Czech University of Life Sciences Prague

Faculty of Economics and Management

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Bachelor Thesis

Impact of ESG on the company's value

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Thesis title

Impact of ESG on company value

Objectives of thesis

The main objectives of this thesis are the following: to analyse the impact of the ESG factors on the company's value and to emphasize the importance of the new concept of ESG factors in investing.
The aim of the theoretical part is to determine the concept of ESG, its history, trends and problems related to it.
The goal of the practical part of this bachelor thesis is to examine the three industries using the companies' stock price and ESG reports over three-years period to find the relationship between share price and environmental, social and governance factors.

Methodology

The first part will be based on the review of scientific literature (articles, statistical data, researches). More-over, a critical review of literature related to the ESG topis is involved to identify the main trends towards the ESG concept.

The second part is practical. The methods used to find out the impact of the ESG factors on the companies' share price is Pearson's correlation. To run the correlation properly, the share price of each company is analysed for three years period. Then the exact environmental social and corporate governance KPIs are selected for each particular industry, taking into account the exceptionality of each one.

The proposed extent of the thesis

40

Keywords

ESG, KPI, share price, Pearson's correlation, sustainability, investments portfolio, environmental impact, social impact, corporate responsibility, governance impact.

Recommended information sources

Atkins, B., 2020. Demystifying ESG: Its History & Current Status. [online] Forbes. Available at: <https://www.forbes.com/sites/betsyatkins/2020/06/08/demystifying-esgits-history–current-status/>

European Federation of Financial Analysts Societies (EFFAS), 2009. KPIs for ESG A Guideline for the Integration of ESG into Financial Analysis and Corporate Valuation. [online] Frankfurt am Main: EFFAS THE EUROPEAN FEDERATION OF FINANCIAL ANALYSTS SOCIETIES, pp.1-66.

Sharma, J., 2013. Business statistics. 2nd ed. New Delhi: Pearson, pp.454-460.

Unwto.org. 2020. Sustainable Development | UNWTO. [online] Available at: <https://www.unwto.org/sustainable-development>

Wu, L., Achyldurdyyeva, J., Jou, W., Foung, W. and Jaw, B., 2021. Relief, Recovery, and Revitalization Measures for Tourism and Hospitality Industry During Covid-19 Pandemic: Case Study From Taiwan. SAGE Open, 11(3), p.21.

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Declaration

I declare that I have worked on my bachelor thesis titled " Impact of ESG on the company's value" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 21 of March _____

Impact of ESG on company value

Abstract

The main goal of this bachelor thesis to analyse the growing trends of the ESG investment and to find the relationship between the ESG criteria of the companies and its share price. Another aim is to emphasize the importance of the ESG based on examples of numerous most current and up-to-date researches.

The thesis consists of two parts – theoretical with the examination of ESG as a wholesome concept, and a practical, where statistical analysis of relationship between ESG and share price takes place.

Theoretical part highlights the relevance and growing tendency of ESG, its popularity and active spreading among industries. It is done through careful evaluation of the literature available in order to proceed to the practical part.

Practical part focuses on the correlation analysis, based on three different industries with four companies as examples. The relationship between each ESG criteria and each company's share price is found.

Keywords: ESG, KPI, share price, Pearson's correlation, sustainability, investments portfolio, environmental impact, social impact, corporate responsibility, governance impact.

Dopad ESG na hodnoty společnosti

Abstrakt

Hlavním cílem této bakalářské práce je analýza rostoucího trendu ESG investic a určení vztahu mezi kritérii ESG vybraných společností a cenou jejich akcií. Dalším ze stanovených cílů je prokázání důležitosti ESG za pomoci relevantních a aktuálních akademických zdrojů a výzkumů.

Tato práce se skládá ze dvou částí. První, teoretická část, se zaměřuje na zkoumání celkového konceptu ESG a následně druhá, praktická část je cílena na statistickou analýzu vztahu mezi ESG a cenou akcií.

Teoretická část klade důraz na relevantnost a rostoucí tendenci ESG, jejich popularitu and neustálé šíření těchto investic mezi odvětvími. Závěry této části jsou podloženy důkladnou analýzou dostupné literatury a následně aplikované v druhé části práce.

Praktická část se zaměřuje na korelační analýzu ve třech různých odvětvích vždy se čtyřmi společnostmi z daného odvětví jako příklady. Výstupy praktické části prokázaly, že existuje vztah mezi jednotlivými kritérii ESG a cenou akcií u každé ze zkoumaných společností.

Klíčová slova: ESG, KPI, cena akcií, Pearsonova korelace, udržitelnost, investiční portfolio, environmentální impakt, sociální impakt, společenská odpovědnost firem, governance impakt.

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1 Introduction

ESG (environmental, social and corporate governance) factors are the system of the benchmarks for the companies' operations and management that emphasize the importance of consciousness and care; investors are interested in these factors while screening and selecting the companies for their portfolio.

Nowadays ESG investing became a widely discussed topic among investors. The reason of this growing popularity is the desire of shareholders to care not only about the return rate and dividends, but also consider ethical problems, environment, social life and governance of the company. One cannot deny that number of socially responsible people become greater and greater every day as we can find in different data sources more information about ecological problems, social inequality and a lot of other global and current issues.

Therefore, it is important to analyse ESG factors and the way how to evaluate companies regarding their environmental, social and government behaviour to make a final decision regarding the investments. Moreover, the bachelor thesis examines the impact of the ESG criteria on particular industries and companies' share price, finding relationship and correlation.

The relevance of the topic could not be underestimated, as these criteria might be one of the crucial decision maker factors, making investors to choose some companies over another. It is evident, that the ESG have their own weak points, such as lack of data, subjectivity and scarcity of the commonly used layout for the data. However, it cannot stop the investors to take into consideration ESG and the companies to implement the values into their day-to-day operations.

2 Objectives and Methodology

2.1 Objectives

The main objectives of this thesis are the following: to analyse the impact of the ESG factors on the company's value and to emphasize the importance of the new concept of ESG factors in investing.

The aim of the theoretical part is to determine the concept of ESG, its history, trends and problems related to it. Moreover, the information about three particular industries is provided as well to get familiar with them before reviewing their share price and ESG KPI in the practical part. In addition, theoretical part also gives an understanding about the statistical method used in the practical part.

The goal of the practical part of this bachelor thesis is to examine the three industries using the companies' stock price and ESG reports over three-years period to find the relationship between share price and environmental, social and governance factors.

2.2 Methodology

This bachelor thesis will consist of two parts as discussed: theoretical part, with the concept definition and industry analysis and practical part with finding the relationship between ESG factors and companies' share price.

The first part is theoretical, and it will be based on the review of scientific literature (articles, statistical data, researches). More precisely, it is the analysis of the ESG concept with a detailed consideration of its individual features (KPIs) applicable to the three different industries. Moreover, a critical review of literature related to the ESG topis is involved to identify the main trends towards the ESG concept.

The second part is practical. The methods used to find out the impact of the ESG factors on the companies' share price is Pearson's correlation. To run the correlation properly, the share price of each company is analysed for three years period. Then the exact environmental social and corporate governance KPIs are selected for each particular industry, taking into account the exceptionality of each one. Afterwards, the Pearson's correlation is run, striving to achieve the most objective results.

3 Theoretical Part

3.1 Definition of ESG

ESG is the abbreviation for environmental, social and governance factors. The first meaning of it can be used to evaluate companies with "respect to a broad range of socially desirable ends" (Harvard Law School Forum, 2020). The name ESG stands for a package of elements that can be used to measure the non-financial impact of some specific companies of investors. Once this measurement done it can also bring financial and business opportunities.

The concept of ESG is growing up exponentially and investors are paying more and more attention to the positive impact of the companies of the society by rating company depending on their contributions. More and more, investors are integrating the ESG system in the investment analyses but also in their final decision process making. There are three categories divided by meaning:

1. For the "E" of environment some general elements like carbon footprint, greenhouse gas emissions, waste management, water usage are mentioned. Therefore, this section focuses on the environment, natural resources and wise consumption.

2. Then for the "S" of social the accent is made on equal pay range, human rights, the relationship with the community, the privacy and data protection, social justice issues treatment and many others.

3. And then the "G" is about the governance of the two previous categories, concretely it is about the board corporation composition and structure, sustainability strategy, political contribution and lobbying but it can also look into corruption and other more complex elements.

3.1.1 History of the Concept

According to Atkins, the ESG concept was firstly mentioned in 2005 in the United Nations Principles for Responsible Investment. This report stated the importance of considering ESG criteria while investing as well as it required the ESG report to be incorporated in companies annual review and financial evaluations (Atkins, 2020). However, the concept dates back to 1960s, when the topic became more widely discussed. There were numerous boycotts of the companies supporting Vietnam war, students were

against this cruelty and required universities to stop investments into weapon production companies.

Later, in 1980s the environmental pillar became more important. The reason was numerous environmental disasters happening back in time (such as Chernobyl disaster in 1986, oil spills, etc.). Therefore, investors started taking into consideration environmental issues very seriously (Kelley and Sardi, 2020).

Furthermore, in 1990s The Intergovernmental Panel on Climate Change (IPCC) confirmed in their report that the human influence on the climate system was evident. The report also concluded that the rapid growth of carbon and methane emissions is leading to the melting of polar ice caps, rising sea levels and environmental disaster (Intergovernmental Panel on Climate Change, 1992). The IPCC stated in the further reports the current environmental situation, which becomes more and more serious and urges an action. Therefore, the main goal of ESG was mostly the fight against climate change.

One of the important steps in further ESG development was the Paris Agreement in 2015 – an international treaty on climate change. Its goal is "to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels" (The Paris Agreement, 2022). After that investment managers and boards of directors had to take into account new carbon emissions regulations. Various organizations analyzed the activities of companies and ranked them according to ESG criteria, which guided investors.

3.1.2 Trends and Importance

Nowadays more investors become conscious about the ESG factors. The absolute majority of them know the concept of ESG and invest wisely. To illustrate, the research claimed that now all the age groups are seeking for ESG options, as millennials spurred its growth – from 2010s they invested $51,1 billion to sustainable funds. This factor caused an interest of all investors, currently nine out of ten people agree that they are more likely to invest money in the companies making a positive impact. The topic that worries them mostly is the climate change (according to the CNBC 76% of older millennials consider this factor while investing). Moreover, one third of millennials take in their portfolio only companies contributing to ESG factors, comparing with 19% of generation Z, 16% of generation X and only 2% of baby boomers (Adamczyk, 2021).

In contrast, according to PwC PE Responsible Investment Survey 2019, 89% investors find business and ethics as the most important factor while investing consciously. Other

crucial aspects are: corruption and bribery, labor regulations, waste management. Therefore, this research found governance factor more appealing for the investors than the environmental ones (Private equity's ESG journey: From compliance to value creation, 2021).

