 2024).

Sustainable development goals

Based on sustainability principles and their applicability to its operations, the Salvatore Ferragamo Group examined the Sustainable Development Goals (SDGs) of the UN. To establish internal activities and concentrate resources, they chose six SDGs. The Group strengthened its commitment to environmental preservation after adopting the Fashion Pact in

2019 by incorporating three more SDGs (climate action, life below water, and life on land) into its Sustainability Plan (SALVATORE FERRAGAMO SUSTAINABILITY, 2024).

Fashion Pact

In 2019, Salvatore Ferragamo revealed its commitment to environmental sustainability and established strategic objectives to lessen its environmental effect by joining the Fashion Pact, an alliance of more than 60 international fashion and textile firms (SALVATORE FERRAGAMO SUSTAINABILITY, 2024).

Animal welfare

In order to guarantee animal care across the supply chain, the group created an animal care policy in 2019. The policy recognizes the significance of environmental and biodiversity respect in product enhancement and provides minimum requirements, certifications, standards, collaborative forms, tactics, and procurement sources to protect the welfare of animals (SAVATORE FERRAGAMO ANIMAL WELFARE, 2020).

New sustainability plan (2023-2025)

The plan specifies various steps to be carried out over a three-year period, along with 12 precise goals for pillars. The goals from previous years, including those resulting from the SDGs' adoption, the Fashion Pact's signature, and the establishment of science-based targets, were considered while developing the plan. The pillars are presented below in summary.

- **Carbon emission reduction**

Boost environmental performance to meet science-based benchmarks and Fashion Pact objectives.

- **Sustainable materials with focus on leather**

Encourage creativity and make use of fresh, ethical, and sustainable resources.

- **Circular economy and recycling**

Reduce waste and advance the circular economy.

- **Supply chain transparency and local focus**

Improve the supply chain transparency, traceability, and sustainability performance of suppliers.

- **Foster diversity, equity, inclusion & belonging**

Enhance talent attraction and develop a good work atmosphere (SALVATORE FERRAGAMO SUSTAINABILITY PLAN, 2022).

SALVATORE FERRAGAMO	Revenue Breakdown	Percentage(%)
	Apparel, Footwear	55.21%
	Retail REIT*	44.79%

Table 3. 7 Revenue Breakdown Salvatore Ferragosto based on data downloaded from Bloomberg, 2024

*A Retail Real Estate Investment Trust (REIT): is a company that owns, operates, or finances income-producing real estate properties focused on retail spaces. These properties can include shopping malls, strip malls, outlet centres, and standalone retail stores.

3.1.8. Hugo Boss

Hugo Boss, headquartered in Metzingen, Germany, is a leading luxury fashion brand globally recognized for its men's and women's apparel, accessories, and footwear. Under a portfolio strategy, it operates two distinct brands, HUGO, and BOSS, each synonymous with quality, innovation, and sustainability. With around 19,000 employees, Hugo Boss aims to achieve its "CLAIM 5" goal by 2025, striving to become a top 100 global brand and a premier tech-driven fashion platform. Notably, in fiscal year 2023, the company surpassed EUR 4 billion in revenue

for the first time. Hugo Boss is renowned for its collaborations, events, and campaigns, which bolster the brand's unique positioning. Leveraging social media, the company actively engages with its digital-native audience worldwide (HUGO BOSS COMPANY, 2024).

In August 2021, Hugo Boss unveiled its "CLAIM 5" growth strategy, targeting younger demographics like Millennials and Gen Z to cultivate devoted followers for both HUGO and BOSS brands. Two years into implementing "CLAIM 5," significant progress has been achieved across all strategic areas. Robust strategy execution and a bold rebranding in early 2022 have propelled both brands forward, resulting in notable market share growth and enhanced global brand resonance. Consequently, Hugo Boss raised its mid-term growth targets for June 2023 (HUGO BOSS STRATEGY, 2023).

Strategy

Claim 1: Boost brands

The brand images of BOSS and HUGO, including logos, products, marketing, and design concepts, were refreshed in January 2022. The business will stick to its two-brand approach, using different marketing techniques to appeal to younger people. Campaigns that prioritize digital media, solid partnerships, and distinctive brand events are all part of the plan. Marketing investments will remain between 7% and 8% of group sales until 2025.

Claim 2: Product is key

For males, they want to employ the BOSS Black, Orange, and green brand lines; for womenswear, they will use the BOSS Camel line exclusively. Early in 2024, the business plans to introduce the HUGO BLUE brand line, which will concentrate on denim. Hugo Red will sell the current product line, which emphasizes street tailoring. Both brands will continue to be positioned in the premium/affordable luxury market because of their strong price-value offers.

Claim 3: Lead in digital

To become the world's premier high-end tech-driven fashion platform, Hugo BOSS is dedicated to digitization. Ever since launching "CLAIM 5", the corporation has advanced digitally in several areas, such as trend identification, product development, AI-powered pricing, and metaverse experiences. To improve the customer experience and bridge digital and physical retail for a seamless omnichannel experience, HUGO BOSS Digital Campus opened in 2021.

Claim 4: Drive omnichannel

Over half of group sales are generated by brick-and-mortar retail, which HUGO BOSS intends to increase in its worldwide channel mix. The corporation planned to invest up to EUR 600 million between 2021 and 2025 and increase retail efficiency by 3% annually. The company also intends to boost digital revenues to more than 20% of group sales by 2025 and expand its worldwide franchise business. The business intends to promote growth in every region.

Claim 5: Organize for growth

The firm has been functioning under a platform-based paradigm for the last two years, which has allowed for profitable expansion and strict plan execution. Increased investments have been made in the supply chain to promote efficiency and growth. The objective of the Digital TWIN effort is to improve sustainability, flexibility in the supply chain, and decision-making (HUGO BOSS STRATEGY, 2023)

Sustainability strategy

Prioritizing sustainability measures across its whole value chain, HUGO BOSS aims to uplift its global premium fashion position and motivate customers. Long-term success is ensured by its ESG initiatives, which provide added value for the firm, its partners in business, its consumers, shareholders, and the community. In order to promote a sustainable future, HUGO

BOSS has established a new sustainability strategy for 2023 that is centered around five major pillars: increasing circularity, driving digitization and data analytics, leveraging nature-positive materials, fighting microplastics, and pushing zero emissions (HUGO BOSS STRATEGY, 2023).

Empower people and teams strategy

Hugo Boss places a strong emphasis on the value of workers' enthusiasm and commitment to its "CLAIM 5" growth strategy. The company values entrepreneurial spirit, personal ownership, team mentality, simplicity, quality, and youthful spirit. These principles encourage trust, innovation, and quick thinking with the goal of fostering employee growth and preserving the company's standing as a leading employer in the fashion sector (HUGO BOSS STRATEGY, 2023).

	Revenue Breakdown	Percentage (%)
HUGO BOSS	Apparel, Footwear	46.10%
	Specialty Apparel	53.90%

Table 3. 8 Revenue Breakdown Hugo Boss based on data downloaded from Bloomberg, 2024

3.1.9 Ralph Lauren

Ralph Lauren Corporation is a global leader in luxury lifestyle products, including apparel, accessories, home furnishings, fragrances, and hospitality. With over 50 years of history, the brand has developed a strong reputation and unique image, expanding its range of products, sales channels, and international reach. Known for its American-inspired style and innovative approach to lifestyle branding, Ralph Lauren has had a significant impact on global fashion since 1967. Ralph Lauren, a famous American designer, is best known for his Polo Ralph Lauren sportswear line, which is central to his extensive fashion empire. He began his career at Brooks Brothers and later created his own necktie line. The company's brands, such as Ralph

Lauren and Polo Ralph Lauren, are among the most recognized globally. By leveraging consumer insights and its expertise in design, marketing, and imaging, and through partnerships with licensees, Ralph Lauren creates cohesive lifestyle collections (RALPH LAUREN WEBSITE, 2024) (Biography.com Editors- Ralph Lauren, 2021).

Last year, Ralph Lauren Corporation introduced "Timeless by Design" as part of its ongoing Citizenship and Sustainability efforts, achieving several key milestones:

- Launched the Cradle to Cradle (C2C) Certified® Gold Cashmere Sweater, aiming for five iconic products to be C2C Certified® by 2025 to support the circular economy.
- Achieved a zero-waste goal by diverting 92% of waste from landfills and incineration at distribution centers.
- Increased women in factory leadership roles by 25%, advancing gender parity in the supply chain.
- Ensured that at least 20% of the Global Leadership Team comprises racially and ethnically diverse talent.
- Enhanced brand storytelling to inclusively represent diverse communities.
- Expanded global impact through equity-focused partnerships.
- Committed \$25 million via The Ralph Lauren Corporate Foundation to establish or expand five cancer centers in underserved areas, including the new Ralph Lauren Center for Cancer Prevention at Georgetown Lombardi Comprehensive Cancer Center in Washington, D.C.

Ralph Lauren Corporation extends its commitment to timelessness beyond its products to encompass the impact on lives, communities, and the environment. Their overarching Purpose is to inspire a better life through authentic and timeless style, which guides their "Timeless by Design" approach to citizenship and sustainability. This involves empowering employees, conducting charitable initiatives through both the company and The Ralph Lauren Corporate

Foundation, and striving for a more circular fashion industry. The 2023 Global Citizenship & Sustainability Report highlights progress toward these objectives, emphasizing collaboration with stakeholders to ensure present and future needs are met (RALPH LAUREN COMPANY, 2024).

RALPH LAUREN	Revenue Breakdown	Percentage (%)
	Specialty Apparel	62.90%
	Apparel, Footwear	37.10%

Table 3. 9 Revenue Breakdown Ralph Lauren based on data downloaded from Bloomberg, 2024

3.2. Variables measurement

Dependent variable: Stock Price

To calculate the market value, we obtained the historical stock prices of each company from 2015 to 2022 from [Yahoo.Finance](https://www.yahoo.com/finance) website. And the stock price trend of variation for each year, was calculated by subtracting the closing stock price on the last trading day of the previous year from the closing stock price on the last trading day of the current year.

Independent Variable: ESG Scores

The ESG scores from 2015-2022 were downloaded from ESG disclosure score of Bloomberg. It is noticeable that for Moncler as the data was not available for 2022, we used the same data as 2021 to make it comparable with the other brands.

Control Variable

The following control variables are included to control their effects on reputation of the brand and the market value of the companies.

- ROE, return to equity of each company at the end of the year, to measure the financial performance of the companies.

- Total asset turnover as operational efficiency to measure the operational performance of the company.
- Board size of the company as a measure of size of the company. We must mention that the board size was not available for Prada from 2015 to 2017, and for Salvatore Ferragamo for the years 2015 and 2016, so we considered the same numbers as the first available year.

The historical data for control variables were extracted from Refinitiv website.

To achieve the objectives of this research, we first studied the trends in the E, S, and G scores, as well as the overall ESG score for each company. Each component's score was examined separately to understand its changes over time. As the next step, we plotted the normalized historical stock prices alongside the ESG scores for each company from 2015 to 2022 to interpret the changes individually over the years. Finally, we conducted a clustering analysis of the companies based on the correlation between their ESG performance and stock price movements. Companies with higher correlation coefficients between these metrics were grouped, which were explained in detail in the fourth chapter.

Then, in the fifth chapter of our study, the description statistics tables of our data were indicated and explained in detail. We also did the linear regression to answer our hypothesis, which is “Is there any relationship between market value and the ESG score?”.

Chapter 4: EXPLANATORY DATA ANALYSIS

In this chapter, firstly, the historical environmental, social, and governance trends of companies are presented separately. In the next step, the historical trend of the ESG score beside the stock price is analysed. Finally, the cluster analysis is performed based on the correlation coefficient of ESG scores.

4.1. Evaluation of historical ESG trend of companies

In the following section the historical ESG scores of the companies from 2015 to 2022 are listed and investigated. The results related to each company are evaluated and compared individually.

4.1.1. Evaluation of historical ESG trend of LVMH

The following chart, which shows the LVMH company's ESG performance results, shows that the environmental trend was consistent from 2015 to 2018, then increased significantly from 2018 to 2020 (from 0.4 to 3.4, or 8.5 times), and then continued to be constant starting in 2021. The company's governance is one of its strong points; while the degree of governance has fluctuated, it has always been over the 4.4 mark. The social section had an increase from 2015 and 2018, but since then, it has fluctuated. Overall, the ESG score has doubled since 2015 until the last report.

LVMH								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.33	0.33	0.33	0.33	1.46	3.48	3.95	3.95
Environmental Supply Chain Management	0.59	0.59	0.59	0.59	0.59	0.59	1.10	1.10
GHG Emissions Management	0.00	0.00	0.00	0.00	3.01	10.00	10.00	10.00
Social	2.29	3.00	3.58	3.74	3.46	3.71	3.43	3.46
Social Supply Chain Management	5.22	6.47	6.30	6.87	5.84	6.75	5.75	5.85
Data Security & Customer Privacy	1.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Product Quality Management	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Marketing & Labelling	0.00	0.00	3.00	3.00	3.00	3.00	3.00	3.00
Governance	4.90	4.49	4.65	4.56	4.94	5.11	5.32	5.24
Board Composition	2.63	3.12	3.35	3.27	3.91	4.63	4.67	4.78
Executive Compensation	6.48	6.18	6.23	5.68	5.95	6.48	6.72	5.99
Shareholder Rights	4.41	3.32	3.52	3.73	3.61	3.23	3.55	3.36
Audit	9.89	7.68	7.68	7.76	8.58	7.76	8.07	8.93
Total ESG Score	2.03	2.19	2.41	2.44	3.01	3.99	4.11	4.10

Table 4. 1 Historical LVMH ESG scores (2015-2022)

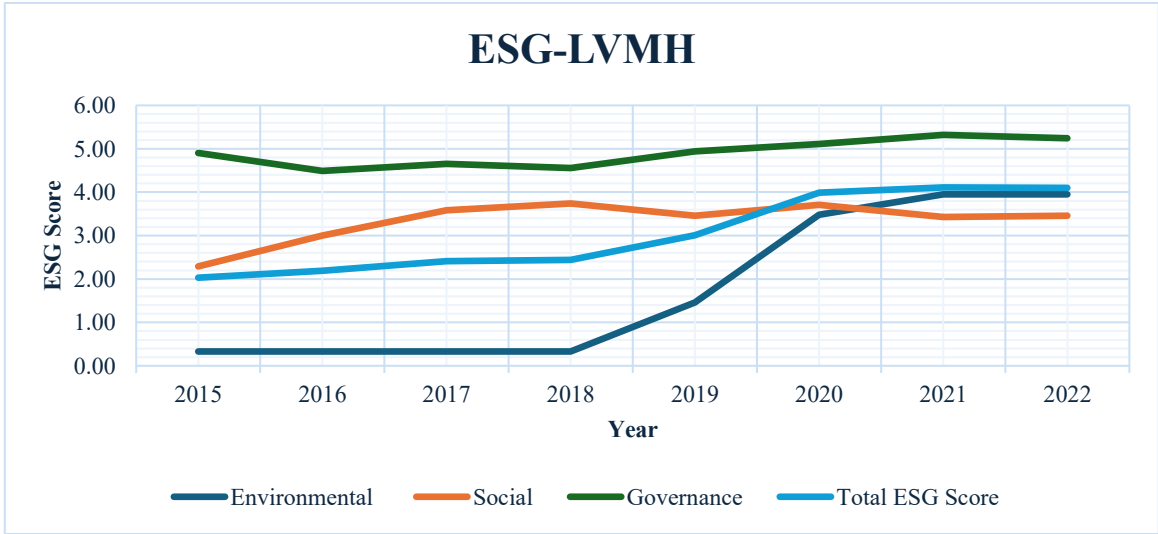


Figure 4. 1 Trend Analysis of ESG Scores for LVMH (2015-2022)

4.1.2. Evaluation of historical ESG trend of BURBERRY

Burberry's ESG performance graphs indicate that, with a value range of 7 to 8, governance performance has the strongest beneficial impact on overall success. The environmental graph shows a 15 times surge in growth between 2018 and 2022. There has been a gradual growth in the social sector between 2015 and 2022. The total ESG score has doubled during this period.