To emphasize growing tendency of the ESG in the market, the research held by United Nations Principles for Responsible Investment Board (UNPRI) stated that the amount of responsible investment capital grows by a third every two years from 2014 to 2018 (Kennedy, 2020).

Moreover, nowadays about half of all managed assets in Europe are classified as responsible investment assets. This allows to ensure the importance and the current peak of the topic.

To continue, it is important to identify the reasons of such an interest towards the ESG. The experts find an explanation in a lot of reasons, but mostly:

- It improves the company's image and reputation, which will attract more investors.
- It forces the company to innovate, which uncovers all kinds of new opportunities.
- The prospect of increasing the value of the company. If a company pays attention to ESG factors (the environment, social aspect and the corporate governance), then in the long run it is likely to be worth more than similar companies that do not take ESG into consideration.
- In such companies, the quality of production is most often high. This means that the probability of workplace related accidents and injuries is lower, the management employs more highly qualified specialists with specialized education.
- Personal responsibility. By investing in ESG companies, investors support the development of society and the environment. In other words, one can make own contribution to improving life and protecting nature. (ESG the report).

3.1.3 Implementation in Different Industries

ESG reports and evaluations can be found in the majority of yearly reports of Fortune 500 companies. It allows to conclude that this concept is universal and can be applied to different industries. However, it is crucial to consider the industry and particular set of ESG criteria for different areas of investment. The problem is that almost any company can be brought under ESG criteria, even clear and measurable ones. However, it is difficult to

rate the companies from different industries, as different criteria may vary and cause unclear interpretation.

Another consequence is different ESG criteria for rating companies. For example, some of them take into consideration the progress during some period of time, constantly showing the difference. Different companies, on the other hand, prefer to focus on the actual data, most fresh and relevant one. In addition, for the three pillars of the ESG there is no universally set list of criteria and KPIs to take into consideration. To illustrate, while analyzing social pillar, some companies put the number of highly qualified employees, the other put the absence of discrimination at work.

To facilitate the process of evaluating the companies from the ESG perspective, the European Federation of Financial Analysts Societies (EFFAS) established the commonly used KPIs three ESG aspects. In the document the KPIs are divided into sub categories, such as general ones, which can be applied to all industries and more exact ones for different industries. To illustrate, general ESGs are: energy efficiency, greenhouse gas emissions (environmental), staff turnover, training and qualification, absenteeism rate (social), litigation risks, corruption (governmental). To measure them some exact KPIs are selected, such as energy consumption (total), greenhouse gas emissions (total) with exact metrics (European Federation of Financial Analysts Societies (EFFAS), 2009).

Moreover, the research publishes exact KPIs with metrics recommended to measure ESG of different industries, regarding of their exceptionalities. This document was widely used during this bachelor thesis to make sure that the companies are being evaluated fairly and the decisions on KPIs are made considering a solid background. The further chapters of this bachelor thesis will be focused mostly on the industries chosen for analysis. The exact KPIs for ESG will be mentioned and the choice will be explained.

3.2   Hospitality Industry

3.2.1   Hospitality Industry Overview and Definition

According to the Cambridge dictionary, the hospitality industry is defined as "businesses such as hotels, bars, and restaurants that offer people food, drink, or a place to sleep" (Hospitality Industry Definition, 2022). However, it is much broader and diverse than just restaurants and hotels properties, as it includes four main sectors: food and beverage, lodging, entertainment and recreation and travel and tourism (The Different Hospitality Sectors Explained, 2018). The industry is extremely important because of its significant market share and market value.

Statista research departments confirms the global hospitality market reached 3486.77 billion US dollars in 2020 and the forecast for 2021 to grow to 3486.5 billion US dollars, with the compound annual growth rate of 18.5 percent (Global market size of the hospitality industry 2020 | Statista, 2021). Consequently, not only the industry is a significant one, but also it is expected to grow, employ more people and serve more clients all around the world.

It is important to mention that the pandemic of Covid 19 influenced hospitality industry a lot. However, the researches expect the tourism to be back in even higher volume because of the "deferred demand" – the fact that for many travellers the tourism activity was postponed due to the lack of supply, as a result the demand did not disappear, but also postponed. After the pandemic the industry should be ready to accommodate the increasingly growing number of tourists (Abbas et al., 2021).

3.2.2   Sustainability in the Industry and KPIs for ESG

The hospitality industry is chosen for the analysis because of its future trends, mainly focusing on ESG factors. To illustrate, Jones states that the companies will focus more and more on the sustainability aspects, such as gas and emissions usage, food sources, water disposal and waste management. According to the author, the systems in hospitality industry will become sophisticated as they will not only monitor the overall company performance, but also auto-report the usage and emissions (Jones, 1999).

As the industry itself is very customer-depending, therefore it should follow all the trends and ideas being popular in the society to satisfy the clients. Since people become more and more conscious in their decisions and practices, being sustainable is one of the

top priorities of all hospitality establishments, as according to Booking Sustainable Travel Report 2021, 83 percent of the travelers find sustainable travel practices essential (Booking.com's 2021 Sustainable Travel Report Affirms Potential Watershed Moment, 2021).

To illustrate, the concept of sustainable tourism becomes extremely popular among travelers nowadays. According to the World Tourism Organization, it is a special kind of tourism, which is concerned about economic, social and environmental effects on our whole planet, as well as about future development. Essentially, this topic should include such elements as using natural resources properly, respecting the cultural diversity and planning economical strategies (Sustainable development | UNWTO, 2020). The reason of the growth of this subject is the general rapid increase in international tourism, which caused some negative consequences such as pollutions, over-consumption and harm to the local communities (Sustainable Tourism - Definition, Principles, and Dimensions of Sustainable Tourism, 2020). Therefore, the goal of sustainable tourism is to reduce this damaging impact.

As for the ESG investing, it is evident that the hospitality companies should and already started caring about being more sustainable in various ways. The fact that the majority of them publishes its sustainability and ESG reports also conclude that the sustainable hospitality is not a futuristic concept, but already existing one and growing its popularity.

In the further analysis of the impact of the ESG factors and the companies' share price, the exact KPIs were selected and presented in the table (Table 1) below:

Table 1. KPIs for ESG of the Hospitality Companies

	Environmental	Social	Governance
ESG which apply to the hospitality companies' group	ESG 1. Energy Efficiency	ESG 2. Gender diversity	ESG 3. Charitable donations
KPIs to measure	ESG 1-1. Energy Intensity (kWh/m2)	ESG 2-1. Percentage of female managers and executives	ESG 3-1. Amount of charitable donations (millions of $ US)

Source: European Federation of Financial Analysts Societies (EFFAS), 2009.

3.3 Food Production Industry

3.3.1 Food Production Industry Overview and Definition

The food production industry is defined "the complex network of farmers and diverse businesses that together supply much of the food consumed by the world population" (Allen and Albala, 2007). However, this industry is a compound one, consisting not only of the fields, factories, etc., but also technological tools, supply chains and many others. It covers all the aspects and stages of the food consumption process, starting from food production, finishing by the sale of the final product.

According to Verified Market Research, the food production industry had valued at 143.51 billion USD in 2020, and is expected to reach to 236.67 billion by 2028. Its expected CAGR (Compound annual growth rate) is 6.6 % from 2021 to 2028 (Global Food Processing Market Size By Type, 2021).

The food market is an essential business with a big growing potential. One can notice that the price per unit in the biggest group of food consumed is slowly growing. This together with a growing world population will make the number in the food production industry world growing too (Consumer Markets: Food, n.d.).

3.3.2 Sustainability in the Industry and KPIs for ESG

The current trends in the food production industry are mostly related to the product quality, because the consumers have the increasing attention to the health and related topics, as the pandemic caused higher sense of anxiety among them. According to the research held by ADM company, consumers' behavior and focus on the healthy lifestyle caused an increased demand for foods and drinks supporting the immune system, improving mood and reducing the environmental footprint. Moreover, over half of the consumers prefer to buy the products containing more natural ingredients and 37% of them target their health needs.

In addition, people started to care not only about their own health and well-being, but also about the environment. For instance, experts estimated that almost 65% of consumers choose products with sustainable packaging, a special way of cooking, etc. The consumers are persuaded that this will help them save the environment. In this regard, consumer demand has increased for the products of companies that support various

projects to preserve the environment, and also use this trend in their production. This is the key reason why 32% of consumers buy sustainable products.

Finally, the consumers prefer transparency, they have high level of trust towards product labels, believing that they accurately reflect all the necessary information about the life cycles of products. Moreover, 26% of buyers in the world look for the country of origin on the label (ADM Unveils the Next Big Consumer Trends. | ADM, 2021).

Given all this information into consideration, it is clear that in the food production industry sustainability is also a top priority. As a consequence, ESG factors play an important role as well. All the companies analyzed in this bachelor thesis try to comply with the current customers' and investors' needs and demands. To illustrate, the table (Table 2) below indicates the chosen ESG criteria for the correlation as well as the KPIs available in the companies reviews to measure them.

Table 2. KPIs for ESG of the Food Production Companies

	Environmental	Social	Governance
ESG which apply to the food production companies' group	ESG 1. Water Efficiency	ESG 2. Safety at the workplace	ESG 3. Global nutrition targets and values
KPIs to measure	ESG 1-1. Water abstracted (m3/ton of production)	ESG 2-1. Total recordable incidents rate	ESG 3-1. Percentage of production complying with global nutrition targets

Source: European Federation of Financial Analysts Societies (EFFAS), 2009.

3.4   Car Manufacturing Industry

3.4.1   Car Manufacturing Industry Overview and Definition

Car manufacturing industry (also called an automobile manufacturing one) is a very significant business in terms of industry size, people employed and its importance. The modern life is difficult to imagine without cars, including private ones and the ones used in logistics. Nowadays there are some crucial changes in the industry, as technological progress now is a very rapid process, urging the car manufacturing area to quickly adapt.

To begin with, the definition of automobile (car) manufacturing industry is the activities and actions involved in the production of motor vehicles, its components (excluding tires, fuel and batteries). This industry's main outcomes are the motor vehicles, light trucks, vans, sport cars (Bell Rae, 2022).

According to Statista.com we can see that in 2020 Volkswagen Group is the biggest company on the market with a revenue of 254,1 billion U.S. dollars. Closely followed by Toyota Motor with 249,4 billion U.S. dollars (Carlier, 2021). It is also one of the world's largest industries by revenue in general.

3.4.2   Sustainability in the Industry and KPIs for ESG

To begin with the biggest trend for the automobile industry, which holds its position for many years and will never lose its importance. It is the security, protection from any risk, danger, damage or cause of injury. In the automotive industry, safety means that users, operators or manufacturers do not face any risks or dangers from a vehicle or its parts. The safety of the vehicles themselves means that there is no risk of damage. Safety in the automotive industry is extremely important and therefore highly regulated. Automobiles and other motor vehicles must comply with a certain number of regulations, both local and international, in order to be allowed on the market.

In our case of the ESG analysis, it is crucial to pay attention on the employees' education, trainings, qualification to minimize the risks of human related errors as they can cost lives of the consumers.

Furthermore, car manufacturing has been in focus to make more sustainable products over the last many years. Some of the big trends are Electrification and Shared Mobility. Today, the automotive industry, one of the world's largest industries, is at the centre of an intensifying global effort to find sustainable materials that can help contain

and reduce high levels of harmful greenhouse gas (GHG) emissions amid the deepening climate crisis. Since road transport is one of the main sources of pollution, the development of environmentally sustainable solutions is of particular relevance.

According to the United Nations Economic Commission for Europe (UNECE), which hosts the authoritative World Forum for Harmonization of Vehicle Regulations (Working Party 29), the sector accounts for 18% of global GHG emissions, with 96% of the energy used in road transport, is a fossil fuel (Zarocostas, 2020).

To put all of these trends and facts into practice, the table (Table 3) below explains the ESG criteria chosen for the further analysis as well as the exact KPIs used to measure quantitatively the data.

Table 3. KPIs for ESG of the Car Manufacturing Industry

	Environmental	Social	Governance
ESG which apply to the car manufacturing companies' group	ESG 1. Emissions Management	ESG 2. Qualified employees' rate	ESG 3. Research and development spending
KPIs to measure	ESG 1-1. Specific solvent emissions (VOC) (in kg/vehicle)	ESG 2-1. Average training/qualification hours per employee per year (h)	ESG 3-1. Investments in research and development (millions of Eur)

Source: European Federation of Financial Analysts Societies (EFFAS), 2009.

3.5 Statistical Methodology

The importance of the statistical methods in this bachelor thesis could not be underestimated. As the goal is to find relationship, correlation analysis is widely used. Correlation analysis is used to identify relationships between research scales. This method allows to detect linear (direct and reverse) relationships between variables or their absence (Sharma, 2013). Correlation analysis is the main method of statistical data analysis in works whose purpose is to study the influence of something on something, in our case, the dependence of ESG on companies' share prices.

The method used to find the relationship between KPIs of ESG and the company's share price is Pearson's correlation.

3.5.1 Pearson's Correlation

According to Sharma, "Karl Pearson's Correlation coefficient measures quantitatively the extent to which two variables x and y are correlated". It is a numerical number between -1 and 1, which concludes the association (direct positive or negative) between variables.

To start calculating the Pearson's correlation coefficient, the following conditions must be met:

- The investigated variables X and Y must be normally distributed.
- The X and Y variables of interest should be measured on an interval or ratio scale.
- The number of values in the investigated variables X and Y must be the same.

When calculating the Pearson linear correlation coefficient, a special formula is used. The value of the correlation coefficient varies from 0 to 1. In this bachelor thesis the Pearson's correlation is calculated using Excel formula.

The weaknesses of Pearson's linear correlation coefficient are:

- Outlier resistance.
- Using the Pearson correlation coefficient, it is possible to determine only the strength of a linear relationship between variables, other types of relationships are identified by regression analysis methods (Sharma, 2013).

4   Practical Part

The practical part of this bachelor thesis will be focused on the exact examples from the four industries analysed above. The emphasis will be made on the comparison and finding relationship of the share price over three years (2018, 2019, 2020) and the KPIs for ESG metrics selected. The method that will be used in this part is Pearson's correlation. Companies to be analysed:

- **Hospitality industry:** Marriott International, Hilton Hotels & Resorts, Hyatt Hotels Corporation, Wyndham Hotels & Resorts.
- **Food Production industry:** Nestlé S.A., Tyson Foods, Inc., The Kraft Heinz Company (KHC), Unilever PLC.
- **Car Manufacturing industry:** BMW (Bayerische Motoren Werke AG), Volkswagen Group, Toyota Motor Corporation, Daimler AG.

4.1   Hospitality Companies' Analysis

For the analysis of the hospitality industry and ESG factors impact, four companies were selected: Hyatt Hotels Corp. (H), Marriott International Inc. (MAR), Wyndham Hotels & Resorts Inc. (WH) and Hilton Worldwide Holdings Inc. (HLT).

They all are international hotel operators and franchisers. The companies manage hotels and resorts under various names and therefore it allows them to create diverse properties portfolio. Corporations operate in US and Canada market as well as internationally.
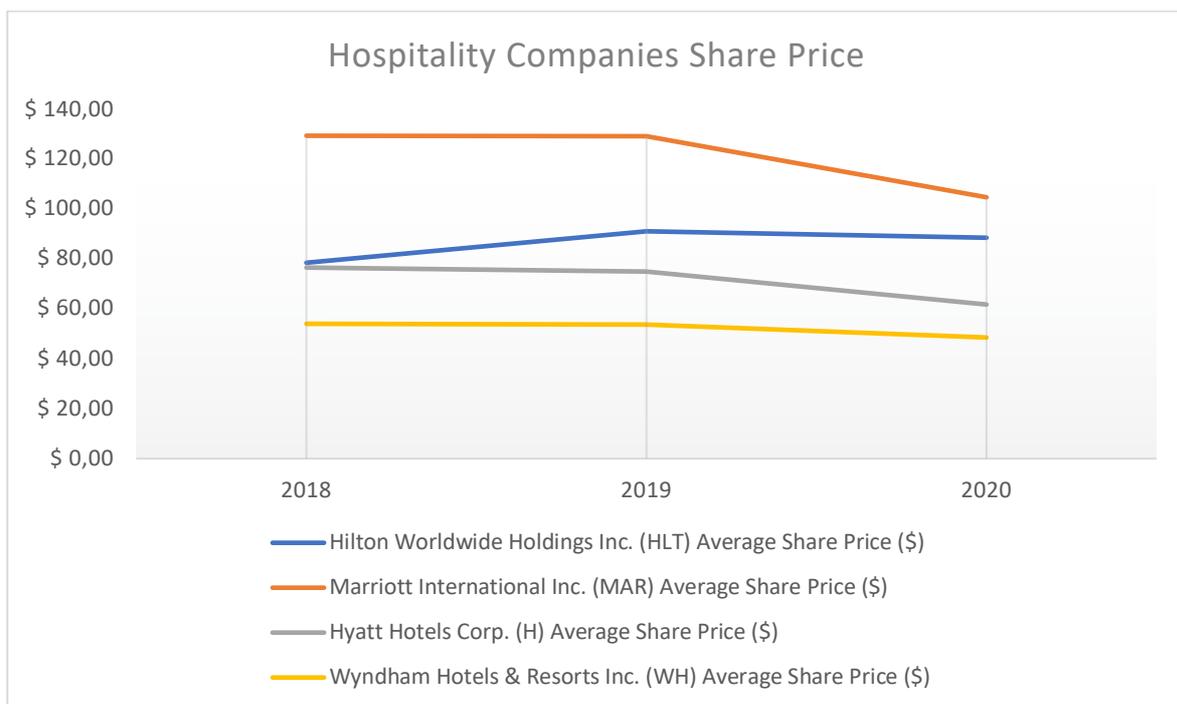
4.1.1   Share Price

To begin with it is important to compare share price of the companies, therefore the table (Table 4) and graph (Figure 1) below illustrate share price for the period of three years, showing changes and trends.

Table 4. Share Price of the Hospitality Companies

Year	Hilton Worldwide Holdings Inc. (HLT) Average Share Price ($)	Marriott International Inc. (MAR) Average Share Price ($)	Hyatt Hotels Corp. (H) Average Share Price ($)	Wyndham Hotels & Resorts Inc. (WH) Average Share Price ($)
2018	78,6057	129,5615	76,6684	54,1089
2019	91,2233	129,373	75,02	53,9059
2020	88,5481	104,8768	61,8446	48,6108

Source: Macrotrends | The Long-Term Perspective on Markets, 2022

Figure 1. Share Price of the Hospitality Companies

Source: Macrotrends | The Long-Term Perspective on Markets, 2022

One can notice a difference between share price of all four companies, with a highest price for Marriott International Inc. (MAR) of more than $100 per share. In contrast, Wyndham Hotels & Resorts Inc. (WH) has the smallest value of around $50 per share.

As for the trends, among four companies only Hilton Worldwide Holdings Inc. (HLT) had a rise of share price from 2018 to 2019, on the other hand, all other

corporations had a slight drop during this period. Moreover, one can observe noticeable decrease of the share price of all four companies from 2019 to 2020.

4.1.2 Environmental Factor Impact

It is essential to analyze the environmental factor impact on the share price. As a Key Performance Indicator (KPI) for this aspect, the Energy Intensity (kWh/m2) was selected. It is an essential KPI, showing the energy efficiency of the building. This KPI allows stakeholders and other interested persons to identify the progress, made by the companies towards the energy efficiency direction as well as for the companies to keep track the goals for the future development. This KPI was selected for the hospitality business analysis as the industry possesses the buildings as a massive part of their assets, accommodating their guests. Therefore, it might be difficult to be sustainable and at the same time maintain a high level of service.

To analyze the companies from the environmental factor perspective the yearly reports were selected for three years period. The reports analyzed are: Hilton 2018,2019,2020 ESG report, Marriott 2018,2019,2020 Serve 360 Report, Hyatt Sustainability Highlights 2019/2020 and Wyndham 2019, 2020 ESG Report. The table (Table 5) below show the results of average energy intensity (kWh/m2) per company per year.

Table 5. Hospitality Companies' Environmental KPI

Year	Hilton Worldwide Holdings Inc. Energy Intensity (kWh/m2)	Marriott International Inc. Energy Intensity (kWh/m2)	Hyatt Hotels Corp. Energy Intensity (kWh/m2)	Wyndham Hotels & Resorts Inc. Energy Intensity (kWh/m2)
2018	297,7	352,9	335,2	255,0
2019	292,1	324,39	330	253,0
2020	221,8	240,95	226,6	206,7

Source: Hilton ESG report, Marriott Serve 360 Report, Hyatt Sustainability Highlights, Wyndham ESG Report.

There is a visible decrease from year to year in all the companies, meaning that they become more and more energy efficient. It is a positive trend as being eco sustainable became one of the priorities for the companies.

The most noticeable contrast is with Marriott example, as there is a drop for 111,95 kWh/m2. The graph (Figure 2) below illustrates the changes in the energy intensity.