BURBERRY								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.33	0.33	0.33	0.33	1.10	2.62	3.95	5.21
Environmental Supply Chain Management	0.59	0.59	0.59	0.59	0.59	0.59	1.10	5.90
GHG Emissions Management	0.00	0.00	0.00	0.00	1.94	6.85	10.00	4.31
Social	1.06	1.69	1.69	2.04	2.04	2.04	2.04	2.42
Social Supply Chain Management	1.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Data Security & Customer Privacy	1.50	1.50	1.50	3.00	3.00	3.00	3.00	3.00
Product Quality Management	1.50	1.50	1.50	1.50	1.50	1.50	1.50	3.00
Marketing & Labelling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Governance	7.53	7.24	7.20	7.09	7.71	8.06	7.97	8.08
Board Composition	6.01	5.99	6.13	6.70	7.87	8.12	7.60	8.43
Executive Compensation	8.50	7.59	7.33	6.09	6.32	6.61	6.90	7.56
Shareholder Rights	8.34	8.14	8.08	8.21	8.51	8.68	8.63	7.19
Audit	8.38	8.24	8.17	7.90	8.45	9.48	9.68	9.74
Total ESG Score	2.02	2.23	2.23	2.35	2.87	3.61	4.11	4.76

Table 4. 2 Historical Burberry ESG scores (2015-2022)

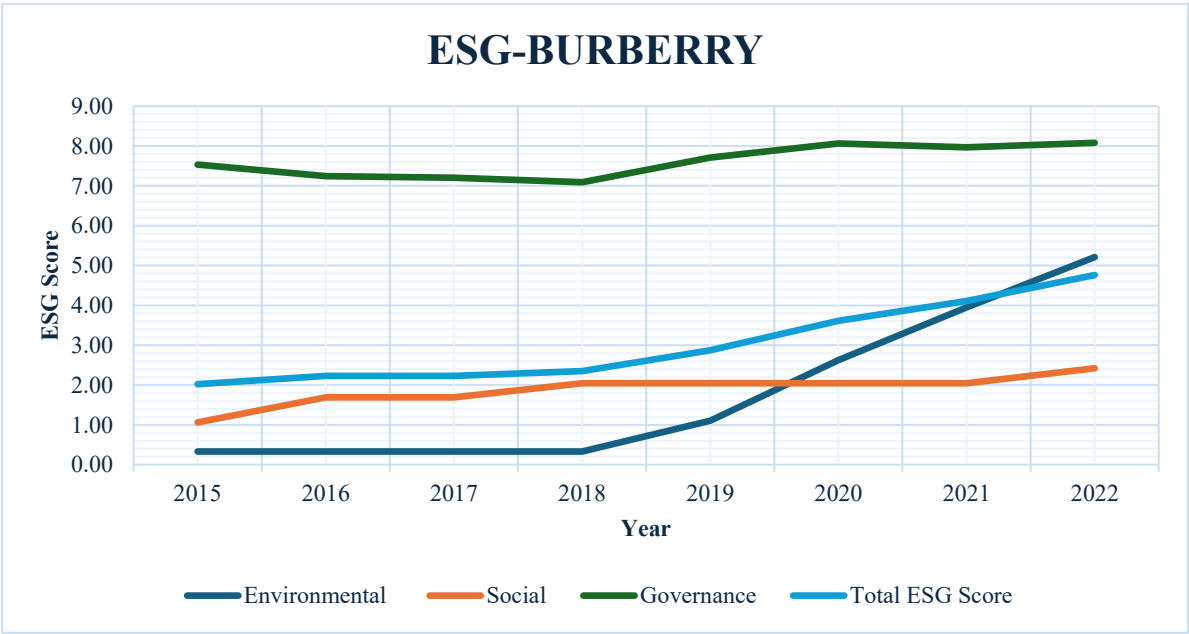


Figure 4. 2 Trend Analysis of ESG Scores for Burberry (2015-2022)

4.1.3. Evaluation of historical ESG trend of CHRISTIAN DIOR

The performance of Dior company is worthy of consideration, while the governance performance has been gradually increasing, the social performance of the company has declined and has reached 1.36 from 2.36 points. This is even though there has been no improvement in the environment sector in 5 years, and a leap has occurred between 2020 and 2021, and after that, a steady process has been followed. The total ESG score has increased only by about 6%, which is notable.

CHRISTIAN DIOR								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.33	0.33	0.33	0.33	0.33	0.33	1.10	1.10
Environmental Supply Chain Management	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
GHG Emissions Management	0.00	0.00	0.00	0.00	0.00	0.00	1.94	1.94
Social	2.36	2.26	2.40	2.36	2.00	2.14	1.65	1.36
Social Supply Chain Management	6.11	5.68	6.26	6.11	4.64	5.23	3.33	2.32
Data Security & Customer Privacy	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Product Quality Management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marketing & Labelling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Governance	4.98	4.77	5.10	5.36	5.51	5.58	5.63	5.63
Board Composition	3.41	4.09	4.46	4.69	4.83	4.67	4.82	4.55
Executive Compensation	7.67	6.23	7.68	6.87	7.07	7.86	7.68	7.62
Shareholder Rights	3.52	3.52	2.83	3.98	3.99	3.99	3.98	3.99
Audit	7.71	6.44	7.07	7.11	7.46	7.15	7.45	8.24
Total ESG Score	2.07	2.00	2.11	2.15	2.04	2.11	2.32	2.20

Table 4. 3 Historical Christian Dior ESG scores (2015-2022)

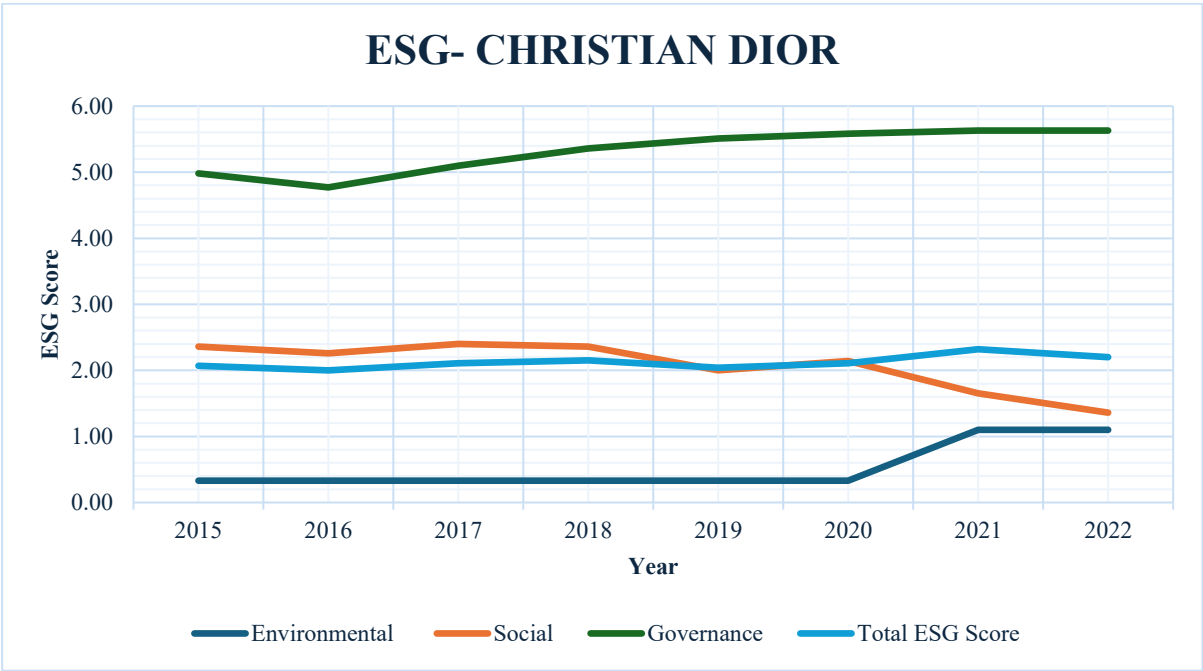


Figure 4. 3 Trend Analysis of ESG Scores for Christian Dior (2015-2022)

4.1.4. Evaluation of historical ESG trend of HERMES

Analysing Hermes' ESG chart reveals that the company's governance performance has reached a gradual decline from 6.35 to 5.78, while the environmental factor has been trending upward since 2018 from 0.33 to 4.34, nearly 13 times more in 2021. Additionally, the social chart has continued this increasing tendency to a far lesser extent. The ESG chart of the firm has generally shown an upward trend, increasing by 2.33 times between 2015 and 2022.

HERMES								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.33	0.33	0.33	0.33	1.88	1.88	4.34	4.34
Environmental Supply Chain Management	0.59	0.59	0.59	0.59	0.59	0.59	4.35	4.35
GHG Emissions Management	0.00	0.00	0.00	0.00	4.31	4.31	4.31	4.31
Social	0.31	0.31	0.94	0.94	0.94	1.37	1.37	1.37
Social Supply Chain Management	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Data Security & Customer Privacy	0.00	0.00	3.00	3.00	3.00	3.00	3.00	3.00
Product Quality Management	0.00	0.00	0.00	0.00	0.00	1.50	1.50	1.50
Marketing & Labelling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Governance	6.35	6.47	5.93	5.62	5.98	5.96	5.91	5.78
Board Composition	6.73	6.72	7.00	5.98	6.37	6.01	5.64	5.44
Executive Compensation	4.98	5.81	4.18	4.06	4.94	4.97	4.83	4.55
Shareholder Rights	6.07	5.69	5.43	5.70	5.61	5.83	5.63	5.71
Audit	8.40	8.38	7.54	7.52	7.57	7.92	9.19	9.16
Total ESG Score	1.48	1.50	1.70	1.65	2.40	2.60	3.48	3.45

Table 4. 4 Historical Hermes ESG scores (2015-2022)

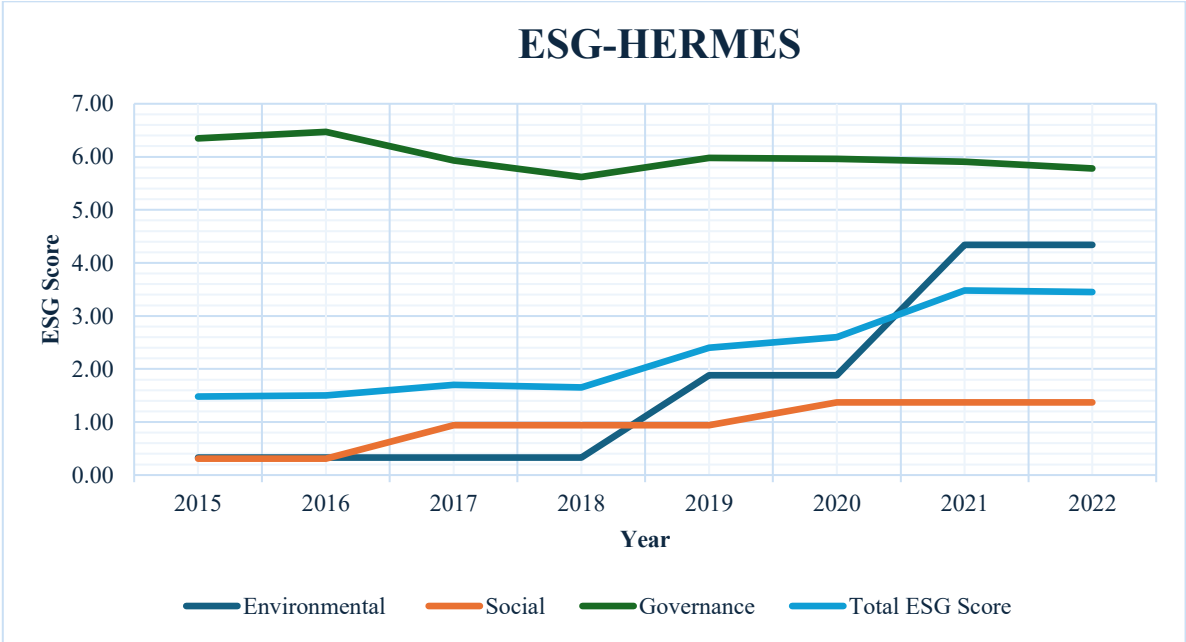


Figure 4. 4 Trend Analysis of ESG Scores for Hermes (2015-2022)

4.1.5. Evaluation of historical ESG trend of PRADA

The Prada Company figure is noteworthy since it shows that all three criteria increased between 2020 and 2021 and remained at that level, except the governance, which has experienced a decline once more. Between 2021 and 2022, the environmental graph's value significantly increased, rising from 0.33 to 4.36. Except for the two periods of 2017–2018 and 2021–2022, when it slightly decreased, the company's ESG score has generally climbed by approximately 2.5 times.

PRADA								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.33	0.33	0.33	0.33	0.33	0.33	4.36	4.46
Environmental Supply Chain Management	0.59	0.59	0.59	0.59	0.59	0.59	4.39	4.57
GHG Emissions Management	0.00	0.00	0.00	0.00	0.00	0.00	4.31	4.31
Social	1.93	2.67	2.67	2.67	2.67	2.89	4.78	4.78
Social Supply Chain Management	1.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Data Security & Customer Privacy	1.50	1.50	1.50	1.50	1.50	1.50	10.00	10.00
Product Quality Management	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Marketing & Labelling	7.02	7.02	7.02	7.02	7.02	9.22	9.22	9.22
Governance	4.88	4.49	4.77	4.71	4.77	4.98	5.79	5.46
Board Composition	4.89	5.37	5.46	5.37	5.43	5.40	7.16	7.07
Executive Compensation	3.63	3.02	2.94	2.77	2.85	3.08	3.75	3.19
Shareholder Rights	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18
Audit	8.68	5.73	7.87	8.04	8.13	9.44	9.72	8.65
Total ESG Score	1.90	2.08	2.14	2.13	2.14	2.25	4.89	4.84

Table 4. 5 Historical Prada ESG scores (2015-2022)

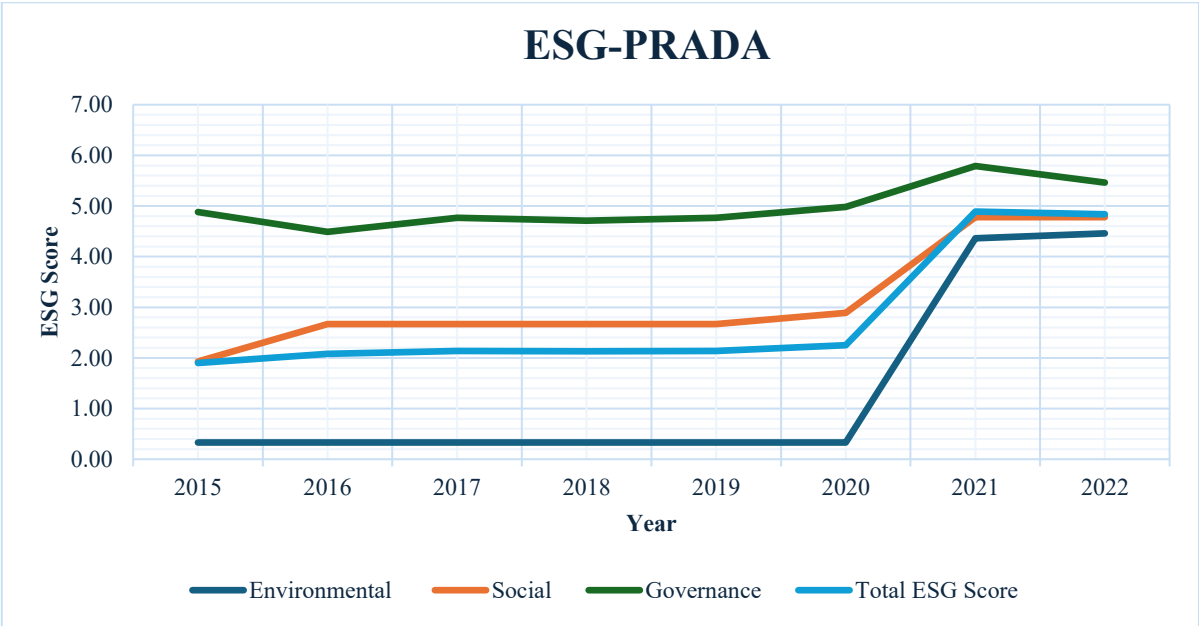


Figure 4. 5 Trend Analysis of ESG Scores for Prada (2015-2022)

4.1.6. Evaluation of historical ESG trend of MONCLER

A review of the Moncler Company's ESG indicator graph reveals that the environmental factor, which increased from zero in 2015 to a value of 3.48 in 2021, is the primary cause of the company's overall ESG score's increasing trend. The company's governance chart has been shifting upward, going from 5.42 to 5.87. The social score has followed a very stable five-year trend. This company's total ESG score climbed as well, rising from 1.29 to 3.16.

MONCLER								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.00	0.33	0.33	0.33	0.33	1.10	3.48	3.48
Environmental Supply Chain Management	0.00	0.59	0.59	0.59	0.59	0.59	0.59	0.59
GHG Emissions Management	0.00	0.00	0.00	0.00	0.00	1.94	10.00	10.00
Social	0.58	0.88	1.28	1.39	1.37	1.33	1.32	1.32
Social Supply Chain Management	0.75	1.70	1.64	2.00	1.93	1.80	1.79	1.79
Data Security & Customer Privacy	0.00	0.00	1.50	1.50	1.50	1.50	1.50	1.50
Product Quality Management	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Marketing & Labelling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Governance	5.42	5.70	5.64	5.92	6.06	6.13	5.87	5.87
Board Composition	6.35	6.63	6.41	6.31	6.81	6.85	6.27	6.27
Executive Compensation	6.35	6.67	6.81	7.27	7.44	7.64	7.38	7.38
Shareholder Rights	4.01	4.01	4.01	4.68	4.68	4.68	4.68	4.68
Audit	4.34	5.07	4.93	5.11	4.67	4.72	4.68	4.68
Total ESG Score	1.29	1.63	1.79	1.89	1.90	2.28	3.16	3.16

Table 4. 6 Historical Moncler ESG scores (2015-2022)

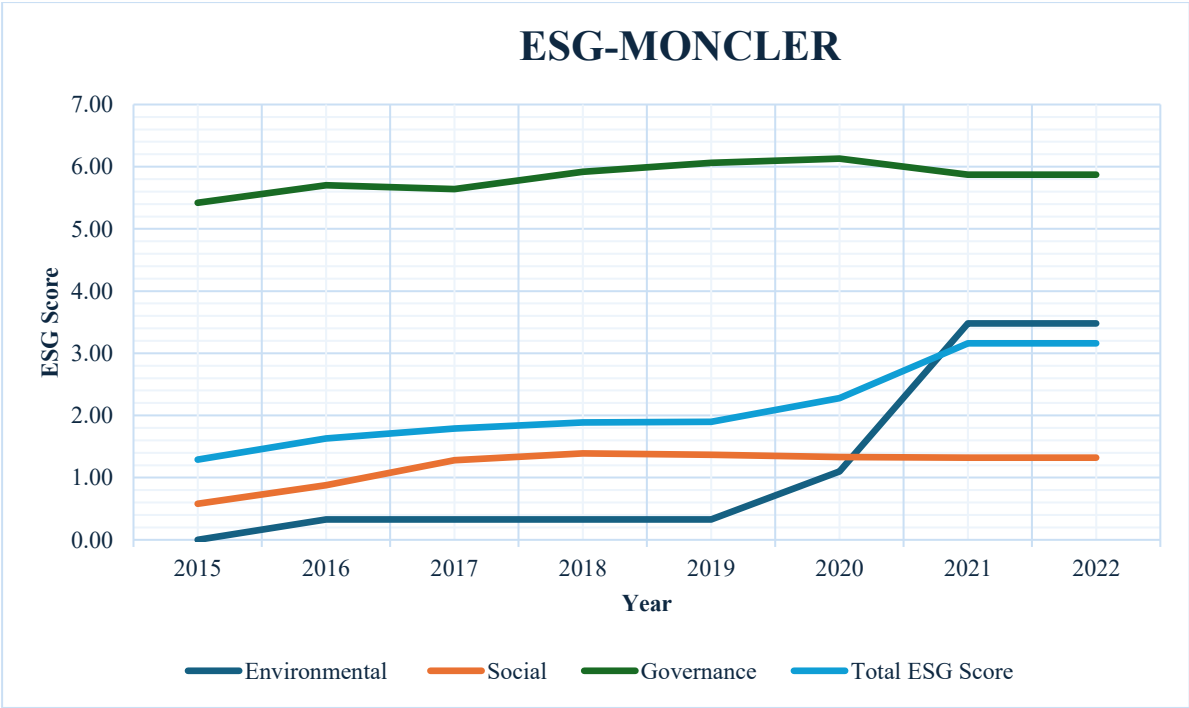


Figure 4. 6 Trend Analysis of ESG Scores for Moncler (2015-2022)

4.1.7. Evaluation of historical ESG trend of SALVATORE FERRAGAMO

With the exception of two abrupt upward movements between 2018 and 2020 and 2021 and 2022, Salvatore Ferragamo's environmental chart has always shown a stable trend prior to and following these abrupt increases, reaching 0.33 to 3.88. Additionally, the social graph displayed a sharp upward trend from 2015 to 2020, followed by a more moderate upward trend. Although it has been steadily rising, the company's governance factor has seen significant fluctuations. The company's overall ESG chart, which has grown by about 2.5 times during 2015 and the most recent report, is likewise extremely similar to the social chart.