Figure 2. Hospitality Companies' Environmental KPI
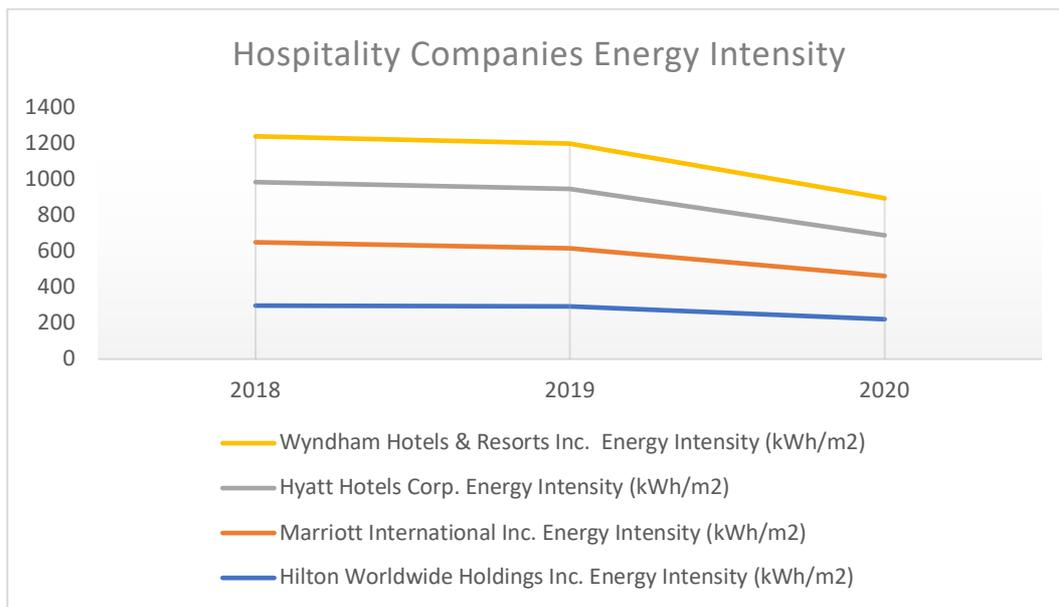
Source: Hilton ESG report, Marriott Serve 360 Report, Hyatt Sustainability Highlights, Wyndham ESG Report.

To find a relationship between the energy intensity and share price, Pearson's correlation is used and the calculations are presented in the table (Table 6).

Table 6. Pearson's Correlation for the Environmental KPI of Hospitality Companies

Parameter	Value 1. Environmental factor
Sample size (n)	12
Pearson correlation coefficient (r)	**-0.2021**
P-value	0.5287
Covariance	-279.3059
Statistic	-0.6527

Source: own calculations

Results of the Pearson correlation indicated that there is a **non-significant very small negative relationship** between energy intensity and share price, (r(10) = .202, p = .529).

Therefore, besides the proven importance of the sustainability as a travelers' preference, statistically it is not considered to be a significant factor affecting the share price.

4.1.3 Social Factor Impact

The second ESG concept factor is a social one, in our case focusing on the percentage of female in possession of managing or executive positions. This KPI is selected because managing women in hospitality industry are in minority, however their percentage as a workforce is more than 50% (Darioly, 2019).

This KPI shows the female empowering as the companies' value and indicates whether the workplace is diverse enough from the gender perspective. The table (Table 7) below shows the percentage of female employees in possession of managing and executive positions in four companies. The same ESG and sustainability reports are used in the research.

Table 7. Social KPI for Hospitality Companies

Year	Hilton Worldwide Holdings Inc. % of female managers and executives	Marriott International Inc. % of female managers and executives	Hyatt Hotels Corp. % of female managers and executives	Wyndham Hotels & Resorts Inc. % of female managers and executives
2018	58%	54%	55,20%	48%
2019	54%	55%	55,20%	51%
2020	44%	56%	55,20%	50%

Source: Hilton ESG report, Marriott Serve 360 Report, Hyatt Sustainability Highlights, Wyndham ESG Report.

The graph below (Figure 3) illustrates the data provided in the table. One can see relatively different results. For example, Hilton Worldwide Holdings Inc. has a noticeable decrease by 4% from 2018 to 2019 and then by 10% to 2020. On the other hand, for

Marriott International Inc. this number moderately increases over the years. As for Hyatt Hotels Corp., there was only an average number available, with no data for each year, therefore this average number is taken into consideration. One can also observe a fluctuation for Wyndham Hotels & Resorts Inc.

Figure 3. Social KPI for Hospitality Companies
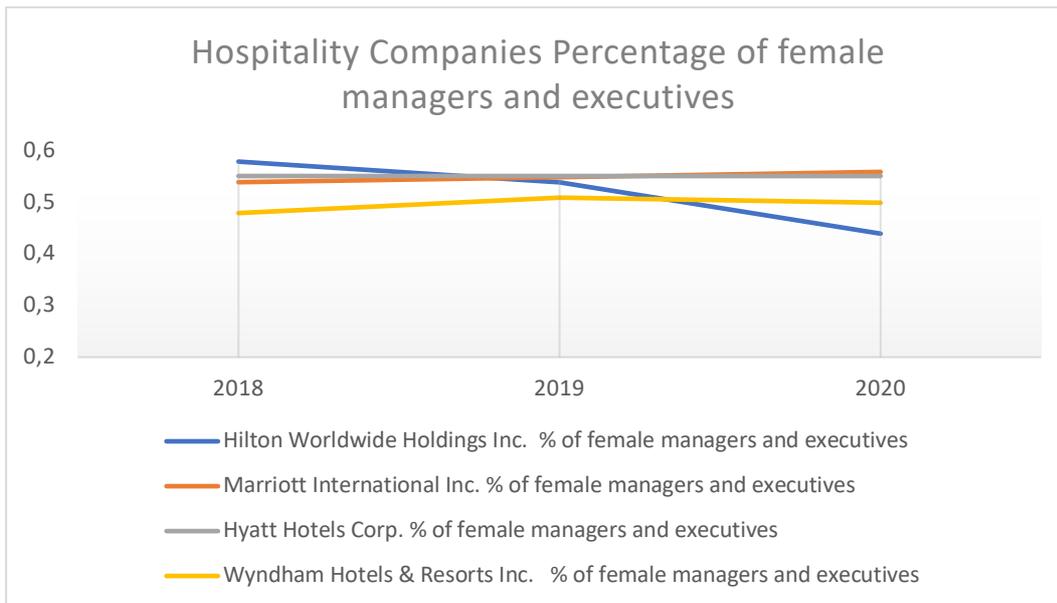
Source: Hilton ESG report, Marriott Serve 360 Report, Hyatt Sustainability Highlights, Wyndham ESG Report.

To find a relationship, Pearson's correlation coefficient was calculated and its results are presented below in the table (Table 8).

Table 8. Pearson's Correlation Results for Social KPI of Hospitality Companies

Parameter	Value 2. Social factor
Sample size (n)	12
Pearson correlation coefficient (r)	**0.3069**
P-value	0.3319
Covariance	33.5381
Statistic	1.0197

Source: own calculations

Results of the Pearson correlation indicated that there is a **non-significant medium positive relationship** between share price and percentage of female managers and executives, (r(10) = .307, p = .332).

To conclude, in this example with social KPI the calculations show more impact on the company's value compared with the previous example.

4.1.4 Governance Factor Impact

The last factor to be analyzed within the industry is the governance factor, more precisely the amount of charitable donations was selected. It shows the policy of the company in regards of helping communities, people, environment, etc. This KPI was selected for the hospitality industry, as the business defines itself as a customer's oriented one, with the priority of service and taking care. Therefore, it is important to analyze the global goals of the companies towards charitable donations, which help people and organizations in need.

The sustainability and ESG reports of four companies are used for the research and the results are presented below in the table (Table 9).

Table 9. Governance KPI for Hospitality Companies

Year	Hilton Worldwide Holdings Inc. charitable donations (millions of $ US)	Marriott International Inc. charitable donations (millions of $ US)	Hyatt Hotels Corp. charitable donations (millions of $ US)	Wyndham Hotels & Resorts Inc. charitable donations (millions of $ US)
2018	1	24,8	9,8	1,5
2019	3,2	27,6	3,3	1,37
2020	3,8	7,76	2,7	0,85

Source: Hilton ESG report, Marriott Serve 360 Report, Hyatt Sustainability Highlights, Wyndham ESG Report.

One can see that the leader among donations is Marriott International Inc., followed by Hyatt Hotels Corp. There is also a visible decrease of the amount of donations from 2019 to 2020, due to revenue drop. In contrast, Wyndham Hotels & Resorts Inc. states the least amount of charitable donations, followed by Hilton. The graph (Figure 4) below represents the numbers from the table.

Figure 4. Governance KPI for Hospitality Companies
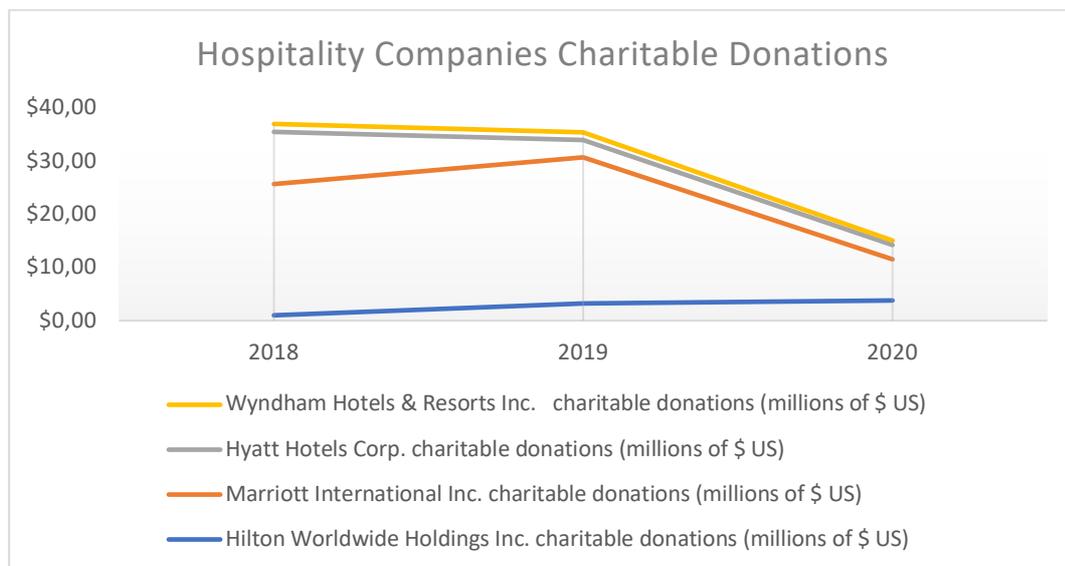
Source: Hilton ESG report, Marriott Serve 360 Report, Hyatt Sustainability Highlights, Wyndham ESG Report.

The table (Table 10) below illustrates the results of conducted Pearson's correlations for finding the relationship between the amount of charitable donations and share price of the companies.

Table 10. Pearson's Correlation for Governance KPI of Hospitality Companies

Parameter	Value 3. Governance factor
Sample size (n)	12
Pearson correlation coefficient (r)	**0.863**
P-value	0.0003006
Covariance	219.6499
Statistic	5.4019

Source: own calculations

Results of the Pearson correlation indicated that there is a **significant large positive relationship** between the amount of charitable donations and share price, (r(10) = .863, p < .001).

Therefore, one can conclude that governance factor is the most important one while analyzing the hospitality companies' value.

4.2   Food Production Companies Analysis

The next industry to be analyzed is a food production one. This is a complex, global network and an essential business. The examples of the industries are four companies: Tyson Foods, Inc., Unilever PLC., The Kraft Heinz Company and Nestlé S.A. The companies are international corporations possessing a significant market share and being a top choice among many consumers.

4.2.1   Share Price Analysis

Firstly, the share price will be analyzed. The table (Table 11) and graph (Figure 5) below show the trends regarding the share price of the companies.

Table 11. Share Price of Food Production Companies

Year	Tyson Foods, Inc. Share price ($)	Unilever PLC. Share price ($)	Nestlé S.A. Share price ($)	The Kraft Heinz Company Share price ($)
2018	66,3137	54,7453	81,2211	60,6465
2019	77,3875	58,8253	100,2172	32,6125
2020	64,4847	57,1515	111,4756	30,6485

Source: Macrotrends | The Long-Term Perspective on Markets, 2022

One can observe the visible rise of the share price of Nestlé S.A. over three-years period from $ 81, 22 to $ 111,48. There was also a moderate increase for Unilever PLC. from 2018 to 2019. However, in 2020 the share price steadily dropped by approximately $1. As for the Tyson Foods, Inc., the share price firstly went up from $66,31 to $ 77,39, but then dropped to $64,49; therefore, there are noticeable fluctuations. Finally, the Kraft

Heinz Company's share price dramatically declined over the three years, firstly from $60,65, then to $32,62 and finally to $30,65 in 2020.

Figure 5. Share Price of Food Production Companies
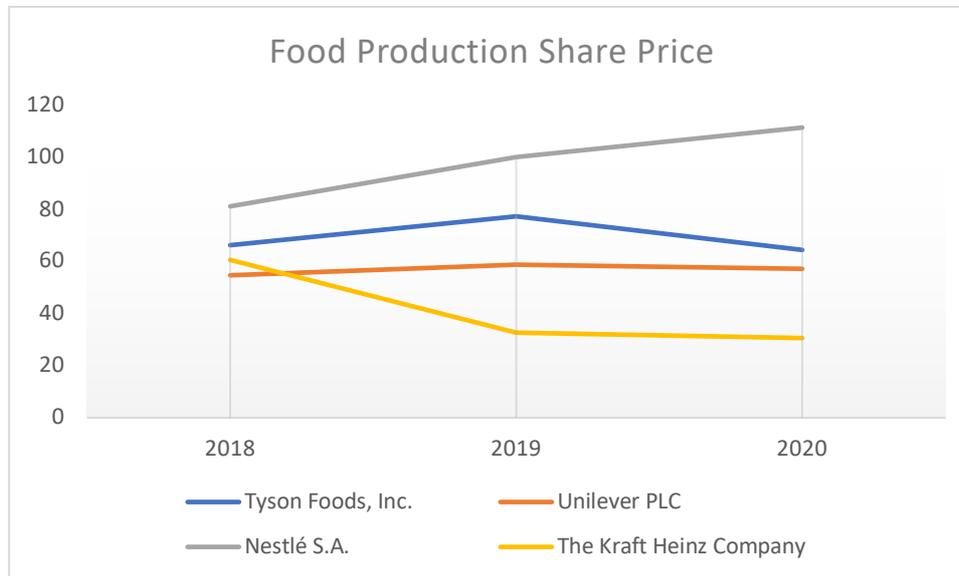
Source: Macrotrends | The Long-Term Perspective on Markets, 2022

4.2.2 Environmental Factor Impact

To analyse one of the most crucial ESG factors in the food production industry, the Water Abstracted (m3/ton of production) KPI was selected. The data recourses used are the ESG reports of the companies – Tyson ESG hub, Creating Shared Value and Sustainability Report Nestlé S.A., The Kraft Heinz Company ESG report, Sustainability performance data Unilever PLC. It is evident that food production industry is very consumptive in terms of natural resources, therefore, this indicator measures how energy efficient the company is. Saving water is one of the top global priority while considering environmental protection. This is why water intensity metric is a factor analysed for this particular industry.

The table (Table 12) and graph (Figure 6) below show the efforts of the gigantic corporations to minimize water waste in the planet.

Table 12. Environmental KPI of the Food Production Companies

Year	Tyson Foods, Inc. Water abstracted (m3/ton of production)	Unilever PLC. Water abstracted (m3/ton of production)	Nestlé S.A. Water abstracted (m3/ton of production)	The Kraft Heinz Company Water abstracted (m3/ton of production)
2018	8,3454	1,67	N/A	N/a
2019	8,0116	1,58	2,28	5,39
2020	7,928134	1,52	2,25	5,24

Sources: Tyson ESG hub, Creating Shared Value and Sustainability Report Nestlé S.A., The Kraft Heinz Company ESG report, Sustainability performance data Unilever PLC.

Figure 6. Environmental KPI of the Food Production Companies
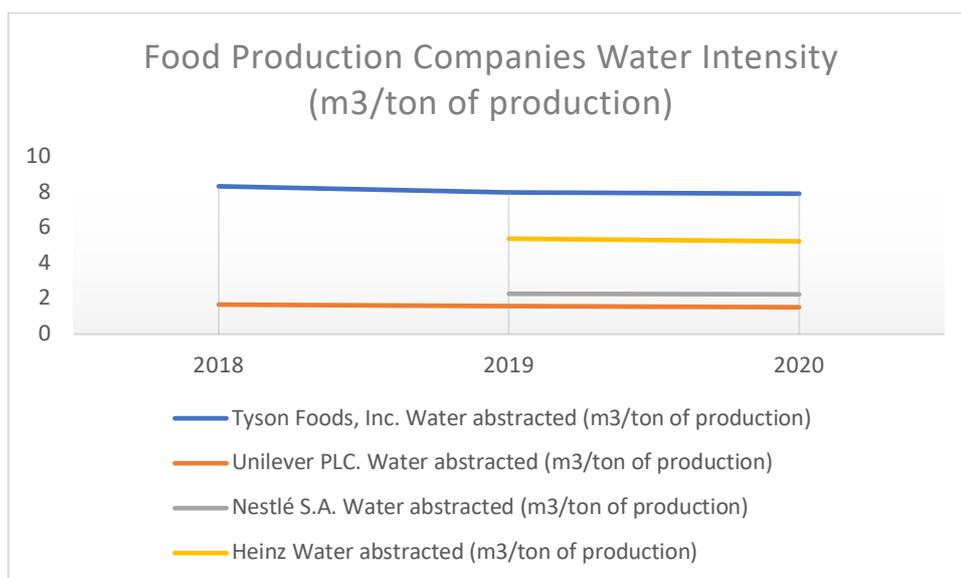
Sources: Tyson ESG hub, Creating Shared Value and Sustainability Report Nestlé S.A., The Kraft Heinz Company ESG report, Sustainability performance data Unilever PLC.

One can observe that among all four companies the lowest results Unilever PLC. has. Moreover, its number is steadily dropping from 1,67 in 2018 to 1,58 in 2019 and finally to 1,52 in 2020. Therefore, there is a visible positive trend in this particular example. As for Nestlé S.A, its results are also positive, even with one year data missing, there is still a decrease from 2,28 to 2,25 m3/ton of production from 2019 to 2020. Moreover, The Craft Heinz Company shows a fall from 5,39 m3/ton of production to 5,24

from 2019 to 2020. Finally, the highest results are for Tyson Foods Inc., illustrating 8,34 8,01 and 7,93 m3/ton of production over three-years period.

To find a relationship between the water intensity factor and the company value, there are results of the Pearson's correlation presented in the table (Table 13) below:

Table 13. Pearson's Correlation for the Environmental KPI of the Food Production Companies

Parameter	Value 1. Environmental factor
Sample size (n)	10
Pearson correlation coefficient (r)	**-0.1777**
P-value	0.6234
Covariance	-13.2739
Statistic	-0.5106

Source: own calculations

Results of the Pearson's correlation indicated that there is a **non-significant very small negative relationship** between Water Intensity (m3/ton of production) and share price, (r(8) = .178, p = .623).

Therefore, this environmental metrics is not affecting the company's value crucially.

4.2.3 Social Factor Impact

To continue, social factor impact will be analyzed. The selected KPI is total recordable incidents rate. This is the number of work-related injuries and illnesses per 100 team members. This factor is important one for this particular industry, as it is considered to be the one with high risk of injuries. The table (Table 14) below shows the data:

Due to the lack of data for Nestlé S.A. this company was not taken into consideration for the calculations. One can observe Unilever PLC. PLC. being the lowest rate company with 0,69 cases in 2018, however in 2019 there was a slight increase to 0,76, and then the number dropped by 2020 to 0,63 cases. The Kraft Heinz Company also reduced its total recordable incidents rate by 0,10 from 2019 to 2020. Unilever PLC. has the highest rate, but it steadily decreases over the period. The changes are presented in the graph (Figure 7).

Table 14. Social KPI of the Food Production Companies

Year	Tyson Foods, Inc. total recordable incidents rate	Unilever PLC. PLC. total recordable incidents rate	Nestlé S.A. total recordable incidents rate	The Kraft Heinz Company total recordable incidents rate
2018	3,94	0,69	N/a	N/a
2019	3,32	0,76	N/a	0,84
2020	2,76	0,63	N/a	0,74

Sources: Tyson ESG hub, Creating Shared Value and Sustainability Report Nestlé S.A.,
The Kraft Heinz Company ESG report, Sustainability performance data Unilever PLC.

Figure 7. Social KPI of the Food Production Companies
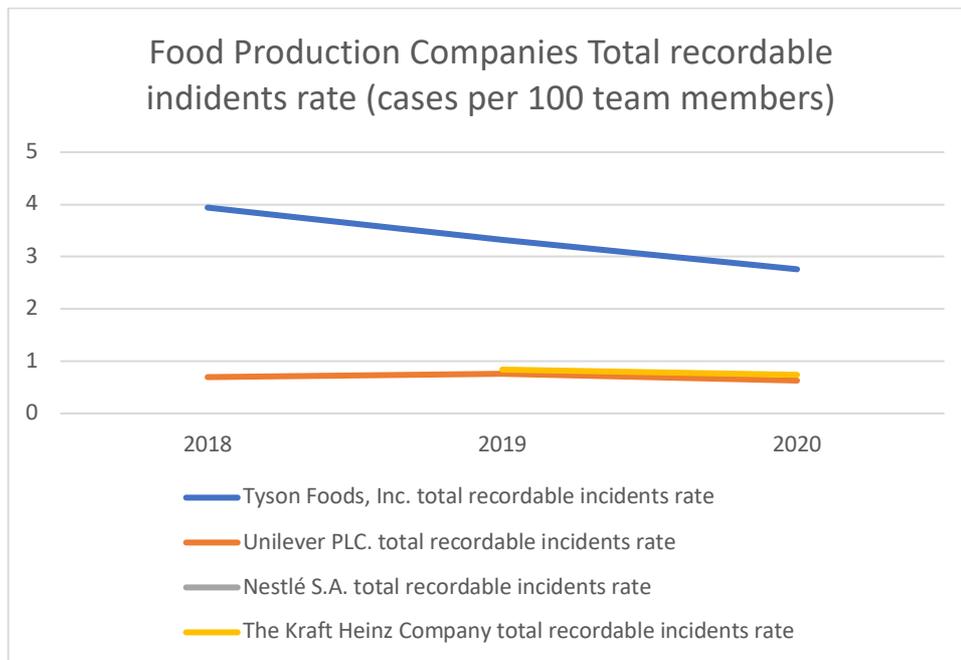
Sources: Tyson ESG hub, Creating Shared Value and Sustainability Report Nestlé S.A.,
The Kraft Heinz Company ESG report, Sustainability performance data Unilever PLC.