SALVATORE FERRAGAMO								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.33	0.33	0.33	0.33	1.10	2.08	2.08	3.88
Environmental Supply Chain Management	0.59	0.59	0.59	0.59	0.59	2.19	2.19	2.19
GHG Emissions Management	0.00	0.00	0.00	0.00	1.94	1.94	1.94	6.85
Social	2.12	2.12	2.50	2.89	3.54	5.06	5.06	5.30
Social Supply Chain Management	1.00	1.00	1.00	1.00	3.00	3.00	3.00	3.00
Data Security & Customer Privacy	1.50	1.50	3.00	10.00	8.78	8.78	8.78	10.00
Product Quality Management	1.50	1.50	1.50	3.00	3.00	3.00	3.00	3.00
Marketing & Labelling	9.22	9.22	9.22	0.00	0.00	9.22	9.22	9.22
Governance	4.84	4.28	4.29	5.33	5.90	5.98	5.64	6.26
Board Composition	3.84	3.85	3.85	6.54	6.40	7.01	6.81	6.94
Executive Compensation	3.64	2.84	3.41	3.87	4.98	4.02	2.82	5.78
Shareholder Rights	5.21	5.21	5.21	5.21	5.21	5.21	5.21	5.21
Audit	9.37	6.61	5.43	5.44	7.56	8.73	9.47	7.38
Total ESG Score	1.96	1.85	1.98	2.32	3.07	4.08	4.00	5.01

Table 4. 7 Historical Salvatore Ferragosto ESG scores (2015-2022)

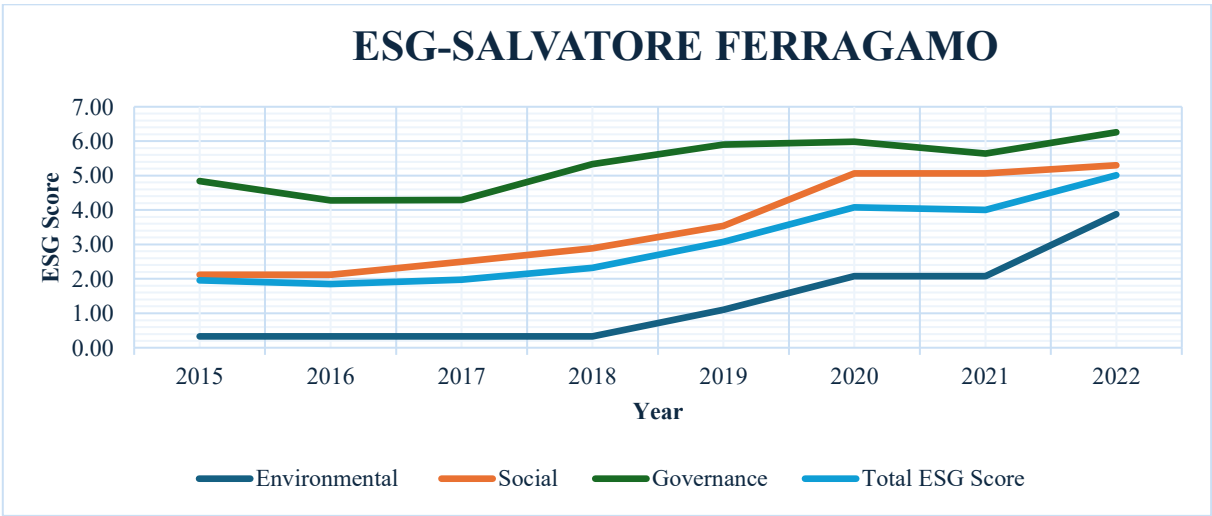


Figure 4. 7 Trend Analysis of ESG Scores for Salvatore Ferragosto (2015-2022)

4.1.8. Evaluation of historical ESG trend of HUGO BOSS

One of the key determinants of Hugo Boss's ESG score is the environment, which saw a notable upward surge from 2017 to 2020, peaking at 5.50 before mildly declining to reach 5.30. Following rapid growth between 2015 and 2018, the company's social component increased to 6.68 from 4.24, then moved up with a gentle slope and fluctuation. The values of the company's governance chart have increased dramatically, from 3.72 in 2015 to 7.02 in 2019, then declined and followed an almost continuous pattern. The company's total ESG score increased by 3.42 from 2015 to 2019 but stabilized between 2021 and 2022.

HUGO BOSS								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.95	0.33	0.59	3.69	5.17	5.50	5.37	5.30
Environmental Supply Chain Management	1.82	0.59	1.10	4.21	5.83	6.42	6.17	6.05
GHG Emissions Management	0.00	0.00	0.00	3.01	4.31	4.31	4.31	4.31
Social	4.24	5.82	6.13	6.68	6.57	6.69	6.76	6.77
Social Supply Chain Management	5.47	5.81	6.71	6.68	6.37	6.57	6.79	6.82
Data Security & Customer Privacy	3.35	9.81	9.81	9.81	9.81	10.00	10.00	10.00
Product Quality Management	1.50	1.50	1.50	3.00	3.00	3.00	3.00	3.00
Marketing & Labelling	9.22	9.22	9.22	9.22	9.22	9.22	9.22	9.22
Governance	3.72	4.29	6.17	6.17	7.02	6.44	6.75	6.86
Board Composition	4.10	5.28	8.35	8.33	8.30	8.43	9.12	9.24
Executive Compensation	4.16	4.01	6.24	6.37	8.07	5.99	5.94	5.99
Shareholder Rights	1.98	2.83	2.83	2.83	3.81	3.83	3.86	3.88
Audit	5.52	5.22	7.80	7.62	8.50	7.67	8.40	8.78
Total ESG Score	2.74	2.98	3.66	5.38	6.16	6.18	6.24	6.24

Table 4. 8 Historical Hugo Boss ESG scores (2015-2022)

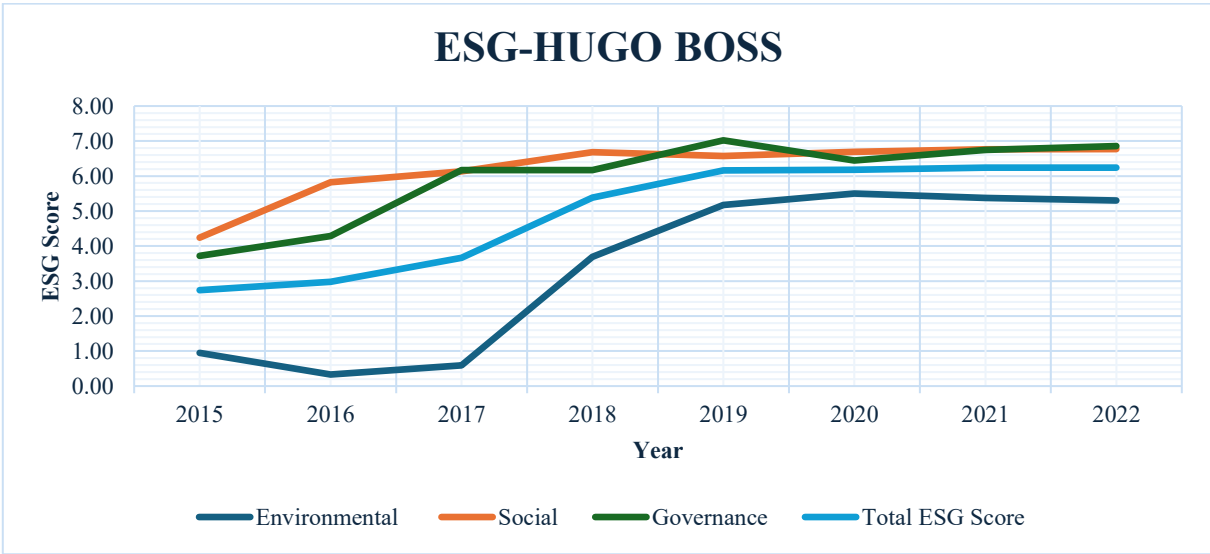


Figure 4. 8 Trend Analysis of ESG Scores for Hugo Boss (2015-2022)

4.1.9. Evaluation of historical ESG trend of RALPH LAUREN

Based on an analysis of the Ralph Lauren Company's whole ESG graph, it showed a very slight increasing trend up until 2019, then there was a sharp increase in 2019 that continued until 2021. The environmental component, which saw notable growth in 2019 and has climbed by around 16.7 times between 2019 and 2021, is the most crucial factor in raising the company's total ESG. There has always been a range of 5.88 to 5.92 on the company's governance criteria. Except for the rise between 2015 and 2017, the company's social chart has consistently had a value of 1.70.

RALPH LAUREN								
Year	2015	2016	2017	2018	2019	2020	2021	2022
Environmental	0.33	0.33	0.33	0.33	0.33	3.75	5.51	5.62
Environmental Supply Chain Management	0.59	0.59	0.59	0.59	0.59	2.02	3.02	3.18
GHG Emissions Management	0.00	0.00	0.00	0.00	0.00	6.85	10.00	10.00
Social	1.06	1.37	1.70	1.70	1.70	1.70	1.70	1.70
Social Supply Chain Management	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Data Security & Customer Privacy	1.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Product Quality Management	1.50	1.50	3.00	3.00	3.00	3.00	3.00	3.00
Marketing & Labelling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Governance	5.88	5.64	5.26	5.47	5.73	6.00	6.23	5.92
Board Composition	4.53	4.45	4.18	4.76	5.51	5.44	5.52	5.69
Executive Compensation	6.77	6.56	5.99	5.84	5.77	6.07	6.41	5.94
Shareholder Rights	5.80	5.14	4.58	4.66	4.69	5.53	5.95	5.20
Audit	8.02	8.11	8.12	8.15	8.16	8.14	8.24	7.77
Total ESG Score	1.74	1.83	1.89	1.93	1.97	3.46	4.10	4.07

Table 4. 9 Historical Ralph Lauren ESG scores (2015-2022)

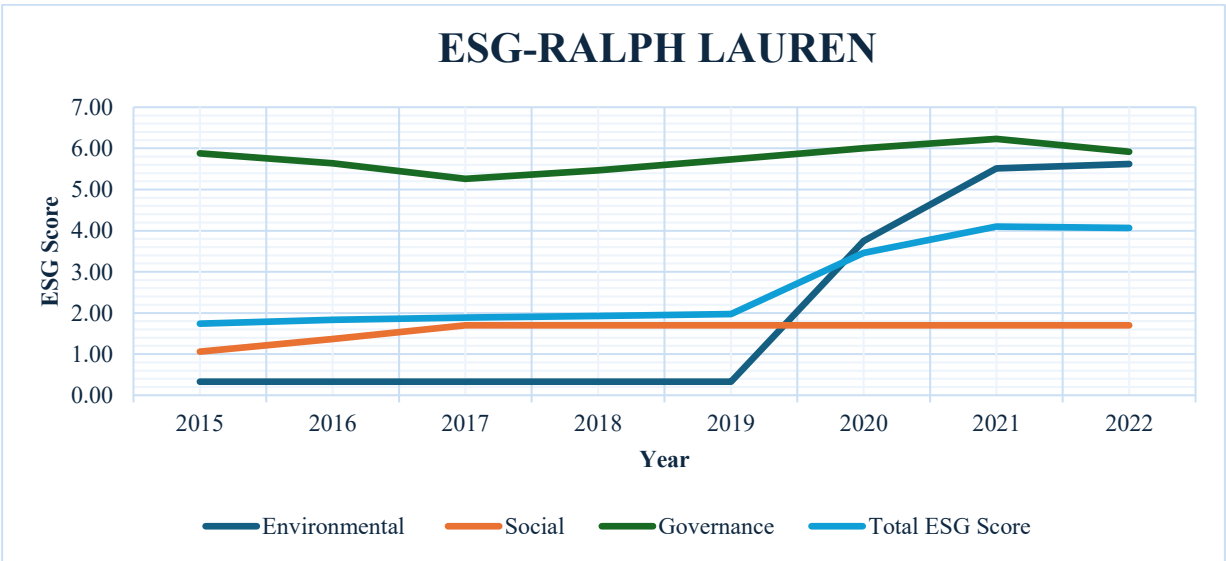


Figure 4. 9 Trend Analysis of ESG Scores for Ralph Lauren (2015-2022)

4.2. Trends in ESG scores and stock price for companies

The objective is to analyse the trend of ESG scores and stock prices of companies. Since the data are on different scales, the initial step is to normalize them to a common scale. The technique employed for this is "Min-Max Scaling Normalization."

$$\text{Normalization value} = \frac{X - X_{min}}{X_{max} - X_{min}}$$

For each company, there are two columns of data: ESG scores and stock prices. The Min-Max Scaling formula is applied to all datasets, and the results are displayed. These normalized values will range between 0 and 1, making them comparable on the same scale.

4.2.1. Trends in ESG scores and stock price for LVMH

The ESG chart and stock price movement trend of LVMH demonstrate that both have consistently had rising movement patterns. Over a three-year period, the two charts overlapped and increased gradually. There has been a notable increase in 2018 in both graphs. Since 2019, this overlapping pattern has changed, and the ESG graph has increased with a steeper slope. The value of ESG remained approximately constant between 2021 and 2022, while the market value dropped. Overall, both graphs have followed an upward trend.

LVMH				
	Currency: USD		Abbreviation: LVMHF	
Time History	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	156.73	2.03	0.00	0.00
2016	189.86	2.19	0.05	0.08
2017	293.60	2.41	0.20	0.18
2018	296.20	2.44	0.21	0.20
2019	466.80	3.01	0.46	0.47
2020	626.00	3.99	0.70	0.94
2021	825.08	4.11	1.00	1.00
2022	731.68	4.10	0.86	1.00

Table 4. 10 Normalized ESG Scores and Stock Prices of LVMH

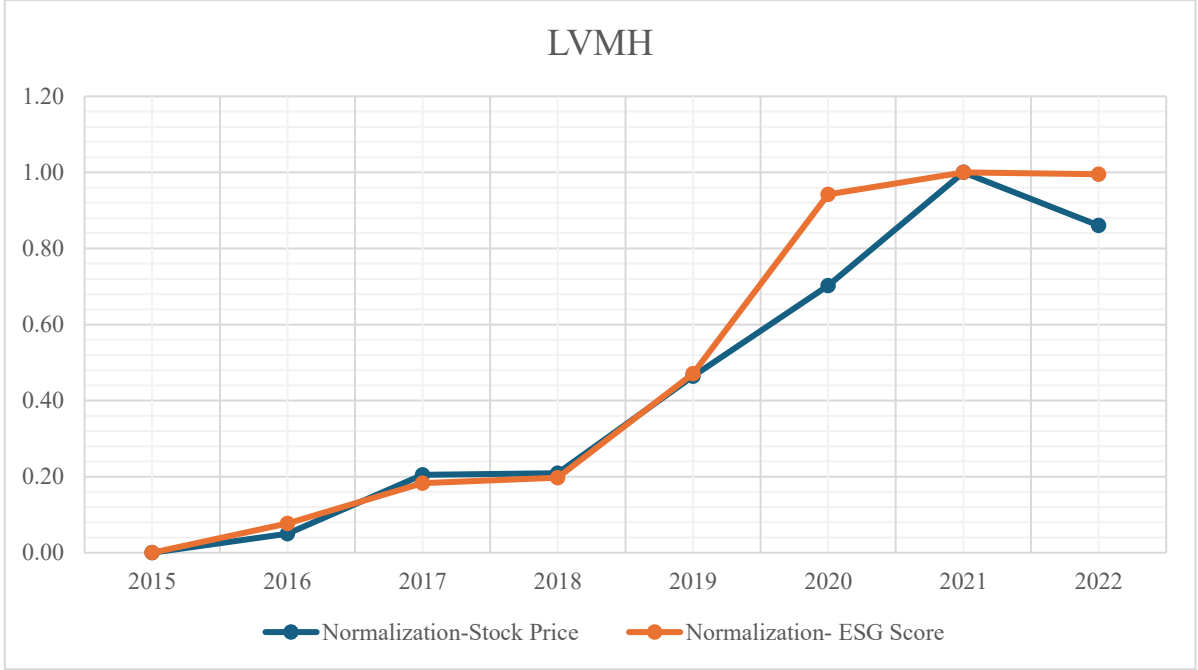


Figure 4. 10 Trends in Normalized ESG Scores and Stock Prices for LVMH

4.2.2. Trends in ESG scores and stock price for BURBERRY

It is evident that the stock price chart has varied over the rising trajectory and saw a significant price decline in 2017 and 2019, and the ESG chart of BURBERRY has consistently increased. These two graphs only overlapped in the period between 2015 and 2016. Overall, the graph of ESG has increased gradually and sharply in some periods while the graph of stock price shows a lot of variations.

BURBERRY				
	Currency: USD		Abbreviation: BURBY	
Time History	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	17.50	2.02	0.00	0.00
2016	18.44	2.23	0.08	0.08
2017	24.19	2.23	0.56	0.08
2018	22.15	2.35	0.39	0.12
2019	29.50	2.87	1.00	0.31
2020	24.56	3.61	0.59	0.58
2021	24.56	4.11	0.59	0.76
2022	24.28	4.76	0.57	1.00

Table 4. 11 Normalized ESG Scores and Stock Prices of BURBERRY

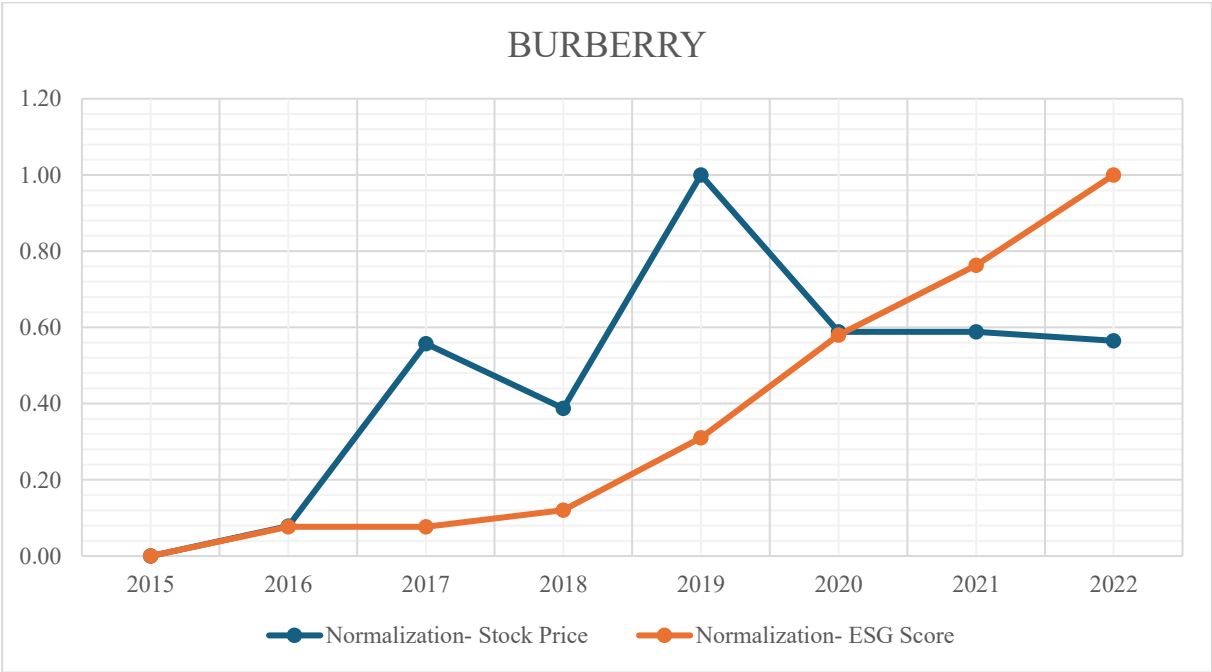


Figure 4. 11 Trends in Normalized ESG Scores and Stock Prices for BURBERRY

4.2.3. Trends in ESG scores and stock price for CHRISTIAN DIOR

Between 2015–2016 and 2018–2019, the ESG graph for Christian Dior showed a notable downward trend, whereas the stock price consistently rose throughout the years, with the exception of 2021–2022, when both graphs experienced a decline. Overall, Christian Dior's ESG scores improved from 2015 to 2022.

CHRISTIAN DIOR				
	Currency: USD		Abbreviation: CHDRF	
Time History	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	174.50	2.07	0.00	0.22
2016	208.00	2.00	0.05	0.00
2017	364.50	2.11	0.29	0.34
2018	379.00	2.15	0.32	0.47
2019	500.00	2.04	0.50	0.13
2020	531.20	2.11	0.55	0.34
2021	820.00	2.32	1.00	1.00
2022	726.00	2.20	0.85	0.63

Table 4. 12 Normalized ESG Scores and Stock Prices of CHRISTIAN DIOR

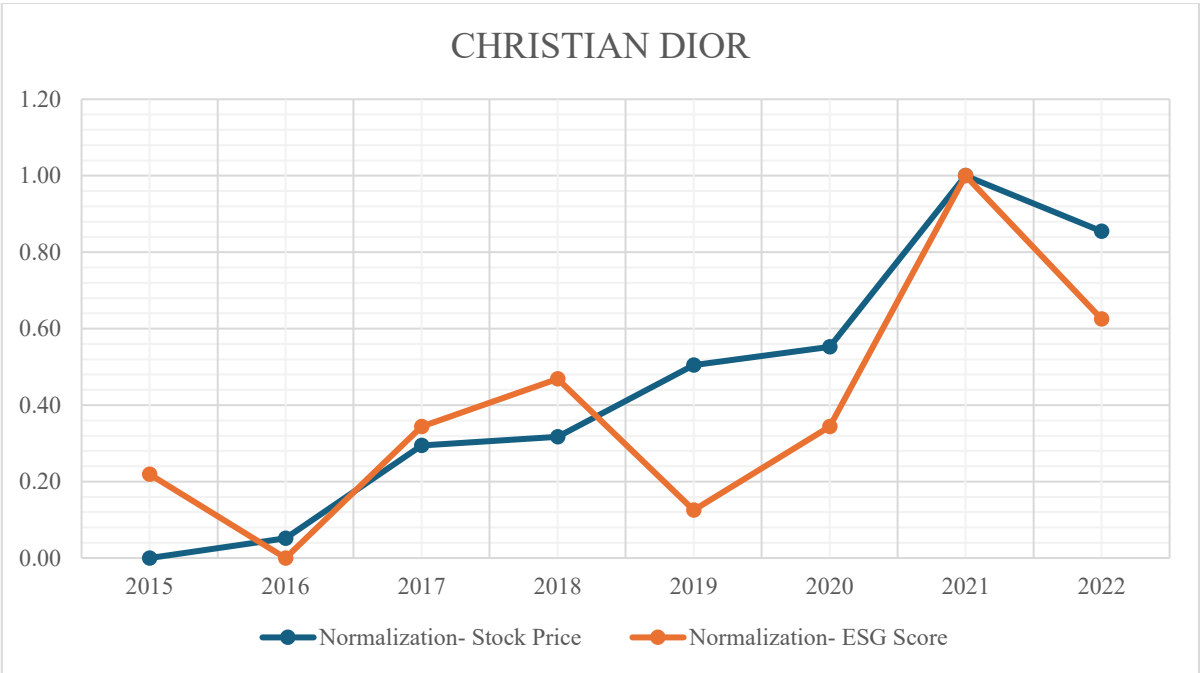


Figure 4. 12 Trends in Normalized ESG Scores and Stock Prices for CHRISTIAN DIOR

4.2.4. Trends in ESG scores and stock price for HERMÈS

By evaluating the ESG and stock price charts of HERMÈS, it is evident that the stock price consistently increased gradually until 2020, followed by a significant jump, and then a slight decline between 2021 and 2022. The ESG graph showed a gradual upward trend until 2018, after which it sharply increased, despite two minor reductions between 2017-2018 and 2021-2022. Overall, both graphs exhibited an increasing trend during the study period.

HERMÈS				
Time History	Currency: EUR		Abbreviation: RMS	
	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	314.50	1.48	0.00	0.00
2016	390.00	1.50	0.06	0.01
2017	446.25	1.70	0.11	0.11
2018	484.80	1.65	0.14	0.09
2019	666.20	2.40	0.29	0.46
2020	879.60	2.60	0.46	0.56
2021	1536.00	3.48	1.00	1.00
2022	1445.00	3.45	0.93	0.99

Table 4. 13 Normalized ESG Scores and Stock Prices of HERMES

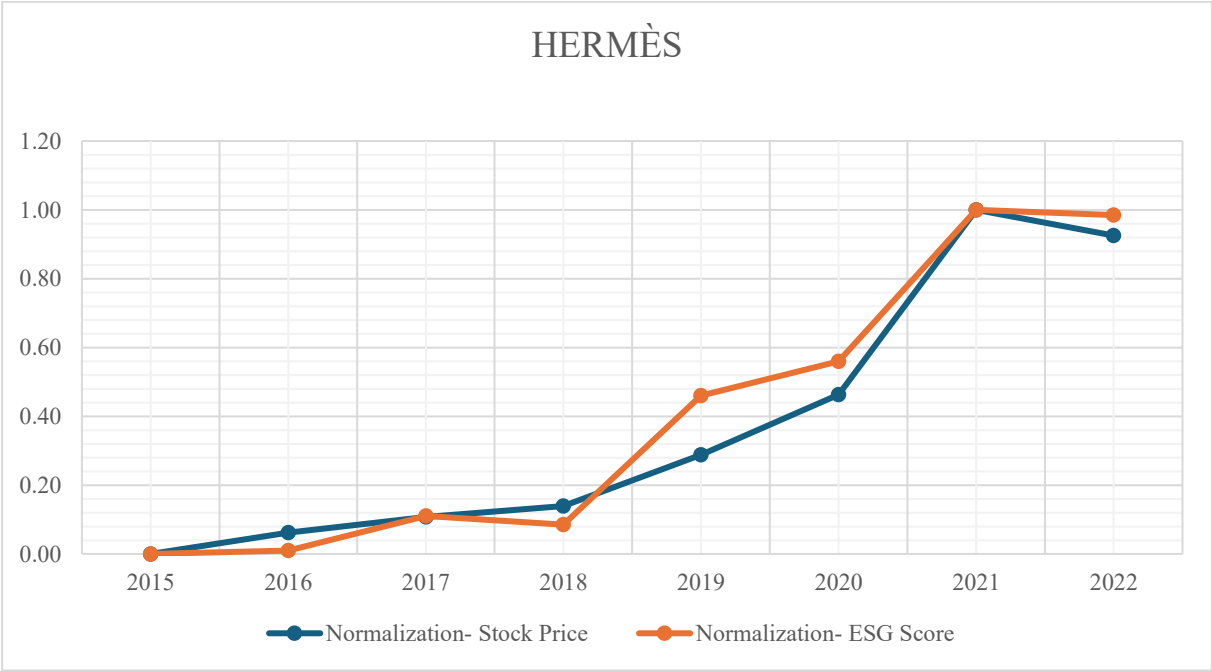


Figure 4. 13 Trends in Normalized ESG Scores and Stock Prices for HERMES

4.2.5. Trends in ESG scores and stock price for PRADA

Analysing Prada's ESG graphs reveals a consistent and gentle upward trend from 2015 to 2020, followed by a significant jump and a small reduction between 2021 and 2022. In contrast, the stock price fluctuated from 2015 to 2019, then surged suddenly, followed by a considerable reduction between 2020 and 2022. Overall, both graphs show significant increases during these years.

PRADA				
	Currency: USD		Abbreviation: PRDSF	
Time History	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	3.00	1.90	0.00	0.00
2016	3.63	2.08	0.16	0.06
2017	3.29	2.14	0.07	0.08
2018	3.23	2.13	0.06	0.08
2019	3.50	2.14	0.13	0.08
2020	6.90	2.25	1.00	0.12
2021	6.29	4.89	0.84	1.00
2022	5.50	4.84	0.64	0.98

Table 4. 14 Normalized ESG Scores and Stock Prices of PRADA

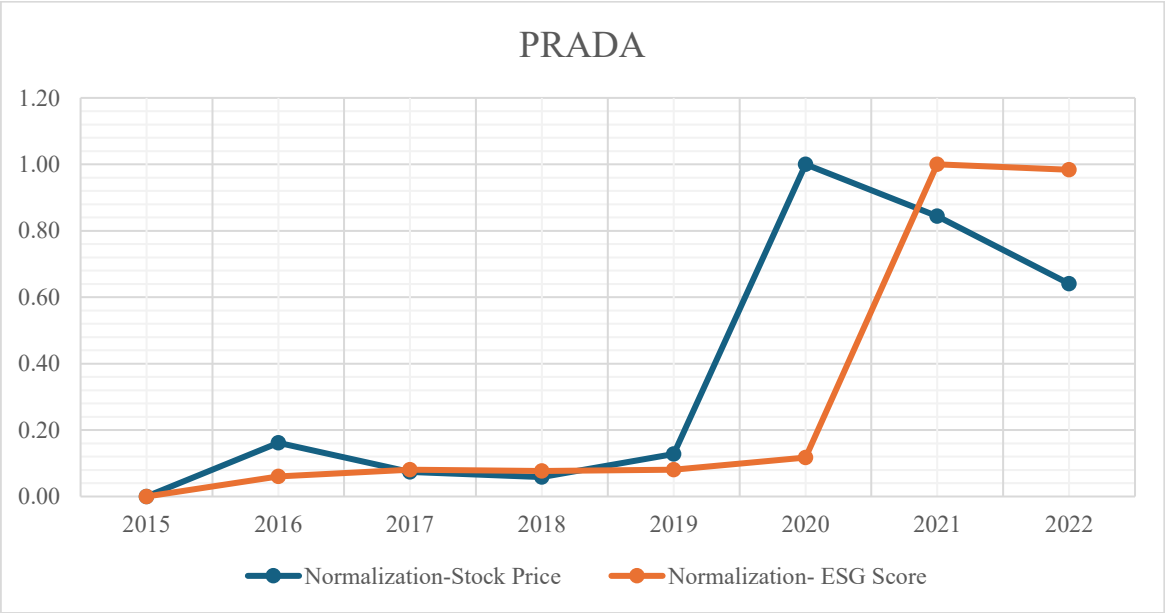


Figure 4. 14 Trends in Normalized ESG Scores and Stock Prices for PRADA

4.2.6. Trends in ESG scores and stock price for MONCLER

A detailed evaluation of the ESG and stock price graphs of MONCLER shows that the ESG scores consistently increased, except between 2018 and 2019. Likewise, the stock price generally rose, apart from a significant decline between 2021 and 2022. Overall, both the ESG score and stock price saw substantial increases from 2015 to 2022.

MONCLER				
	Currency: EUR		Abbreviation: MOV	
Time History	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	12.87	1.29	0.00	0.00
2016	16.52	1.63	0.07	0.14
2017	26.12	1.79	0.26	0.21
2018	28.77	1.89	0.31	0.25
2019	40.53	1.90	0.53	0.25
2020	50.16	2.28	0.72	0.41
2021	64.62	3.16	1.00	0.77
2022	49.66	3.72	0.71	1.00

Table 4. 15 Normalized ESG Scores and Stock Prices of MONCLER

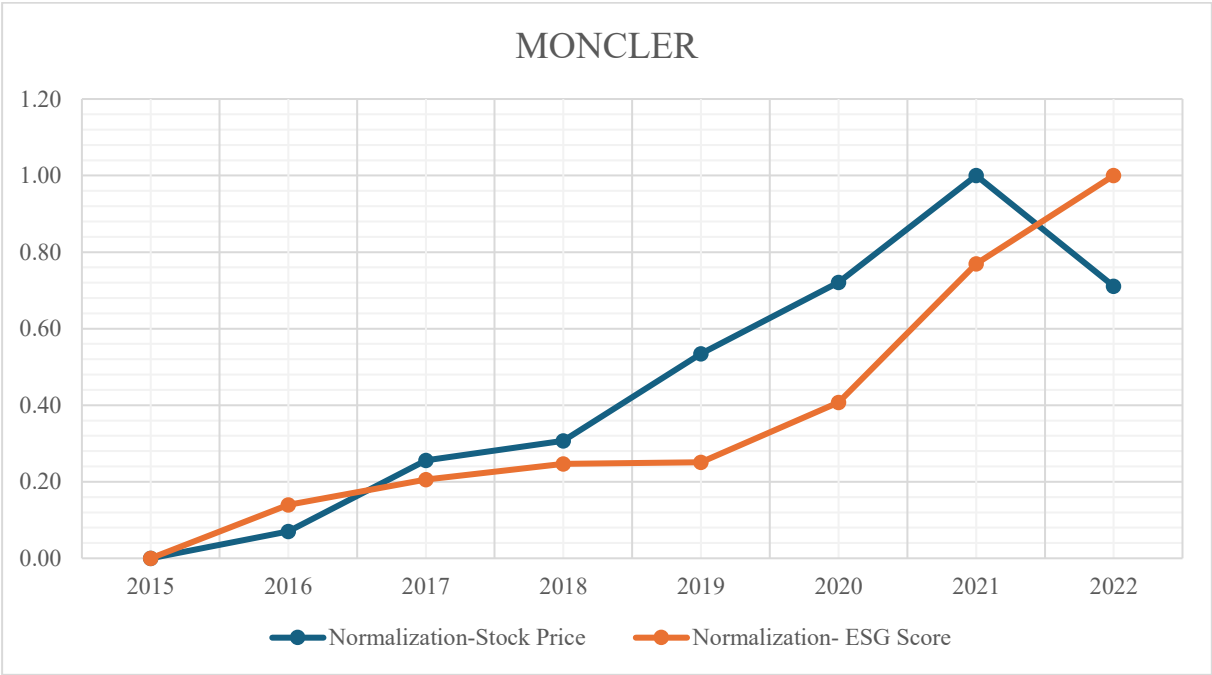


Figure 4. 15 Trends in Normalized ESG Scores and Stock Prices for MONCLER

4.2.7. Trends in ESG scores and stock price for SALVATORE FERRAGAMO

Analysing SALVATORE FERRAGAMO'S graphs reveals that the ESG score consistently followed an upward trend, except for a decline from 2020 to 2021. In contrast, the stock price experienced significant fluctuations over the eight years, ultimately reaching its lowest value in 2022. Overall, the ESG score achieved its highest level during this period, while the stock price dropped to its lowest point.