To correlate the impact the Pearson's correlation is used and the results are shown in the table (Table 15).

Results of the Pearson correlation indicated that there is a **non-significant large positive relationship** between total recordable incidents rate and share price, ($r(6) = .691$, $p = .058$).

Therefore, social factor affects the food production company's value more than the previous example with environmental KPI.

Table 15. Pearson's Correlation of the Social KPI for the Food Production Companies

Parameter	Value 2. Social factor
Sample size (n)	8
Pearson correlation coefficient (r)	**0.6914**
P-value	0.05752
Covariance	15.5189
Statistic	2.3441

Source: own calculations

4.2.4 Governance Factor Impact

Finally, the governance factor will be analyzed. The KPI selected for this one is the percentage of production complying with global nutrition targets. This factor is a very important one, as it shows the care of the company towards its consumers and these targets have higher and higher standards each year. The table (Table 16) and graph (Figure 8) below indicate the data:

Table 16. Governance KPI for the Food Production Companies

Year	Tyson Foods Inc. % of production complying with global nutrition targets	Unilever PLC. % of production complying with global nutrition targets	Nestlé S.A. % of production complying with global nutrition targets	The Craft Heinz Company % of production complying with global nutrition targets
2018	N/a	50%	N/a	N/a
2019	N/a	56%	80,5%	76%
2020	N/a	61%	81%	74,20%

Sources: Tyson ESG hub, Creating Shared Value and Sustainability Report Nestlé S.A., The Kraft Heinz Company ESG report, Sustainability performance data Unilever PLC.

Figure 8. Governance KPI for the Food Production Companies
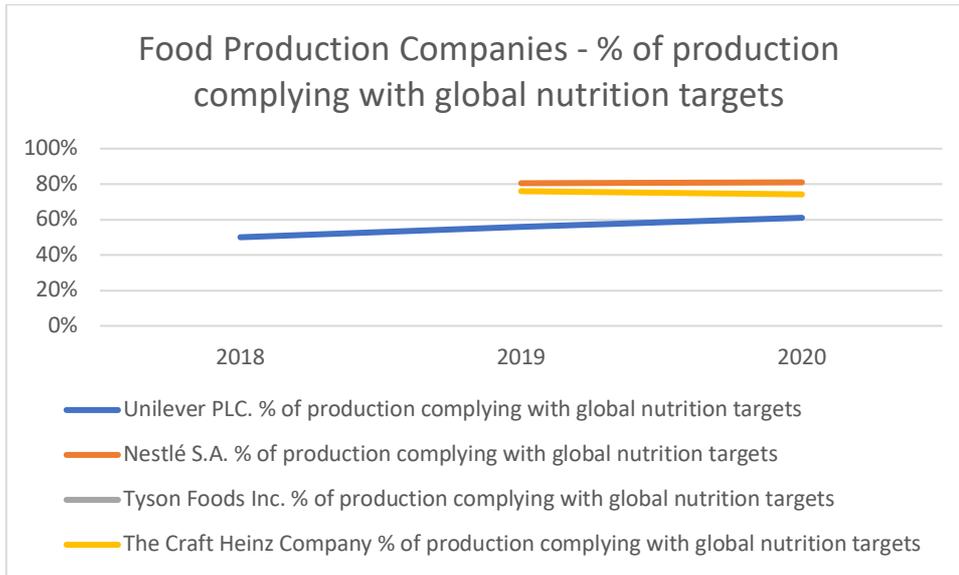
Food Production Companies - % of production complying with global nutrition targets

— Unilever PLC. % of production complying with global nutrition targets
— Nestlé S.A. % of production complying with global nutrition targets
— Tyson Foods Inc. % of production complying with global nutrition targets
— The Craft Heinz Company % of production complying with global nutrition targets

Sources: Tyson ESG hub, Creating Shared Value and Sustainability Report Nestlé S.A., The Kraft Heinz Company ESG report, Sustainability performance data Unilever PLC.

As shown in the graph, there is a visible rise of the percentage for Unilever PLC., from 50% to 56% and finally to 61%. As for the Nestlé S.A., the rise is not that dramatic, however the trend is rather positive. Finally, the Craft Heinz Company is the only example showing the decrease from 76% to 74,20%. Due to the lack of data Tyson Foods Inc. was not taken into consideration while calculating the Pearson's correlation, presented in the table below (Table 17):

Table 17. Pearson's Correlation of the Governance KPI for the Food Production Companies

Parameter	Value 3. Governance factor
Sample size (n)	7
Pearson correlation coefficient (r)	**0.2293**
P-value	0.6209
Covariance	89.5652
Statistic	0.5267

Source: own calculations

Results of the Pearson correlation indicated that there is a **non-significant small positive relationship** between percentage of production complying with global nutrition targets and share price, ($r(5) = .229$, $p = .621$).

It means that this value is also not crucial for the industry.

4.3   Car Manufacturing Companies Analysis

The next industry to be analyzed is a car production one. This industry is a massive one, growing faster and faster and highly depending on technology development. The examples of the companies to be analyzed are: Bayerische Motoren Werke Aktiengesellschaft (BMW.DE), Volkswagen AG (VWAGY), Daimler AG (DDAIF), Toyota Motor Corporation (TM).

4.3.1   Share Price Analysis

To begin with, the share price should be analyzed. Similar way as with the previous examples, share price was calculated for three years period, which enable to see the trends. The table (Table 18) and graph (Figure 9) below illustrate the data.

Remark: the share prices of BMW and Daimler AG were only available in EUR, therefore, the currency exchange rate of 1.0931 as per Yahoo finance was selected. Rate as of 06.03.2022 22.00.

*Table 18. Share Price of the Car Manufacturing Companies*

Year	BMW share price ($)	Volkswagen AG share price ($)	Daimler AG share price ($)	Toyota Motor Corporation share price ($)
2018	75,5916	17,6823	64,9516	126,1464
2019	75,3245	17,4633	54,5121	128,4058
2020	65,0982	16,7796	44,9287	130,7749

Source: Yahoo Finance, 2022.

One can observe a visible contrast between share prices of four examples. The most expensive share is Toyota Motor Corporation one. Interestingly, it is also the only growing one, with the price per share of $126,1464 in 2018, $128,4058 in 2019 and finally $130,7749 in 2020. As for BMW, its share price was $75,5916 in 2018 and since that year it gradually decreases to $65,0982 in 2020. Similarly, Daimler AG share price was

$64,9516 in 2018 and by 2020 this number dropped by almost $20. Finally, Volkswagen AG has the smallest price per share - $17,6823 in 2018. This number remains relatively stable, with very moderate drop of $1 during three years period.

Figure 9. Share Price of the Car Manufacturing Companies
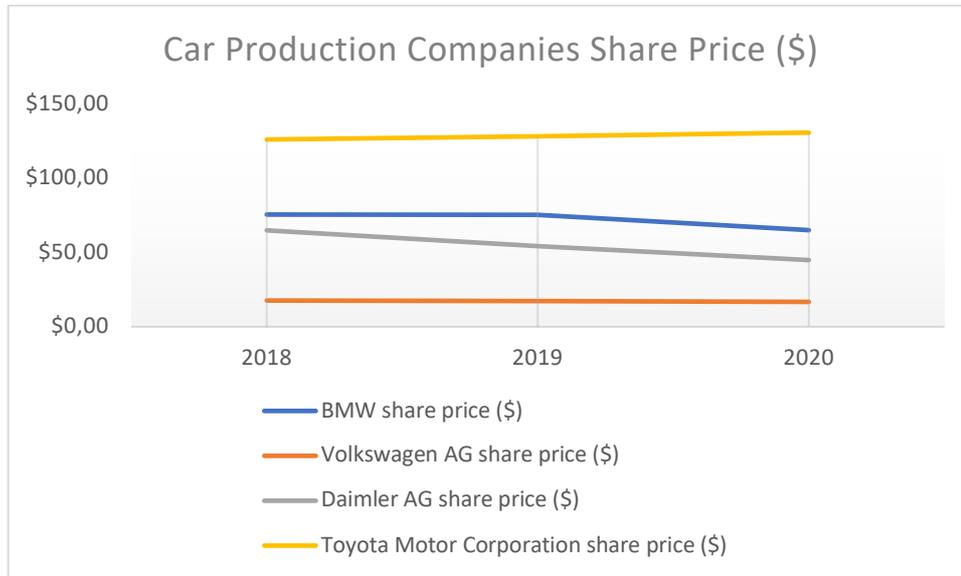
Source: Yahoo Finance, 2022.

4.3.2   Environmental Factor Analysis

To start the analysis of the ESG factors impact on car production companies' value, the environmental KPI was selected. As it is evident that in terms of automobile industry emissions remains a top priority, therefore the metrics selected is specific solvent emissions (VOC) (in kg/vehicle).

This measurement helps to understand how the companies act towards being more environmentally friendly and to reduce the emission amount per vehicle. The table (Table 19) and graph (Figure 10) below illustrate the data extracted from the ESG reports: Toyota Motor Corporation Sustainability Data Book 2020, BMW Sustainability Report, Volkswagen Group Sustainability Report, Daimler Sustainability Report 2020.

One can see that the least amount of VOC BMW company has, with less than 1 kg per vehicle and this number tends to decrease over time. As for the Volkswagen AG, the number is steadily decreasing as well, from 1,93 kg in 2018 to 1,59 kg in 2020, which is a positive tendency as well. On the other hand, VOC per vehicle continues to grow for Daimler AG company. From 1,37 kg in 2018 to 1,47 kg in 2019 and finally to 1,77 kg in

2020, which is the only negative trend. Due to the lack of data, Toyota Motor Corporation was not taken into consideration for the environmental KPI correlation.