SALVATORE FERRAGAMO				
Time History	Currency: USD		Abbreviation: SFRGY	
	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	11.29	1.96	0.59	0.03
2016	11.10	1.85	0.55	0.00
2017	12.60	1.98	0.88	0.04
2018	10.44	2.32	0.40	0.15
2019	10.74	3.07	0.47	0.39
2020	10.00	4.08	0.31	0.71
2021	13.14	4.00	1.00	0.68
2022	8.61	5.01	0.00	1.00

Table 4. 16 Normalized ESG Scores and Stock Prices of SALVATORE FERRAGAMO

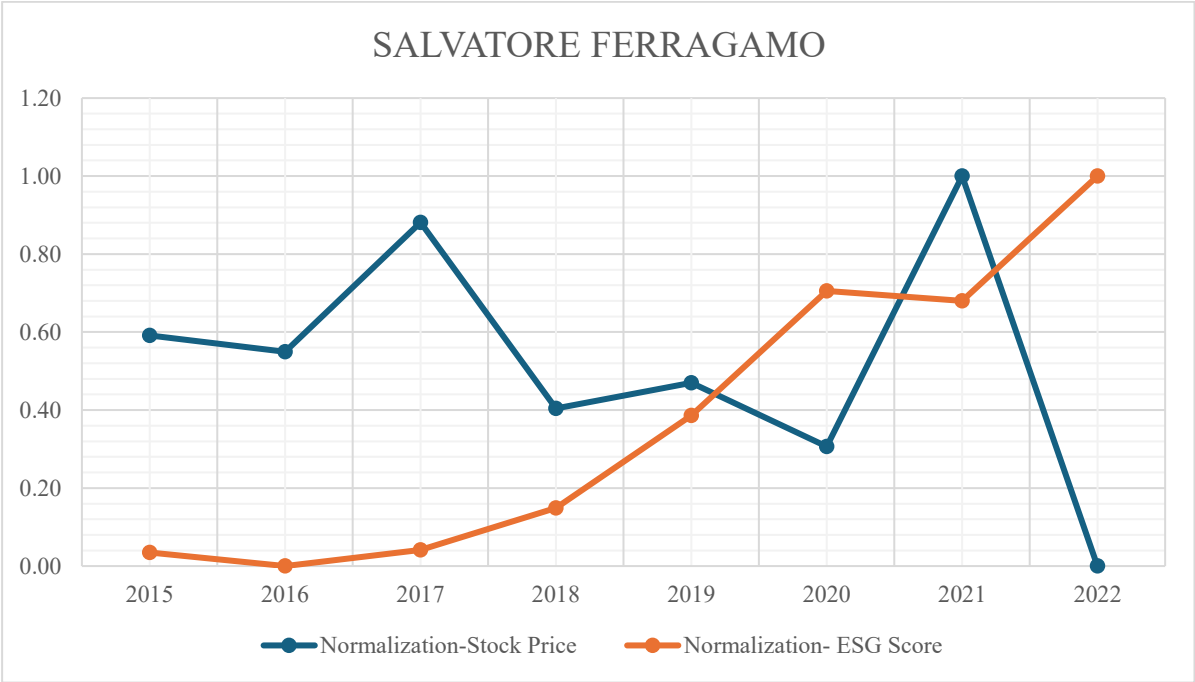


Figure 4. 16 Trends in Normalized ESG Scores and Stock Prices for SALVATORE F.

4.2.8. Trends in ESG scores and stock price for HUGO BOSS

The analysis of the ESG and stock price charts for Hugo Boss Company reveals distinct patterns in the two graphs. The ESG score began at its lowest value in 2015, jumped between 2017 and 2019, and then remained stable. In contrast, the stock price fluctuated, hitting its lowest point in 2020, and continued to fluctuate thereafter.

HUGO BOSS				
	Currency: USD		Abbreviation: BOSSY	
Time History	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	16.92	2.74	0.99	0.00
2016	12.13	2.98	0.51	0.07
2017	16.98	3.66	1.00	0.26
2018	12.21	5.38	0.52	0.75
2019	9.58	6.16	0.26	0.98
2020	7.00	6.18	0.00	0.98
2021	11.97	6.24	0.50	1.00
2022	11.59	6.24	0.46	1.00

Table 4. 17 Normalized ESG Scores and Stock Prices of HUGO BOSS

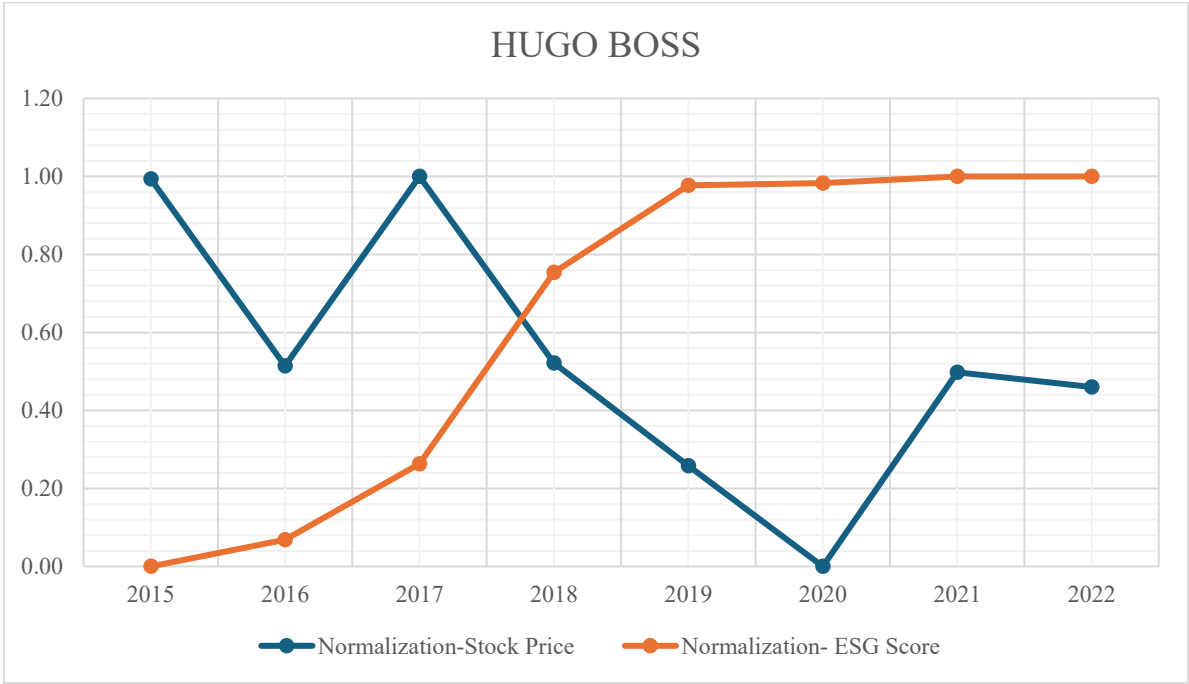


Figure 4. 17 Trends in Normalized ESG Scores and Stock Prices for HUGO BOSS

4.2.9. Trends in ESG scores and stock price for RALPH LAUREN

Ralph's graphs show that the company's ESG scores steadily improved from 2015 to 2019, and then a sharp surge happened between 2019 and 2021. The stock price graph shows a fluctuating trend during these years. Generally, the ESG score has experienced an increase from its lowest value to its highest one, while the stock price showed a swing pattern.

RALPH LAUREN				
	Currency: USD		Abbreviation: RL	
Time History	Stock Price	ESG Score	Normalization of Stock Price	Normalization of ESG Score
2015	111.48	1.74	0.74	0.00
2016	90.32	1.83	0.00	0.04
2017	103.69	1.89	0.47	0.06
2018	103.46	1.93	0.46	0.08
2019	117.22	1.97	0.94	0.10
2020	103.74	3.46	0.47	0.73
2021	118.86	4.10	1.00	1.00
2022	105.67	4.07	0.54	0.99

Table 4. 18 Normalized ESG Scores and Stock Prices of RALPH LAUREN

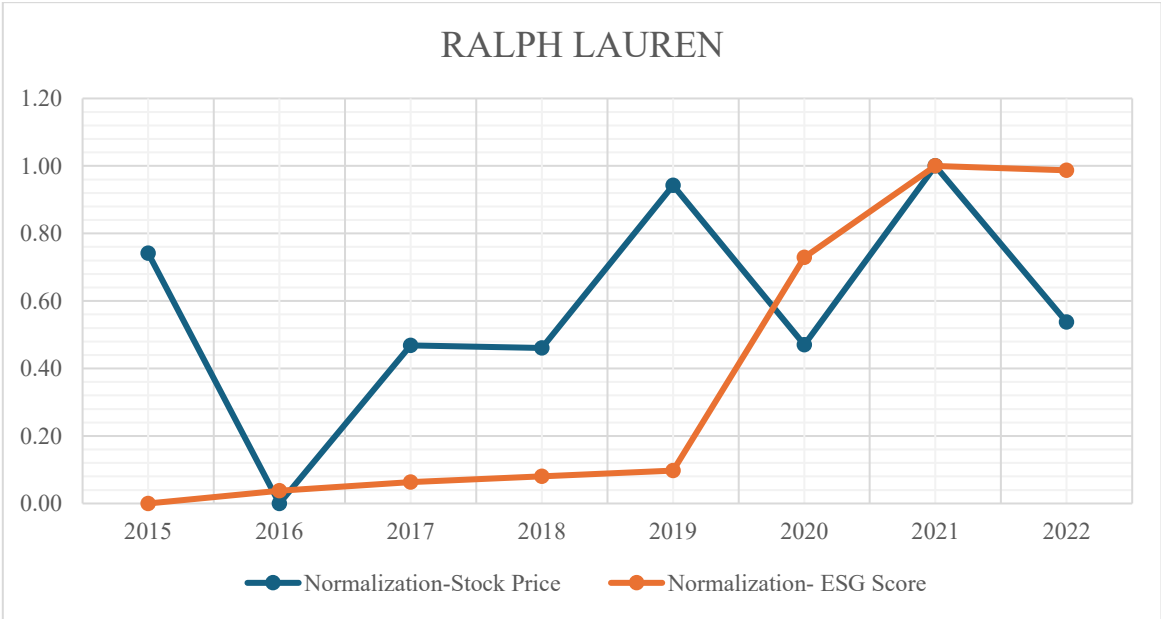


Figure 4. 18 Trends in Normalized ESG Scores and Stock Prices for RALPH LAUREN

4.3. Cluster Analysis

In the section of clustering companies based on their ESG performance, we went through the following process:

Our dataset is the historical ESG score of the companies from 2015 to 2022 which is shown in the table below:

Total ESG Scores								
Year	2015	2016	2017	2018	2019	2020	2021	2022
LVMH	2.03	2.19	2.41	2.44	3.01	3.99	4.11	4.1
Burberry	2.02	2.23	2.23	2.35	2.87	3.61	4.11	4.76
Christian Dior	2.07	2	2.11	2.15	2.04	2.11	2.32	2.2
Hermes	1.48	1.5	1.7	1.65	2.4	2.6	3.48	3.45
Prada	1.9	2.08	2.14	2.13	2.14	2.25	4.89	4.84
Moncler	1.29	1.63	1.79	1.89	1.9	2.28	3.16	3.72
Salvatore Ferragamo	1.96	1.85	1.98	2.32	3.07	4.08	4	5.01
Hugo Boss	2.74	2.98	3.66	5.38	6.16	6.18	6.24	6.24
Ralph Lauren	1.74	1.83	1.89	1.93	1.97	3.46	4.1	4.07

Table 4. 19 Historical ESG scores of the companies

Initially, to normalize the data, we computed the relative change of yearly ESG scores for each company individually to measure the percentage change from one period to another, using the following formula:

$$Relative\ Change = \frac{ESG\ Rate_{2016} - ESG\ Rate_{2015}}{ESG\ Rate_{2015}}$$

With this calculation, instead of absolute values, the focus will be on the growth or decline of the company's performance. By expressing the change as a percentage, it allows for a more intuitive comparison between companies, regardless of their initial ESG scores. In the sense that a business that started off with a low score and made considerable improvement will have a high percentage change, signifying progress.

The table below indicates the results, in which each of the scores represents the normalized variation of the ESG scores of each company during these years.

Normalized ESG scores	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
LVMH	0.08	0.10	0.01	0.23	0.33	0.03	0.00
Burberry	0.10	0.00	0.05	0.22	0.26	0.14	0.16
Christian Dior	-0.03	0.05	0.02	-0.05	0.03	0.10	-0.05
Hermes	0.01	0.13	-0.03	0.45	0.08	0.34	-0.01
Prada	0.09	0.03	0.00	0.00	0.05	1.17	-0.01
Moncler	0.26	0.10	0.06	0.01	0.20	0.39	0.18
Salvatore Ferragamo	-0.06	0.07	0.17	0.32	0.33	-0.02	0.25
Hugo Boss	0.09	0.23	0.47	0.14	0.00	0.01	0.00
Ralph Lauren	0.05	0.03	0.02	0.02	0.76	0.18	-0.01

Table 4. 20 Normalized ESG score table

As the next step, we calculated the Pearson correlation between the ESG performance changes of the companies, to group the most correlated companies together in the same cluster.

The Pearson correlation is a measure of how well two variables are related, and the result of the formula is a value in the range of -1 and 1, where 1 and -1 show respectively the most positive relationship and the most negative relationship, and zero indicates no relationship between the variables. The Pearson correlation is calculated among the formula:

$$r_{xy} = \frac{n(\sum ESG_i * ESG_j) - (\sum ESG_i)(\sum ESG_j)}{\sqrt{n(\sum ESG_i^2) - (\sum ESG_i)^2} * \sqrt{(\sum ESG_j^2) - (\sum ESG_j)^2}}$$

Where r is the Pearson correlation coefficient, n is the number of the years (8). “i” and “j” are the two companies which we are calculating the correlation between them (Statistics, 2024).

According to the table and the scatter chart below Prada and Moncler with the correlation almost near to 0.8 have the strongest correlation between the companies based on their ESG performance.

	<i>Companies</i>	<i>Correlations</i>		<i>Companies</i>	<i>Correlations</i>
1	LVMH & Burberry	0.6684	19	Christian Dior & Salvatore Ferragamo	-0.4199
2	LVMH & Christian Dior	-0.0860	20	Christian Dior & Hugo Boss	0.0485
3	LVMH & Hermes	0.3284	21	Christian Dior & Ralph Lauren	0.3242
4	LVMH & Prada	-0.2678	22	Hermes & Prada	0.4591
5	LVMH & Moncler	-0.2322	23	Hermes & Moncler	-0.0082
6	LVMH & Salvatore Ferragamo	0.5732	24	Hermes & Salvatore Ferragamo	0.0993
7	LVMH & Hugo Boss	-0.2935	25	Hermes & Hugo Boss	-0.2469
8	LVMH & Ralph Lauren	0.7354	26	Hermes & Ralph Lauren	-0.0344
9	Burberry & Christian Dior	-0.2754	27	Prada & Moncler	0.7825
10	Burberry & Hermes	0.3566	28	Prada & Salvatore Ferragamo	-0.5187
11	Burberry & Prada	0.0315	29	Prada & Hugo Boss	-0.3416
12	Burberry & Moncler	0.1012	30	Prada & Ralph Lauren	0.0761
13	Burberry & Salvatore Ferragamo	0.6327	31	Moncler & Salvatore Ferragamo	-0.5995
14	Burberry & Hugo Boss	-0.6418	32	Moncler & Hugo Boss	-0.6132
15	Burberry & Ralph Lauren	0.6085	33	Moncler & Ralph Lauren	0.2703
16	Christian Dior & Hermes	0.1638	34	Salvatore Ferragamo & Hugo Boss	-0.0439
17	Christian Dior & Prada	0.7139	35	Salvatore Ferragamo & Ralph Lauren	0.3601
18	Christian Dior & Moncler	0.5022	36	Hugo Boss & Ralph Lauren	-0.4084

Table 4. 21 The table of correlation between the companies

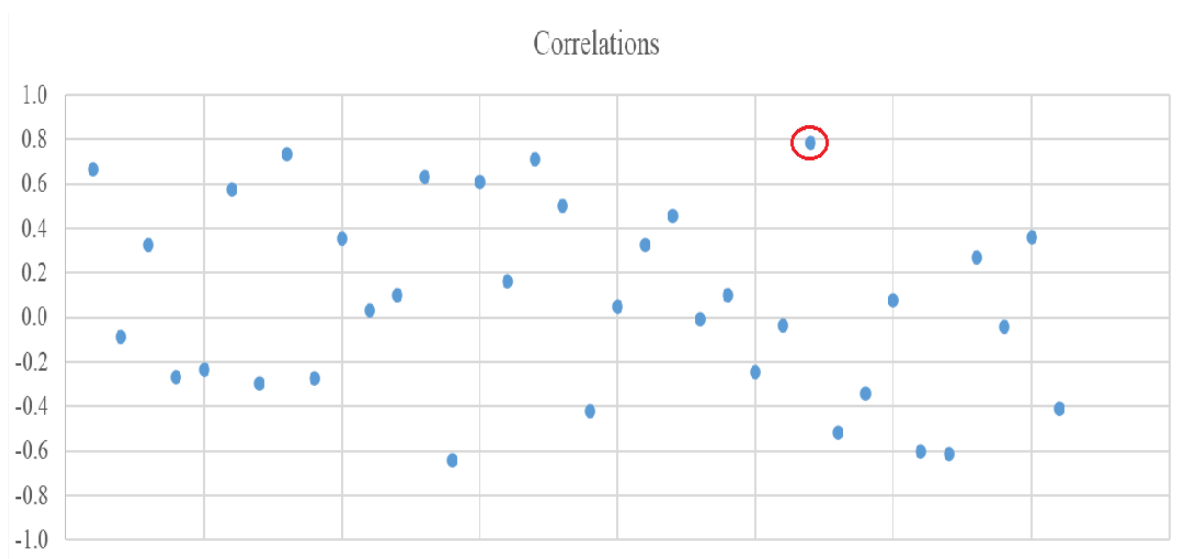


Figure 4. 19 Scatter chart of Correlation Coefficients of Initial Brand Pairs

So, Prada and Moncler were placed in “Group A” and the value of this group was determined by the average score of these two companies:

	LVMH	Burberry	Christian Dior	Hermes	PRADA & MONCLER (Group A)	Salvatore Ferragamo	Hugo Boss	Ralph Lauren
2015-2016	0.08	0.10	-0.03	0.01	0.18	-0.06	0.09	0.05
2016-2017	0.10	0.00	0.05	0.13	0.07	0.07	0.23	0.03
2017-2018	0.01	0.05	0.02	-0.03	0.03	0.17	0.47	0.02
2018-2019	0.23	0.22	-0.05	0.45	0.01	0.32	0.14	0.02
2019-2020	0.33	0.26	0.03	0.08	0.13	0.33	0.00	0.76
2020-2021	0.03	0.14	0.10	0.34	0.78	-0.02	0.01	0.18
2021-2022	0.00	0.16	-0.05	-0.01	0.09	0.25	0.00	-0.01

Table 4. 22 Updated normalized ESG score table

Again, the correlation between the changes of ESG of the remained companies with group A was recalculated by the same formula and the results are indicated below, as the result shows that LVMH and Ralph Lauren with correlation 0.7354 were placed as “Group B”:

	Companies	Correlations		Companies	Correlations
1	LVMH & Burberry	0.6684	15	Christian Dior & Group A	0.6925
2	LVMH & Christian Dior	-0.0860	16	Christian Dior & Salvatore Ferragamo	-0.4199
3	LVMH & Hermes	0.3284	17	Christian Dior & Hugo Boss	0.04851
4	LVMH & Group A	-0.2702	18	Christian Dior & Ralph Lauren	0.3242
5	LVMH & Salvatore Ferragamo	0.5732	19	Hermes & Group A	0.3662
6	LVMH & Hugo Boss	-0.2935	20	Hermes & Salvatore Ferragamo	0.0993
7	LVMH & Ralph Lauren	0.7354	21	Hermes & Hugo Boss	-0.2469
8	Burberry & Christian Dior	-0.2754	22	Hermes & Ralph Lauren	-0.0344
9	Burberry & Hermes	0.3566	23	Group A & Salvatore Ferragamo	-0.5591
10	Burberry & Group A	0.0495	24	Group A & Hugo Boss	-0.4204
11	Burberry & Salvatore Ferragamo	0.6327	25	Group A & Ralph Lauren	0.1256
12	Burberry & Hugo Boss	-0.6418	26	Salvatore Ferragamo & Hugo Boss	-0.0439
13	Burberry & Ralph Lauren	0.6085	27	Salvatore Ferragamo & Ralph Lauren	0.3601
14	Christian Dior & Hermes	0.1638	28	Hugo Boss & Ralph Lauren	-0.4084

Table 4. 23 The correlations table

Correlations

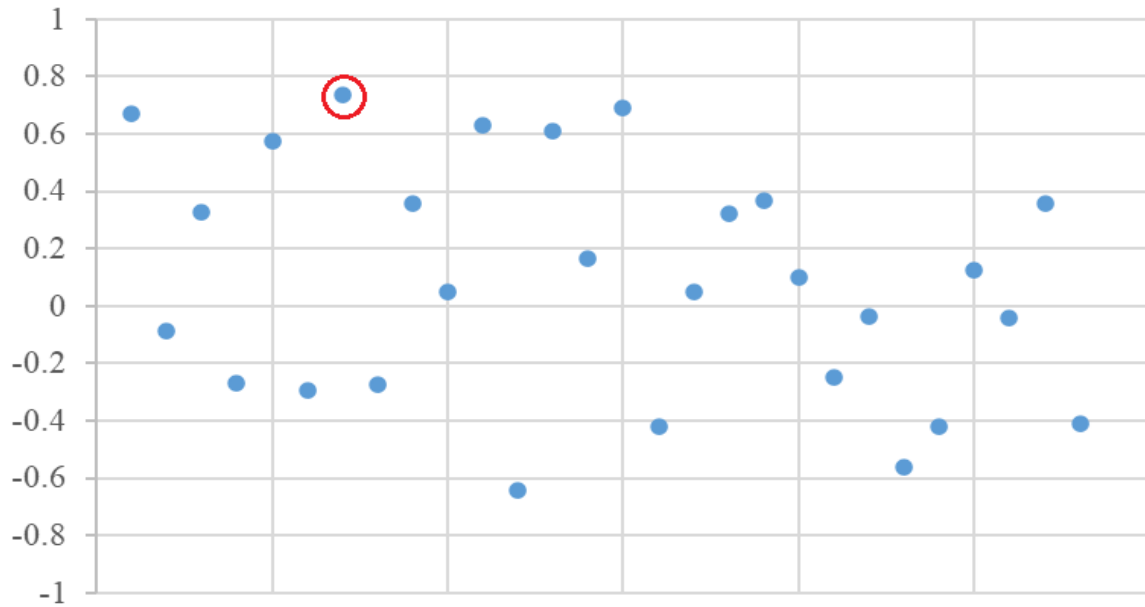


Figure 4. 20 Scatter chart of Correlation Coefficients After First Grouping

we kept going through this procedure, grouping two businesses that were highly connected each time, until all the brands were grouped. The brands in these groups had correlations that were either high or moderate. we set a criterion for correlation using coefficients greater than 0.3. Below are the relevant tables and graphs, along with a description of each computing step:

	LVMH & RALPH LAUREN (Group B)	Burberry	Christian Dior	Hermes	PRADA & MONCLER (Group A)	Salvatore Ferragamo	Hugo Boss
2015-2016	0.065	0.1	-0.03	0.01	0.175	-0.06	0.09
2016-2017	0.065	0	0.05	0.13	0.065	0.07	0.23
2017-2018	0.015	0.05	0.02	-0.03	0.03	0.17	0.47
2018-2019	0.125	0.22	-0.05	0.45	0.005	0.32	0.14
2019-2020	0.545	0.26	0.03	0.08	0.125	0.33	0
2020-2021	0.105	0.14	0.1	0.34	0.78	-0.02	0.01
2021-2022	-0.005	0.16	-0.05	-0.01	0.085	0.25	0

Table 4. 24 Updated normalized ESG score table

	Company	Correlation		Company	Correlation
1	Group B & Berberry	0.6659	12	Christian Dior & Hermes	0.1638
2	Group B & Dior	0.2092	13	Christian Dior & Group A	0.6925
3	Group B & Hermes	0.0830	14	Christian Dior & Salvatore Ferragamo	-0.4199
4	Group B & Group A	0.0030	15	Christian Dior & Hugo Boss	0.0485
5	Group B & Salvatore	0.4526	16	Hermes & Group A	0.3662
6	Group B & Hugo Boss	-0.3959	17	Hermes & Salvatore Ferragamo	0.0993
7	Burberry & Christian Dior	-0.2754	18	Hermes & Hugo Boss	-0.2469
8	Burberry & Hermes	0.3566	19	Group A & Salvatore Ferragamo	-0.5591
9	Burberry & Group A	-0.3430	20	Group A & Hugo Boss	-0.4204
10	Burberry & Salvatore Ferragamo	0.6327	21	Salvatore Ferragamo & Hugo Boss	-0.0439
11	Burberry & Hugo Boss	-0.6418			

Table 4. 25 Updated Correlation Coefficients

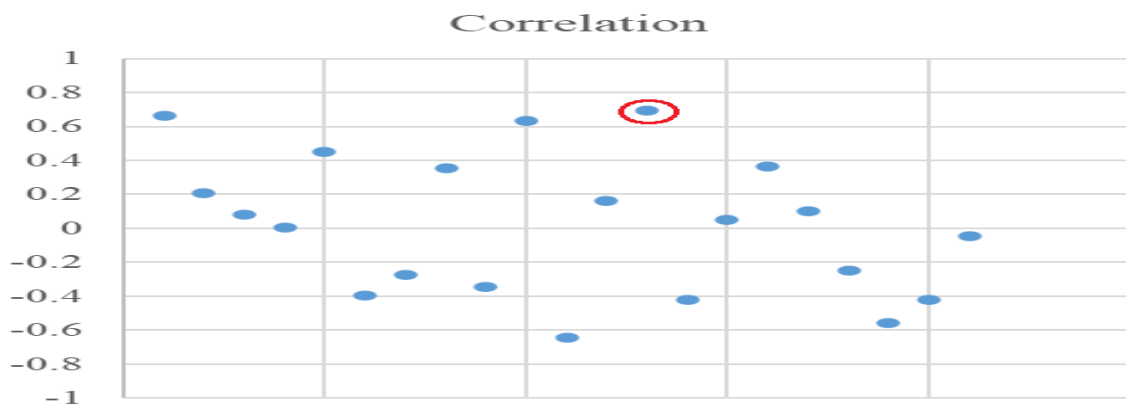


Figure 4. 21 Scatter chart of Correlation Coefficients After Second Grouping

It is obvious that Christian Dior belongs to Group A and has the highest correlation with Prada and Moncler, and our ESG score table will be updated as shown below.

	LVMH & RALPH LAUREN (Group B)	Burberry	Hermes	PRADA & MONCLER & DIOR (Group A)	Salvatore Ferragamo	Hugo Boss
2015-2016	0.065	0.1	0.01	0.0725	-0.06	0.09
2016-2017	0.065	0	0.13	0.0575	0.07	0.23
2017-2018	0.015	0.05	-0.03	0.025	0.17	0.47
2018-2019	0.125	0.22	0.45	-0.0225	0.32	0.14
2019-2020	0.545	0.26	0.08	0.0775	0.33	0
2020-2021	0.105	0.14	0.34	0.44	-0.02	0.01
2021-2022	-0.005	0.16	-0.01	0.0175	0.25	0

Table 4. 26 Updated normalized ESG score table

	Company	Correlation		Company	Correlation
1	Group B & Burberry	0.6659	9	Burberry & Group A	-0.0068
2	Group B & Hermes	0.0830	10	Hermes & Group A	0.3469
3	Group B & Group A	0.0404	11	Hermes & Salvatore Ferragamo	0.0993
4	Group B & Salvatore	0.4526	12	Hermes & Hugo Boss	-0.2469
5	Group B & Hugo Boss	-0.3959	13	Group A & Salvatore Ferragamo	-0.5603
6	Burberry & Hermes	0.3566	14	Group A & Hugo Boss	-0.3556
7	Burberry & Salvatore Ferragamo	0.6327	15	Salvatore Ferragamo & Hugo Boss	-0.0439
8	Burberry & Hugo Boss	-0.6418			

Table 4. 27 Updated Correlation Coefficients

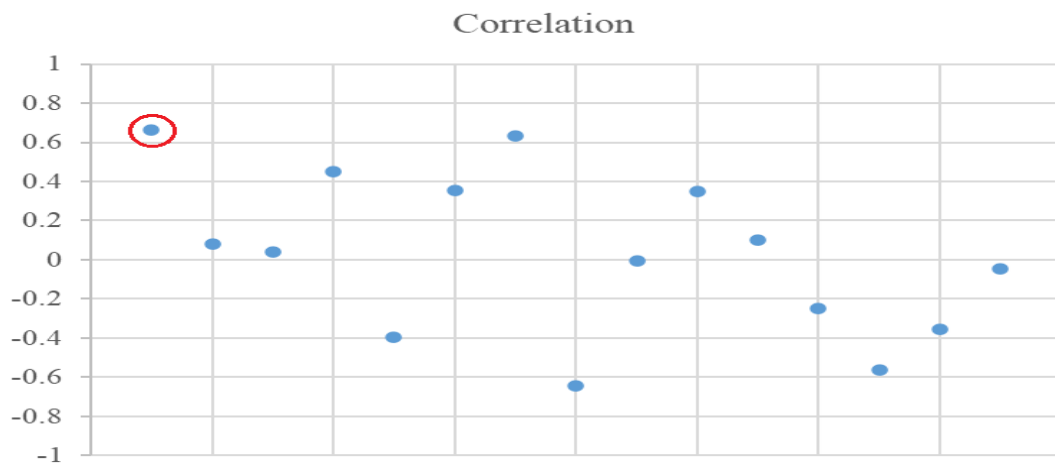


Figure 4. 22 The scatter chart of the correlation coefficient After third Grouping

Based on the computations above, Burberry has a strong link with LVMH and Ralph Lauren, placing it in the same group as those companies. And the correlation will be calculated again according to the table below.

	LVMH & RALPH LAUREN & BURBERRY (Group B)	Hermes	PRADA & MONCLER & DIOR (Group A)	Salvatore Ferragamo	Hugo Boss
2015-2016	0.0825	0.01	0.0725	-0.06	0.09
2016-2017	0.0325	0.13	0.0575	0.07	0.23
2017-2018	0.0325	-0.03	0.025	0.17	0.47
2018-2019	0.1725	0.45	-0.0225	0.32	0.14
2019-2020	0.4025	0.08	0.0775	0.33	0
2020-2021	0.1225	0.34	0.44	-0.02	0.01
2021-2022	0.0775	-0.01	0.0175	0.25	0

Table 4. 28 Updated normalized ESG score table

	<i>Company</i>	<i>Correlation</i>
1	Group B & Hermes	0.1869
2	Group B & Group A	0.0270
3	Group B & Salvatore	0.5538
4	Group B & Hugo Boss	-0.5157
5	Hermes & Group A	0.3469
6	Hermes & Salvatore Ferragamo	0.0993
7	Hermes & Hugo Boss	-0.2469
8	Group A & Salvatore Ferragamo	-0.5603
9	Group A & Hugo Boss	-0.3556
10	Salvatore Ferragamo & Hugo Boss	-0.0439

Table 4. 29 Updated Correlation Coefficients

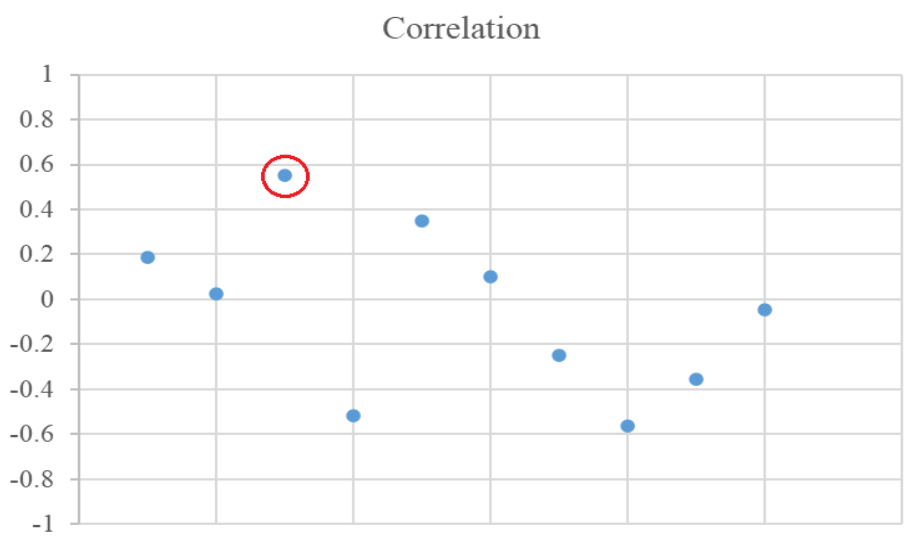


Figure 4. 23 The scatter chart of the correlation coefficient After fourth Grouping

The calculations above classify Salvatore Ferragamo as a member of this group due to its almost significant link with the brands in group B. In the following steps, we repeated the process with the existing groups and categorized Hermes into Group A. Hermes showed a moderate correlation with both groups, but it was more strongly correlated with Group A (0.3469) than with Group B (0.1569).