Table 19. Environmental KPI of the Car Manufacturing Companies

Year	BMW Specific solvent emissions (VOC) (in kg/vehicle)	Volkswagen AG Specific solvent emissions (VOC) (in kg/vehicle)	Daimler AG Specific solvent emissions (VOC) (in kg/vehicle)	Toyota Motor Corporation Specific solvent emissions (VOC) (in kg/vehicle)
2018	0,93	1,93	1,37	N/a
2019	0,85	1,68	1,47	N/a
2020	0,81	1,59	1,77	N/a

Source: BMW, Volkswagen, Daimler, Toyota Sustainability Reports

Figure 10. Environmental KPI of the Car Manufacturing Companies
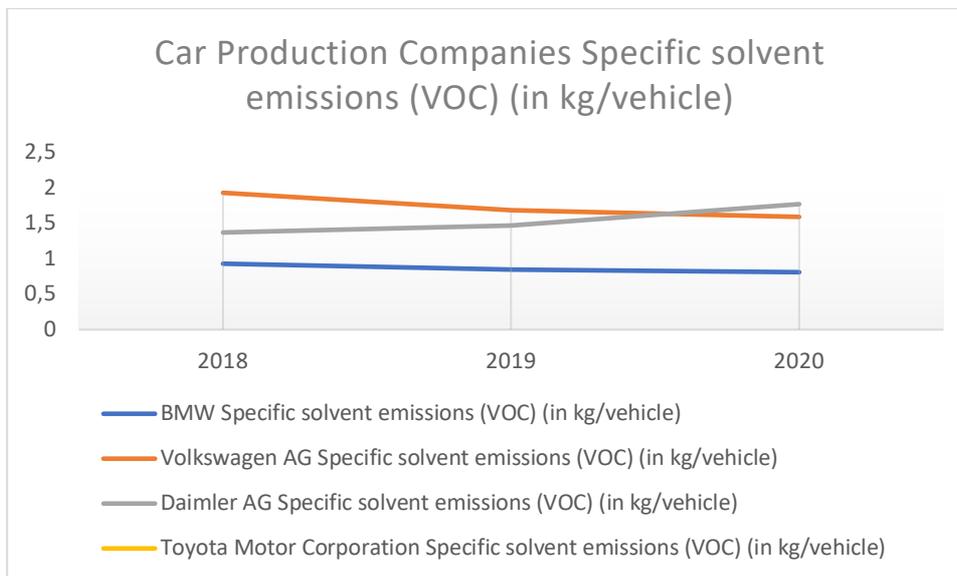
Source: BMW, Volkswagen, Daimler, Toyota Sustainability Reports

Results of the Pearson correlation presented in the table (Table 20) indicated that there is **a significant very small negative relationship** between specific solvent emissions (VOC) (in kg/vehicle) and share price, $r(7) = .836$, $p = .005$.

Table 20. Pearson's Correlation of the Environmental KPI of the Car Manufacturing Companies

Parameter	Value 1. Environmental factor
Sample size (n)	9
Pearson correlation coefficient (r)	-0.8358
P-value	0.005011
Covariance	-8.7271
Statistic	-4.0276

Source: own calculations

Consequently, one can agree that the environmental factor (VOC emissions) is not affecting a share price of car manufacturing companies in a positive way.

4.3.3 Social Factor Analysis

To continue, social factor should be analyzed. As a specific metrics selected for the car production industry, the average training/qualification hours per employee per year (h) was chosen. The reason is that this industry requires a lot of well-trained staff, as it is extremely demanding in terms of product quality and safety. Therefore, to ensure the highest quality standards, staff trainings are essential. In the table (Table 21) below there is a data illustrated by graph (Figure 11).

Table 21. Social KPI for Car Manufacturing Companies

Year	BMW average training/qualification hours per employee per year (h)	Volkswagen AG average training/qualification hours per employee per year (h)	Daimler AG average training/qualification hours per employee per year (h)	Toyota Motor Corporation average training/qualification hours per employee per year (h)
2018	22,7	n/a	22	n/a
2019	16,7	11,7	21,9	12
2020	14,1	24,5	11,9	n/a

Source: BMW, Volkswagen, Daimler, Toyota Sustainability Reports

Figure 11.Social KPI for Car Manufacturing Companies
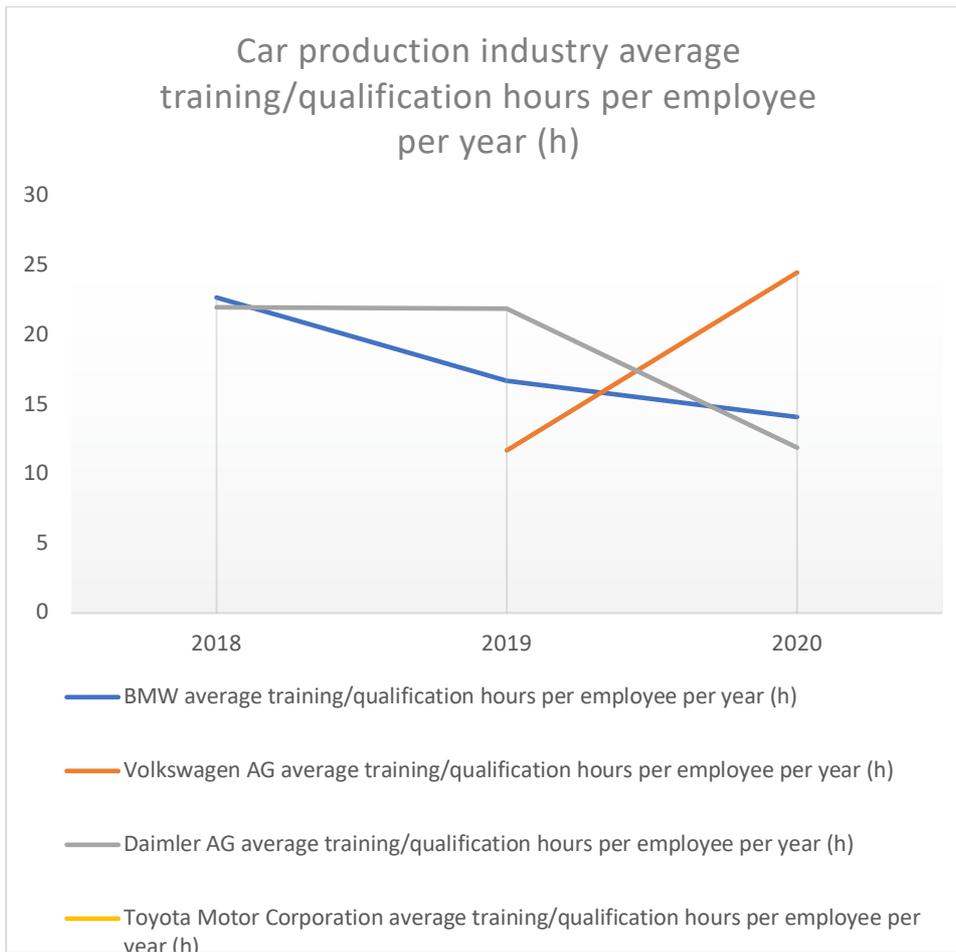
Source: BMW, Volkswagen, Daimler, Toyota Sustainability Reports

As it is shown in the graph, only Volkswagen AG dramatically increases its employee training time, all other companies are, in contrast, decreasing this amount. To illustrate, BMW average training time decreased from 22,7 h to14,1 over three years. Daimler AG also dropped this number by 10 h from 2019 to 2020. As for Toyota Motors, only 2019 data was available and it was 12 hours per employee per year. The table (Table 22) below demonstrates the results of the Pearson's correlation.

Results of the Pearson's correlation indicated that there is **a non-significant very small negative relationship** between average training/qualification hours per employee per year (h) and share price, (r(7) = .209, p = .590).

Table 22. Pearson's Correlation for the Social KPI for the Car Manufacturing Companies

Parameter	Value 2. Social factor
Sample size (n)	9
Pearson correlation coefficient (r)	**-0.2087**
P-value	0.59
Covariance	-37.2555
Statistic	-0.5646

Source: own calculations

4.3.4 Governance Factor Analysis

Governance factor KPI is investments in research and development (training and further education for BMW) in EUR million. This factor is chosen because, as mentioned before, car production industry heavily relies on research in development. In order to continue the creation of new car models, it is essential to keep researching. Therefore, this particular metrics is chosen for this particular industry. The table (Table 23) below illustrates the findings:

Table 23. Governance KPI for the Car Manufacturing Companies

Year	BMW investments in research and development (millions of Eur)	Volkswagen AG investments in research and development (millions of Eur)	Daimler AG investments in research and development (millions of Eur)	Toyota Motor Corporation investments in research and development (millions of Eur)
2018	373	1 160	3 726	817
2019	370	1 360	4 594	805
2020	279	1 386	4 158	852

Source: BMW, Volkswagen, Daimler, Toyota Sustainability Reports

It is clear that the company which invests the most is Daimler AG, with 3726 millions of euro in 2018 and with a dramatic rise of the investment in 2019 to 4594 million

of euro. There was a moderate drop by 2020, but overall, the company has high results in this area. The next leader is Volkswagen AG with 1160 million euro invested in 2018 and with a stable rise over the years. As for BMW, the number decreases from 2019 to 2020 by 91 millions of euro. Finally, Toyota Motor Corporation had a drop as well from 2018 to 2019, however, in 2020 the amount increased to 852 million invested.

The graph (Figure 12) below illustrates the data. To find a relationship between investments in research and development and companies' value Pearson's correlation is used and the results are presented.

Figure 12. Governance KPI for the Car Manufacturing Companies

Car Production Companies investments in research and development (millions of EUR)

— BMW investments in research and development (millions of Eur)

— Volkswagen AG investments in research and development (millions of Eur)

— Daimler AG investments in research and development (millions of Eur)

— Toyota Motor Corporation investments in research and development (millions of Eur)
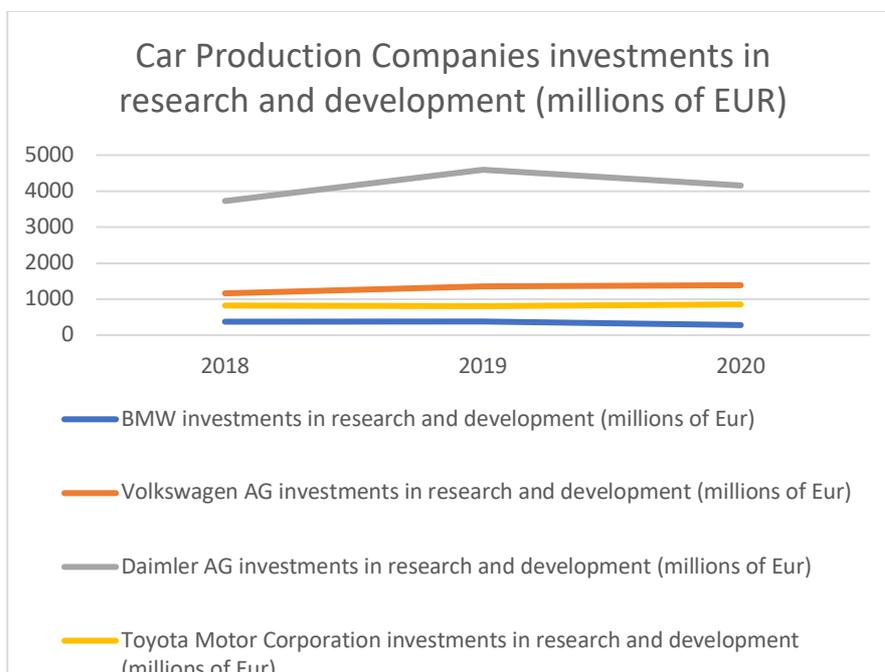
Source: BMW, Volkswagen, Daimler, Toyota Sustainability Reports

Table 24. Pearson's Correlation for Governance KPI for the Car Manufcturing Companies

Parameter	Value 3. Governance factor
Sample size (n)	12
Pearson correlation coefficient (r)	**-0.298**
P-value	0.3469
Covariance	-19612.9021
Statistic	-0.9871

Source: own calculations

Results of the Pearson's correlation indicated that there is a **non-significant very small negative relationship** between X and Y, (r(10) = .298, p = .347).