	LVMH & RALPH LAUREN & BURBERRY & SALVATORE FERRAGAMO (Group B)	Hermes	PRADA & MONCLER & DIOR (Group A)	Hugo Boss
2015-2016	0.01125	0.01	0.0725	0.09
2016-2017	0.05125	0.13	0.0575	0.23
2017-2018	0.10125	-0.03	0.025	0.47
2018-2019	0.24625	0.45	-0.0225	0.14
2019-2020	0.36625	0.08	0.0775	0
2020-2021	0.05125	0.34	0.44	0.01
2021-2022	0.16375	-0.01	0.0175	0

Table 4. 30 Updated normalized ESG score table

	<i>Company</i>	<i>Correlation</i>
1	Group B & Hermes	0.1569
2	Group B & Group A	-0.3362
3	Group B & Hugo Boss	-0.2895
4	Hermes & Group A	0.34689
5	Hermes & Hugo Boss	-0.2469
6	Group A & Hugo Boss	-0.3556

Table 4. 31 Updated Correlation Coefficients

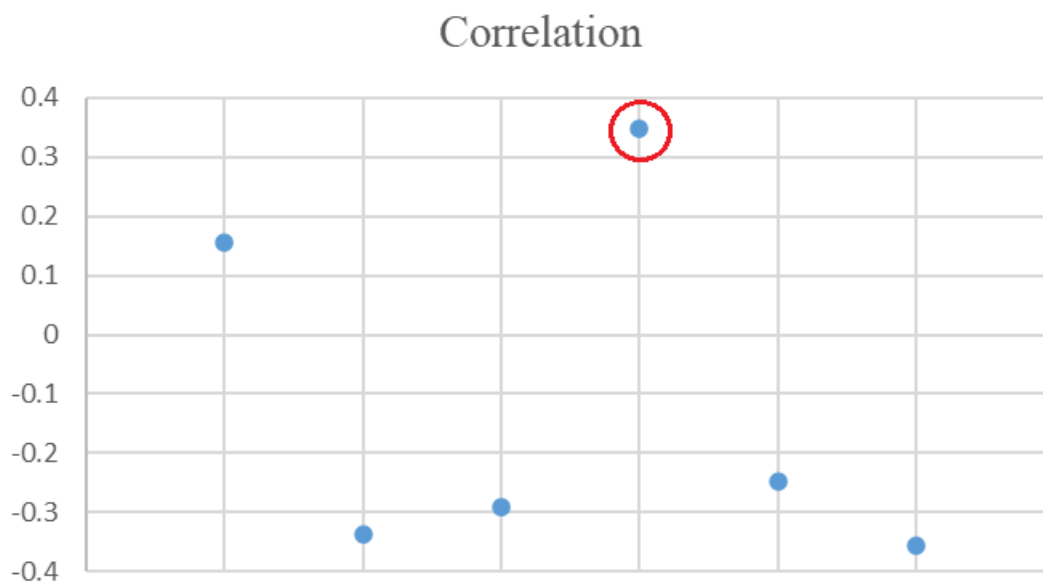


Figure 4. 24 The scatter chart of the correlation coefficient After fifth Grouping

we calculated Hugo Boss's correlation coefficient with Groups 1 and 2 as the last step of the computations. It was not categorized into any group because its association with every other brand was negative and below our predetermined level. we decided to treat it as an individual category.

It is noticeable that, also in the first part of this chapter, it was visible that the trend of its ESG and its individual criteria fluctuated a lot, and there was not any similarity in the trend of this brand with the other brands.

	LVMH & RALPH LAUREN & BURBERRY & SALVATORE FERRAGAMO (Group B)	PRADA & MONCLER & DIOR (Group A)	Hugo Boss (NOT PAIRED / Group C)
2015-2016	0.01125	0.04125	0.09
2016-2017	0.05125	0.09375	0.23
2017-2018	0.10125	-0.0025	0.47
2018-2019	0.24625	0.21375	0.14
2019-2020	0.36625	0.07875	0
2020-2021	0.05125	0.39	0.01
2021-2022	0.16375	0.00375	0

Table 4. 32 Updated normalized ESG score table

	Company	Correlation
1	Group B & Group A	-0.0825
2	Group B & Hugo Boss	-0.2895
3	Group A & Hugo Boss	-0.3605

Table 4. 33 Final Correlation Coefficients of Brand Groups

The result of our clustering of the companies, which is presented in the table below, displays the existence of three distinct groups consisting of brands with strong or moderate correlations based on ESG criteria.

Our companies were divided in 3 groups based on the correlation between the percentage of their ESG's movements in 8 years from 2015 to 2022	
Group A	PRADA & MONCLER & CHRISTIAN DIOR & HERMES
Group B	LVMH & RALPH LAUREN & BURBERRY & SALVATORE FERRAGAMO
Group C	Hugo Boss

Table 4. 34 The table of results of Cluster Analysis

Chapter 5: SUPERVISED DATA ANALYSIS

In the final chapter, the linear regression model is performed and analysed. The results are discussed, and the conclusion and limitations of the research are presented.

5.1. Descriptive Statistics

The table below provides descriptive statistics (mean, standard deviation, minimum, and maximum) of our study variables. There is a vast range between the minimum and maximum stock prices between the companies, with an average of 208.36.

The mean ESG score is almost 2.9 out of 10 and ranges from 1.29 (the lowest score) to 6.24 (the highest score). The standard deviation of 0.15 indicates that ESG scores among the companies are relatively consistent and close to the mean, with little variation.

An average ROE of approximately 18.83% indicates good profitability for all the companies overall. In addition, a relatively low standard deviation shows that ROE values are fairly consistent across the companies, indicating that most companies have similar profitability levels. The wide range between -24.66 and 37.13 shows that although most companies are profitable, some have a negative ROE, reflecting potential financial challenges or losses.

The mean of total asset turnover is 0.86, which suggests that, on average, companies generate 0.86\$ in sales for every dollar of assets. The total asset turnover ratios among the companies are quite similar, as indicated by the low standard deviation (0.038), reflecting consistent operational efficiency. Despite this consistency, there is still a notable range, with a minimum of 0.39, which demonstrates the lowest efficiency, and a maximum achieved ratio of 1.69, which shows the highest efficiency between the studied companies.

The average board size is around 12 members, which aligns with common corporate governance practices. The low standard deviation (0.26) suggests uniform board sizes across companies,

with little variation. However, the board size ranges from 9 to 18 members, which reflects variation in corporate governance structures, but overall, they remain relatively consistent.

Variables	Mean	Standard Deviation	Minimum	Maximum
Stock Price	208.3611	38.2468	3.00	1536.00
ESG Score	2.8971	0.1502	1.29	6.24
ROE	18.8278	1.2950	-24.66	37.13
Total Asset Turnover	0.8629	0.0383	0.39	1.69
Board Size	11.9583	0.2635	9.00	18.00

Table 5. 1 Descriptive Statistics

5.2. Linear Regression Model

In this chapter, the multiple linear regression model selected to be used to determine whether market value is affected by the ESG score of the companies or not.

In this section, the stock price is considered the response variable to represent the market value. The ESG score of the sample companies is employed as the predictor variable. Additionally, Return on Equity (ROE), total asset turnover, and board size are included as control variables. ROE serves as a measure of the operational performance of the companies, total asset turnover is used as a financial ratio to assess the company’s efficiency, and board size accounts for the company’s size.

Return on Equity (ROE) is a crucial financial metric for assessing a company's profitability by evaluating its ability to generate profit from shareholders' equity. The formula to calculate the Return on Equity (ROE) is:

$$ROE = \frac{Net\ Income}{Shareholde's\ Equity} \times 100$$

ROE is a crucial financial metric for a company's financial health, indicating its efficiency in generating returns on equity and its ability to create value for shareholders. A higher ROE signifies the company is effectively utilizing its equity to generate profits, which is favourable for shareholders.

Total Asset Turnover is a financial statistic that assesses how well a business uses its resources to produce revenue. It shows how successfully the business is making use of all its resources to generate income. The formula to calculate Total Asset Turnover is:

$$Total\ Asset\ Turnover = \frac{Net\ Sales}{Average\ Total\ Assets}$$

A high Total Asset Turnover ratio indicates efficient asset utilization, while a low ratio suggests inefficiencies. Comparing the ratio over time or against industry benchmarks can provide insights into a company's operational efficiency and revenue generation effectiveness.

Board Size refers to the number of directors or members on a company's board of directors. The higher number of board members indicates a diverse and experienced board, potentially improving decision-making and governance. Board size impacts company governance and operations and can impact stock price positively or negatively. In general, the larger board size, the bigger the company is.

The regression equation takes the form:

$$Stock\ price = \beta_0 + \beta_1ESG + \beta_2ROE + \beta_3Total\ Asset\ Turnover + \beta_4Board\ Size + \varepsilon$$

Where:

- β_0 is the intercept
- $\beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients for each independent variable
- ε is the error term

The linear regression was done by excel, and the following output carried out:

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.619812127
R Square	0.384167072
Adjusted R Square	0.347400928
Standard Error	262.1706373
Observations	72

Table 5. 2 Model summary table

The fit of the regression model, or how well it can "fit" the dataset, is shown in the first part.

- Multiple R:

Multiple R is the square root of R-squared, which is the correlation coefficient and measures the strength of the linear relationship between the predictor variables and the response variable.

The degree to which the response variable and the predictor factors have a linear connection is measured. A multiple R of 0 denotes no linear relationship at all, whereas a multiple R of 1 denotes a perfect linear relationship. 0.6198 denotes a moderately positive relationship between the predictor variables and stock price as the response variable.

- R-squared:

R^2 is also known as the coefficient of determination, and it is the percentage that the predictor variable can account for in explaining the variation in the responder variable. R-squared values can vary from 0 to 1. A value of 0 means that there is no possible explanation of the response variable by the predictor variable. A value of 1 denotes that the predictor variable can accurately and completely explain the response variable. Here, R squared 0.3842 means that approximately 38.42% of the variance in stock prices can be explained by the model.

- Adjusted R Square:

This is a modified version of R-squared that has been adjusted for the number of predictors in the model. It is always lower than the R-squared. In our model, the adjusted R-squared is 0.347, slightly lower than R^2 , which shows that the model has a reasonably good fit.

- Standard Error:

It measures the average distance that the observed values fall from the regression line. In our model, the observed values fall an average of 262.1706 units from the regression line.

- Observations:

It just indicates the number of observations in our dataset, which is 72 (9 companies for 8 years). In the next section of our results, we can see the analysis of variance (ANOVA), which illustrates the degrees of freedom, the sum of squares, the mean squares, the F statistic, and the overall significance of the regression model:

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	2872765.219	718191.3049	10.44893538	1.22764E-06
Residual	67	4605140.685	68733.44306		
Total	71	7477905.905			

Table 5. 3 The ANOVA (Analysis of variance) table

Degree of Freedom (df):

The regression degree of freedom is the number of regression coefficients minus 1. Here, as we have 5 regression coefficients, the df will be $5-1=4$.

The total degree of freedom indicates the number of observations minus 1, which will be $72-1=71$.

Residual degree of freedom is equal to Total df (71)- regression df (4) = 67.

- The Sum of Squares:

It is calculated by subtracting the mean from all the values, squaring the differences, and adding them together. The divergence of data values from the mean value is measured by the sum of squares. Higher variability is indicated by a larger sum of squares, and a lesser deviation from the mean is shown by a smaller result.

- Mean Squares:

It is calculated by dividing the Sum of Squares by the degree of freedom.

- F statistics:

The f statistic, calculated using regression MS / residual MS, indicates the model's accuracy in fitting data, and its usefulness is determined by the statistical significance of predictor variables.

- Significance F:

The last value in the ANOVA table is “Significance of F” which is the p-value associated with the F statistic. If the p-value is less than the significance level, this indicates sufficient evidence to reject the null hypothesis, suggesting that the regression model provides a better fit to the data than a model with no predictor variables. This result is favourable as it implies that the predictor variables contribute to an improved fit of the model. Typically, the significance level is set at 0.05.

In this model, the F statistic of 10.4489 has an extremely low P-value (1.228E-06), which indicates the overall model is statistically significant at a high level of confidence.

The third section of the table provides the coefficient for each term in the regression model, and contains their standard error, t-statistics, P-value, and confidence intervals, which are testing the overall significance of our regression model.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-73.59375	196.68579	-0.37417	0.70946	-466.18023	318.99274
ESG SCORE	-1.66501	25.88418	-0.06433	0.94890	-53.33006	50.00004
ROE	12.34045	3.02724	4.07647	0.00012	6.29805	18.38284
TOTAL ASSET TURNOVER	-471.08578	98.04825	-4.80463	0.00001	-666.79091	-275.38065
BOARD SIZE	38.54577	14.19823	2.71483	0.00842	10.20599	66.88554

Table 5. 4 The Coefficients Table

- Coefficients

In the first column we can see the suitable coefficient for each variable, means that the estimated regression equation will be:

$$\begin{aligned} \text{Stock Price} = & -73.5937 - 1.665(\text{ESG Score}) + 12.3404(\text{ROE}) \\ & - 471.08578(\text{Total Asset Turnover}) + 38.5458(\text{Board Size}) \end{aligned}$$

Each coefficient represents the mean increase in the response variable corresponding to a one-unit increment in the specified predictor variable, while holding all other predictor variables constant.

- Standard Error, T stat

The uncertainty around each variable's estimated coefficient is measured by the standard error., and the coefficient divided by the standard error provides the t-statistic.

- P-value

The p-value for the t-statistic is displayed in the next column. This figure indicates whether a certain response variable is important in the model.

- Confidence Interval for Coefficient Estimates

The lower and upper bounds for a 95% confidence range for the coefficient estimates are given in the table's final two columns. These intervals provide us with a range that the real population parameter (coefficient) fits within with a reasonable degree of confidence.

The lower bound column denotes the minimum value of the confidence interval for the coefficient estimate, indicating the smallest probable value of the true coefficient at a specified confidence level, commonly 95%. Conversely, the upper bound column signifies the maximum

value of the confidence interval, indicating the largest probable value of the true coefficient with the same confidence level. This range helps to understand the precision and reliability of the coefficient estimate. A broader gap denotes greater uncertainty regarding the real value of the coefficient, whereas a narrower interval reflects a more accurate estimate.

Individual interpretation of each term

1) Intercept is interpreted as the expected average of stock price if all the other variables were zero. But here the intercept is negative which means that it does not have an obvious interpretation. In addition, it has a P-value of 0.7095 that indicated it is not significant.

2) ESG score: The coefficient is -1.665 and P-value 0.9489 which is much higher than the significance level (0.05) shows that it is not significant as a response variable in our model, indicating that the ESG score does not have a statistically significant impact on stock prices in this model.

3) ROE: The coefficient for the ROE is 12.340 with a p-value of 0.000123644, which is statistically significant at the high confidence level. This suggests that a one-unit increase in the ROE is associated with an average increase of 12.340 in the stock price, with the true effect likely ranging between 6.2980 and 18.3828 units, assuming all other predictor variables in the model are held constant.

4) Total Asset Turnover: The coefficient -471.0858 and the negligible P-value shows that there is highly significant negative coefficient, while the negative coefficient suggests a paradoxical relationship, which might require further investigation, or it could illustrate multicollinearity.

5) Board Size: Also, the results of the last control variable, board size, prove that it is statistically significant, and indicates a positive impact on stock price.

The fourth and last part of the results is the residual output of ESG scores, which helps in diagnosing the fit of our linear regression.

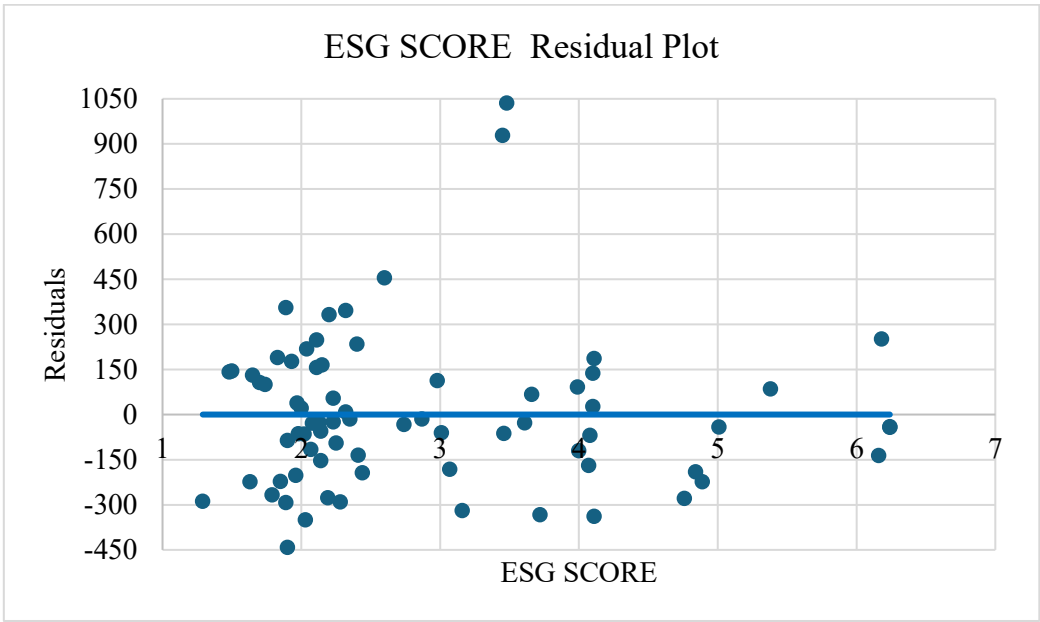


Figure 5. 1 Residual Plot for ESG Scores against Residuals

The y-axis of the graph above indicates the residuals, which are the difference between the observed stock prices and the predicted values from the linear regression, and the X-axis is the historical ESG scores of the companies. The distribution of the residuals both above and below the horizontal line suggests that the linear model is an appropriate model for our research.

In the plot, two residuals, 1036.48 and 929.29, are shown as outliers, which belong to Hermes Company in 2021 and 2022, respectively.

5.3. Results of linear regression model

The regression model reveals that while ROE and board size are significant predictors of stock prices, the ESG score does not demonstrate a statistically significant relationship with stock prices within our dataset. The overall model is significant, explaining approximately 38.42% of the variance in stock prices. However, the relatively high standard error and the insignificant

coefficient for ESG suggest that other factors may be more crucial in predicting stock prices. This finding implies that, within the context of this study, ESG disclosure may not have a direct impact on market valuation, highlighting the need for further research to explore the underlying dynamics and potential external influences on the relationship between ESG practices and market value. In particular, better standardized and more independent data is necessary to obtain more reliable conclusions.

5.4. Conclusion

This thesis has explored the impact of Environmental, Social, and Governance (ESG) scores on the market value of companies within the luxury fashion industry. Through a comprehensive analysis of nine prominent brands: LVMH, Burberry, Dior, Hermes, Prada, Moncler, Salvatore Ferragamo, Hugo Boss, and Ralph Lauren over an eight-year period, we have investigated the relationship between ESG practices and stock performance. The results have shown that although the model is statistically significant, ESG scores do not directly affect the stock price.

The data indicated that social metrics remained relatively constant for most companies, while environmental metrics greatly improved after 2018, and governance measurements were usually stable and showed good ratings. These patterns imply that luxury fashion companies are progressively improving their environmental responsibility.

5.5. Limitations and Implications

Although numerous reasons might be blame for the lack of obvious correlation between ESG ranking and stock price, we mention the most important limitations that we faced to during our research. The first and most important limitation was lack of ESG data as the result of the voluntary nature of ESG reporting and the lack of mandatory requirements contribute to the quality and availability of the data.

Secondly is the lack of predetermined criteria for ESG reporting, which makes the ESG reports unreliable and inconstant. As the companies are free to customise disclosures to suit their own objectives, they can prepare the reports to disguising their true sustainability policies, which is called greenwashing. The accuracy of ESG data is compromised by this variability, which also makes determining its actual influence on financial performance more difficult.

Bibliography

1. Admin. (2021). *Prada designer products*, <https://lifeinitaly.com/prada-designer-products/>. Life in Italy.
2. BBC NEWS. (2018, july). *Burberry burns bags, clothes and perfume worth millions*. Retrieved from <https://www.bbc.com/news/business-44885983>
3. BBC News. (2018). *Burberry stops burning unsold goods and using real fur*, <https://www.bbc.com/news/business-45430683>, 6 Sep 2018. BBC News.
4. Biography.com Editors- Christian Dior. (2021). *Christian Dior Biography*. Retrieved from The Biography.com website, Publisher: A&E; Television Networks: <https://www.biography.com/history-culture/christian-dior>
5. Biography.com Editors- Ralph Lauren. (2021). *Ralph Lauren Biography*. Retrieved from The Biography.com website, Publisher: A&E; Television Networks: <https://www.biography.com/history-culture/ralph-lauren>
6. Bloomberg. (2024, 06). *Global Roles Bloomberg*, Retrieved 08/06/2024. Retrieved from <https://www.bloomberg.com/company/careers/global-roles/>
7. Bloomberg Terminal. (2023). *Environmental, Social and Governance (ESG) Scores, Methodology and Field Information*, Retrieved 19/05/2024. Bloomberg.
8. Boffo, R., & R. Patalano. (2020). “ESG Investing: Practices, Progress and Challenges”, OECD Paris, <https://www.oecd.org/daf/fin/financial-markets/ESG-Investing-Practices-Progress-Challenges.pdf>.
9. Burberry. (n.d.). *Discover our heritage, History of Burberry*, <https://www.burberryplc.com/company/history>, Retrieved on 12 may 2024.
10. Cernansky, R. (2021). *Can fashion be climate positive? Burberry commits to finding out*, <https://www.voguebusiness.com/sustainability/can-fashion-be-climate-positive-burberry-commits-to-finding-out> 10 June 2021. Vogue Business.
11. Clarkson, P., Ponn, J., Gordon, R., Rudzicz, F., Tsang, A., & Wang, J. (2020). A Textual Analysis of US Corporate Social Responsibility Reports, *Abacus* 56(1):3–34, <http://dx.doi.org/10.1111/abac.12182>.
12. Cowell, A. (1999). *INTERNATIONAL BUSINESS; Prada in \$170 Million Deal For Church, the Shoemaker*, <https://www.nytimes.com/1999/09/10/business/international-business-prada-in-170-million-deal-for-church-the-shoemaker.html>, 10 september 1999, Retrieved 18 may 2024. The New York Times Magazine.

13. Davis, J. (2023). *Burberry partners with Vestiaire Collective on circular fashion project*, <https://www.harpersbazaar.com/uk/fashion/fashion-news/a45650141/burberry-vestiaire-collective-resale/>, 26 Oct 2023. BAZAAR.
14. DIOR LA GALERIE. (2024). *DIOR LA GALERIE- Discover the rich history of the House through the work of Christian Dior and his six successors*. Retrieved from DIOR Website: <https://www.galeriedior.com/it/storia>
15. DIOR SUSTAINABILITY. (2024). *DIOR SUSTAINABILITY*. Retrieved from DIOR Website: https://www.dior.com/it_it/fashion/news-savoir-faire/folder-novita-ed-eventi/dior-sustainability
16. DIOR Website. (2024). *Fashion and accessories- Perfumes and beauty*. Retrieved from DIOR Website: https://www.dior.com/it_it?msclkid=99561913317b100534037f42f79d4692
17. Earthday. (2024, 03 07). *CLIMATE ACTION, GREENWASHING: HOW INDUSTRIES LIE TO YOU*, Retrieved 12/06/2024. Retrieved from Earthday.org: <https://www.earthday.org/greenwashing-how-industries-lie-to-you/>
18. EBA, EUROPIAN BANKING AUTHORITY. (2021). *EBA REPORT ON MANAGEMENT AND SUPERVISION OF ESG RISKS FOR CREDIT INSTITUTIONS AND INVESTMENT FIRMS, EBA/REP/2021/18*. https://eba.europa.eu/sites/default/files/document_library/Publications/Reports/2021/1015656/EBA%20Report%20on%20ESG%20risks%20management%20and%20supervision.pdf.
19. Eberl, M., & Schwaiger, M. (2005). *Corporate reputation: disentangling the effects on financial performance*, <http://dx.doi.org/10.1108/03090560510601798>. European Journal of Marketing.
20. EEA. (2023). *Textiles and the environment: the role of design in Europe's circular economy*, <https://www.eea.europa.eu/publications/textiles-and-the-environment-the/textiles-and-the-environment-the>. European Environment Agency.
21. Enda, J. (2011, 04). *American Journalism Review*, Retrieved 08/06/2024. Retrieved from <https://web.archive.org/web/20121012203239/http://www.ajr.org/article.asp?id=5023>
22. Europarl. (2020). *What if fashion were good for the planet?*[https://www.europarl.europa.eu/RegData/etudes/ATAG/2020/656296/EPRS_ATAG\(2020\)656296_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2020/656296/EPRS_ATAG(2020)656296_EN.pdf). European Parliament.
23. European Commission. (2021). *Overview of sustainable finance*. Retrieved from European Commission: https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en

24. Fashion. (2022). *When Prada acquired Helmut Lang*, <https://www.nssmag.com/en/fashion/30628/prada-helmut-lang-italian-luxury-group>, 7 september 2022; retrieved 18 may 2024. NNS magazine.
25. Fashion;. (2023). *Prada Reports Record-High Annual Revenue*, <https://hypebeast.com/2023/3/prada-2022-financial-report-highest-sales-strong-profitability-miu-miu>, 9 march 2023, retrived 18 may 2024. Hyperbeast Group.
26. Fombrun, C., & C. B. M. van Riel. (2004). *Fame & Fortune: How Successful Companies Build Winning Reputations*, https://books.google.it/books/about/Fame_Fortune.html?id=7iZcLsu5HxgC&redir_esc=y. FT Press.
27. Franco, J., Dildar, H., & Mccoll, R. (2019). Luxury fashion and sustainability: looking good together, https://www.researchgate.net/publication/335265645_Luxury_fashion_and_sustainability_looking_good_together. *Journal of Business Strategy*.
28. Gatzert, N. (2015). The Impact of Corporate Reputation and Reputation Damaging Events on Financial Performance: Empirical Evidence from the Literature, https://www.researchgate.net/publication/304552924_The_Impact_of_Corporate_Reputation_and_Reputation_Damaging_Events_on_Fin. *SSRN Electronic Journal*.
29. Goloshchapova, I., Poon, S.-H., Pritchard, M & Reed, Ph. (2019). Corporate social responsibility reports: topic analysis and big data approach , https://www.researchgate.net/publication/331094559_Corporate_social_responsibility_reports_topic_analysis_and_big_data_approach, . *The European Journal of Finance Eur J Fin* 25(17):1637–1654.
30. Gonzalez-Rodriguez, A. (2015). *Prada earnings take a 30 percent cut in 2014*, <https://fashionunited.uk/news/business/prada-earnings-take-a-30-percent-cut-in-2014/2015040116017>. Fashion United.
31. Guercini, S., & Ranfagni, S. (2013). Sustainability and Luxury: The Italian Case of a Supply Chain Based on Native Wools, https://www.researchgate.net/publication/259187075_Sustainability_and_Luxury_The_Italian_Case_of_a_Supply_Chain_Based_on_Native_Wools. *Journal of Corporate Citizenship*.
32. Handley, L. (2018). *British fashion house Burberry to stop burning unsold items*, <https://www.cnn.com/2018/09/06/british-fashion-house-burberry-to-stop-burning-unsold-items.html>, 6 Sep 2018. CNBC.
33. Hayes, A. (2024, 01 22). *What Is Greenwashing? How It Works, Examples, and Statistics*, Retrieved 12/06/2024. Retrieved from Investopedia: <https://www.investopedia.com/terms/g/greenwashing.asp>

34. Hermès Contemporary. (2024). *Hermès, contemporary artisans since 1837*. Retrieved from Hermès Paris: <https://www.hermes.com/us/en/content/271292-contemporary-artisans-since-1837/>
35. Hermès History. (2024). *Six generations of artisans*. Retrieved from Hermès Paris: <https://www.hermes.com/us/en/content/271366-six-generations-of-artisans/>
36. Hermès Partners. (2024). *Organisational structure of Hermès International*. Retrieved from Hermès : <https://finance.hermes.com/en/organisational-structure-hermes-international-0/>
37. Hoekstra, A., Chapagain, A., Aldaya, M., & Mekonnen, M. (2011). *The Water Footprint Assessment Manual: Setting the Global Standard*, https://www.researchgate.net/publication/265103631_The_Water_Footprint_Assessment_Manual_Setting_the_Global_Standard. Earthscan.
38. HUGO BOSS COMPANY. (2024). This is HUGO BOSS. <https://group.hugoboss.com/en/company>.
39. HUGO BOSS STRATEGY. (2023). CLAIM 5 STRATEGY- Annual report 2023. <https://annualreport-2023.hugoboss.com/management-report/group-profile/group-strategy.html>.
40. Jia, Fu, Yin, Shiyuan, Chen, Lujie, & Chen, Xiaowei. (2020). Circular Economy in Textile and Apparel Industry: A systematic Literature review, https://www.researchgate.net/publication/339437460_Circular_Economy_in_Textile_and_Apparel_Industry_A_systematic_Literature_review. *Journal of Cleaner Production*.
41. Kennon, J. (2022, 01 13). *What is a Bloomberg Terminal?*, Retrieved 08/06/2024. Retrieved from The Balance: <https://www.thebalancemoney.com/what-is-a-bloomberg-terminal-or-bloomberg-machine-358002>
42. Kerr, J., & Landry, J. (2017). *Pulse of Fashion Industry*, <https://globalfashionagenda.org/pulse-of-the-industry/>. Global Fashion Agenda & The Boston Consulting Group.
43. Langeland, T. (2010). *Facebook's Zuckerberg Joins Gates, Buffett in Pledge*, <https://www.bloomberg.com/news/articles/2010-12-09/seventeen-of-wealthiest-u-s-families-take-buffett-gates-giving-pledge-?embedded-checkout=true>, Retrieved 08/06/2024. Bloomberg.
44. Lehmann, M. (2018). *Pulse of Fashion Industry*, https://www.peta.org.uk/wp-content/uploads/2019/03/Pulse_of_the_fashion_industry_report_2018-1.pdf. Global Fashion Agenda and The Boston Consulting Group.
45. Lim, T. (2024). Environmental, social, and governance (ESG) and artificial intelligence in finance: State-of-the-art and research takeaways,

https://www.researchgate.net/publication/378552801_Environmental_social_and_governance_ESG_and_artificial_intelligence_in_finance.

46. LVMH. (2024). *UNIVERSAL REGISTRATION DOCUMENT*, https://r.lvmh-static.com/uploads/2024/03/urd-2023-va_vdef.pdf retrieved 26/03/2024.
47. LVMH;. (2023). *2022 SOCIAL AND ENVIRONMENTAL RESPONSIBILITY REPORT*, https://r.lvmh-static.com/uploads/2024/04/lvmh_committed_to_positive_impact_2023-1.pdf.
48. Mitkow, S., Antczak, J., & Roszkiewicz, M. (2022). Challenges for the Defense Industry Against the Background of ESG (Environmental, Social, Governance) Concepts, <https://ersj.eu/journal/3074#>. *European Research Studies Journal, Volume XXV, Issue 4, 177-194*.
49. Moncler Group. (2024). History and strategies of Moncler Group. <https://www.monclergroup.com/en/>.
50. Ocean tomo. (2024). *Intangible Asset Market Value Study*. Retrieved from <https://oceantomo.com/intangible-asset-market-value-study/>, accessed April 2024
51. PRADA. (2024). *A journey through our history*, <https://www.pradagroup.com/en/group/history.html>, retrieved 18 may 2024. PRADA Group.
52. Press, J. (2000). *International Directory of Company Histories, Vol. 33. St.* <https://archive.org/details/internationaldir0033unse/page/n699/mode/2up>
53. Prisco, J. (2019). *Prada to go fur-free in 2020*, <https://edition.cnn.com/style/article/prada-goes-fur-free-2020/index.html>, updated 22 may 2019, retrieved 18 may 2024. CNN Style.
54. RALPH LAUREN COMPANY. (2024). RALPH LAUREN 2023 GLOBAL CITIZENSHIP & SUSTAINABILITY REPORT. <https://corporate.ralphlauren.com/citizenship-and-sustainability>.
55. RALPH LAUREN WEBSITE. (2024). About us. *History*, <https://corporate.ralphlauren.com/our-company>.
56. Raman, N., Bang, G., & Nourbakhsh, A. (2020). Mapping ESG trends by distant supervision of neural language models, *Mach Learn Knowl Extr* 2(4):453–468. https://www.researchgate.net/publication/346338851_Mapping_ESG_Trends_by_Distant_Supervision_of_Neural_Language_Models.
57. Reid, J. (2023). *Luxury goods giant LVMH becomes the first European company to surpass \$500 billion in market value*, <https://www.cnbc.com/2023/04/24/lvmh-becomes-the-first-european-company-surpass-500-billion-in-value.html> 24 April 2023. CNBC.

58. SALVATORE FERRAGAMO History. (2024). Overview and history.
<https://group.ferragamo.com/en/group/group-overview/>.
59. SALVATORE FERRAGAMO SUSTAINABILITY. (2024). *FERRAGAMO RESPONSIBLE PASSION- OUR COMMITMENT TO SUSTAINABILITY*. Retrieved from SALVATORE FERRAGAMO: <https://sustainability.ferragamo.com/en/our-commitment>
60. SALVATORE FERRAGAMO SUSTAINABILITY PLAN. (2022). *FERRAGAMO RESPONSIBLE PASSION- SUSTAINABILITY PLAN*. Retrieved from SALVATORE FERRAGAMO: <https://sustainability.ferragamo.com/en/our-commitment/sustainability-plan>
61. Sanderson, R. (2018). *Prada shares soar on sale growth outlook*,
<https://www.ft.com/content/c13d92e4-25f2-11e8-b27e-cc62a39d57a0>. Milan: Financial Times.
62. SAVATORE FERRAGAMO ANIMAL WELFARE. (2020). *FERRAGAMO RESPONSIBLE PASSION- ANIMAL WELFARE*. Retrieved from SALVATORE FERRAGAMO: <https://sustainability.ferragamo.com/en/products-materials/animal-welfare#animal>
63. SICKLER, J. (2022, 09 28). *Reputation Management, retrieved 13/06/2024*. Retrieved from <https://www.reputationmanagement.com/blog/why-is-reputation-important/>.
64. Statistics. (2024). *Correlation Coefficient: Simple Definition, Formula, Easy Steps*. Retrieved from Statistics how to: <https://www.statisticshowto.com/probability-and-statistics/correlation-coefficient-formula/#Excel>
65. Sustainability, H. (2024). *Sustainable Development*. Retrieved from Hermès Paris: <https://www.hermes.com/us/en/content/134986-sustainable-development/>
66. The Global Compact. (2004). *Who cares wins: connecting the financial markets to a changing world? United Nations Report*.
https://www.unepfi.org/fileadmin/events/2004/stocks/who_cares_wins_global_compact_2004.pdf.
67. THOMPSON, R. (2024). Top 50 Luxury Clothing Brands In The World Today,
<https://mensflair.com/luxury-clothing-brands/>, retrieved on 01 march 2024. *Men's Flair*.
68. Truong, Y., McColl, R., & Kitchen, P. J. (2009). New luxury brand positioning and the emergence of Masstige brands,
https://www.researchgate.net/publication/247478620_New_luxury_brand_positioning_and_the_emergence_of_Masstige_brands. *Journal of Brand Management*.
69. Truong, Y., Simmons, G., McColl, R., & Kitchen, P. (2008). Status and conspicuousness—are they related? Strategic marketing implications for luxury brands,
<https://doi.org/10.1080/09652540802117124>. *Journal of Strategic Marketing*.

70. Uluyol, Y. (2023). *Tailoring Responsibility: Tracing Apparel Supply Chains from the Uyghur Region to Europe*, <https://www.shu.ac.uk/helena-kennedy-centre-international-justice/research-and-projects/all-projects/eu-apparel>, Dec 2023, Revision Feb 2024. Sheffield Hallam University.
71. *wikipedia*. (2024). Retrieved from <https://en.wikipedia.org/wiki/Prada> , retrieved 18 may 2024
72. WONGTRAKOOL, B. M. (2018). ESG Essentials: What You Need to Know About Environmental, Social, and Governance Investing, <https://www.westernasset.com/us/en/research/whitepapers/esg-essentials-what-you-need-to-know-2018-04.cfm>. *Western Asset*.