Consequently, the last governance factor does not play an important role in share price of the car manufacturing companies.

4.4 Final Comparison

As proven by nine Pearson's correlation analysis held in the practical apart, only two of them showed a significant relationship, other seven correlations state a non-significant relationship between ESG and share price.

To illustrate, each industry will be concluded regarding its ESG impact.

1. Hospitality industry analysis showed that among three factors analyzed, only governance area shows a significant positive relationship between its KPI and share price. As for environmental factor, the relationship is non-significant very small negative one and as for the social one, it is non-significant medium positive relationship. Therefore, one can conclude that governance and social criteria affect share price in a positive way and the environmental one has a small negative effect.

2. Food production industry analysis claimed that environmental factor is the only one affecting the share price in a bad way (non-significantly). Social and governance factors have a non-significant positive impact on the share price.

3. Car manufacturing industry analysis indicated that for this industry environmental factor play a significant role in share price, affecting it negatively. On the other hand, social and governance factors have non-significant very small negative relationship on the companies' value.

Factors that may cause the unclear findings:

- Smaller sample size
- The fact, that for each ESG criteria only one KPI was used and correlated
- More factors affecting share price in more significant ways that ESG (such as COVID-19 global pandemic, crisis, etc.)

5 Conclusion

To conclude, the topic of ESG investing is on its peak nowadays because of the rapid growth of the whole concept and overall investors' interest towards sustainability. One cannot deny that ESG factors can diversify the portfolio and ensure that the investments are done to the better long-term goal. Proven by numerous researches, articles, findings in this bachelor thesis ESG reports and metrics must be implemented in different companies' reports and reviews.

As for the correlation analysis held in the practical part of this bachelor thesis, there findings claimed that the relationship between ESG and share price is rather unsignificant. As discussed in chapter 4.4. Final Discussions, the reason is the limitation of the correlation, smaller sample size, only one KPI for each category taken into calculation, etc.

The topic has a bid potential for further analysis, as the ESG tends to continue to grow and the companies' overall trends towards ESG are positive. Therefore, the author recommends to continue working on ESG impact on company value, because the results may vary year to year, the topic is very dynamic and changes-depending. Further research should focus mostly on bigger sample size, more examples and wholesome analysis of the factors, affecting the share price. Author's final recommendation is to look at the topic at slightly different, more complex perspective to ensure more accurate conclusions and more precise results.

6 References

Abbas, J., Mubeen, R., Iorember, P., Raza, S. and Mamirkulova, G., 2021. Exploring the
impact of COVID-19 on tourism: transformational potential and implications for a
sustainable recovery of the travel and leisure industry. *Current Research in
Behavioral Sciences*, 2.

Adamczyk, A., 2021. *Millennials spurred growth in sustainable investing for years. Now,
all generations are interested in ESG options*. [online] CNBC.com. Available at:
<https://www.cnbc.com/2021/05/21/millennials-spurred-growth-in-esg-investing-
now-all-ages-are-on-board.html>

ADM.com. 2021. *ADM Unveils the Next Big Consumer Trends. | ADM*. [online] Available
at: <https://www.adm.com/news/news-releases/adm-unveils-the-next-big-consumer-
trends>

ALLEN, G. a K. ALBALA, 2007. The Business of Food: Encyclopedia of the Food and
Drink Industries. Westport, CT: Greenwood Press. ISBN 978-0313337253.

Atkins, B., 2020. *Demystifying ESG: Its History & Current Status*. [online] Forbes.
Available at: <https://www.forbes.com/sites/betsyatkins/2020/06/08/demystifying-
esgits-history--current-status/>

Bell Rae, J., 2022. *Automotive Industry | History, Overview, Definition, Developments, &
Facts*. [online] Encyclopedia Britannica. Available at:
<https://www.britannica.com/technology/automotive-industry>

Bergman, M., Deckelbaum, A. and Karp, B., 2020. Introduction to ESG. [online] Harvard
Law School Forum On Corporate Governance. Available at:
<https://corpgov.law.harvard.edu/2020/08/01/introduction-to-esg/>

Birmingham City University. 2018. *The Different Hospitality Sectors Explained*. [online]
Available at: <https://www.bcu.ac.uk/business-school/news-and-events/blogs/the-
different-hospitality-sectors-explained>

Dictionary.cambridge.org. 2022. *Hospitality Industry Definition*. [online] Available at:
<https://dictionary.cambridge.org/dictionary/english/hospitality-industry>

Esgthereport.com. 2021. What is ESG and why is it Important?. [online] Available at:
<https://www.esgthereport.com/what-is-esg-and-why-is-it-important/>

European Federation of Financial Analysts Societies (EFFAS), 2009. *KPIs for ESG A
Guideline for the Integration of ESG into Financial Analysis and Corporate
Valuation*. [online] Frankfurt am Main: EFFAS THE EUROPEAN FEDERATION
OF FINANCIAL ANALYSTS SOCIETIES, pp.1-66. Available at:
<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ah
UKEwjJg76v9s32AhUC_KQKHSVrDoAQFnoECEEQAQ&url=https%3A%2F%2F
ec.europa.eu%2Fdocsroom%2Fdocuments%2F1547%2Fattachments%2F1%2Ftransl
ations%2Fen%2Frenditions%2Fnative&usg=AOvVaw2A0FOi4KwGrGt5bq7fLGvR
>

Intergovernmental Panel on Climate Change, 1992. *Climate Change: The IPCC 1990 and
1992 Assessments*. World Meteorological Organization/United Nations Environment
Program, pp.47-61.

Jones, P., 1999. Operational issues and trends in the hospitality industry. *International
Journal of Hospitality Management*, 18(4), pp.427-442.

Kennedy, B., 2020. *The growth of responsible investing*. [online] Davygfm.com. Available
at: <https://www.davygfm.com/insights/esg-investing-series/the-growth-of-
responsible-investing.html>

Macrotrends.net. 2022. *Marriott - 29 Year Stock Price History | MAR*. [online] Available
at: <https://www.macrotrends.net/stocks/charts/MAR/marriott/stock-price-history>

Macrotrends, 2022. | *The Long Term Perspective on Markets*. [online] Available at:
    <https://www.macrotrends.net>

Nakat, Z. and Bou-Mitri, C., 2021. COVID-19 and the food industry: Readiness
    assessment. [online] Science Direct. Available at:
    <https://www.sciencedirect.com/science/article/pii/S0956713520305776#fig1>

Pwc.com. 2021. *Private equity's ESG journey: From compliance to value creation*.
    [online] Available at:
    <https://www.pwc.com/gx/en/services/sustainability/publications/private-equity-and-
    the-responsible-investment-survey.html>

Serve360.marriott.com. 2020. *SERVE 360 REPORT 2018, 2019, 2020*. [online] Available
    at: <http://serve360.marriott.com/wp-
    content/uploads/2019/09/2019_Serve_360_Report.pdf>

Sharma, J., 2013. Business statistics. 2nd ed. New Delhi: Pearson, pp.454-460.

Statista.com. n.d. Consumer Markets: Food. [online] Available at:
    <https://www.statista.com/outlook/cmo/food/worldwide>

Statista. 2021. *Global market size of the hospitality industry 2020 | Statista*. [online]
    Available at: <https://www.statista.com/statistics/1247012/global-market-size-of-the-
    hospitality-industry/>

Stockopedia. 2022. *Marriott International Share Price - MAR Share Price | Stockopedia*.
    [online] Available at: <https://www.stockopedia.com/share-prices/marriott-
    international-NSQ:MAR/>

Su, C. and Chen, C., 2020. Does sustainability index matter to the hospitality
    industry?. *Tourism Management*, 81, p.104158.

Sustainability.booking.com. 2021. Booking.com's 2021 Sustainable Travel Report Affirms
Potential Watershed Moment. [online] Available at:
<https://www.sustainability.booking.com/post/booking-com-s-2021-sustainable-
travel-report-affirms-potential-watershed-moment/].

Tourism Notes. 2020. *Sustainable Tourism - Definition, Principles, And Dimensions Of
Sustainable Tourism*. [online] Available at: <https://tourismnotes.com/sustainable-
tourism/>

Unfccc.int. 2022. *The Paris Agreement*. [online] Available at: <https://unfccc.int/process-
and-meetings/the-paris-agreement/the-paris-agreement>

Unwto.org. 2020. *Sustainable Development | UNWTO*. [online] Available at:
<https://www.unwto.org/sustainable-development>

Verified Market Research. 2021. Global Food Processing Market Size By Type. [online]
Available at: <https://www.verifiedmarketresearch.com/product/food-processing-
market/>

Verma, V. and Chandra, B., 2017. Sustainability and customers' hotel choice behaviour: a
choice-based conjoint analysis approach. Environment, Development and
Sustainability, 20(3), pp.1347-1363.

Wu, L., Achyldurdyyeva, J., Jou, W., Foung, W. and Jaw, B., 2021. Relief, Recovery, and
Revitalization Measures for Tourism and Hospitality Industry During Covid-19
Pandemic: Case Study From Taiwan. *SAGE Open*, 11(3), p.21.

Zarocostas, J., 2020. *World IP Day 2020: The search for eco-friendly materials in the
automobile industry*. [online] Wipo.int. Available at: <https://www.wipo.int/ip-
outreach/en/ipday/2020/articles/auto_industry.html>

7   List of pictures, tables, graphs and abbreviations

7.1   List of tables

7.2 List of graphs

7.3 List of abbreviations

KPI: Key Performance Indicator

ESG: Environmental, Social, Governance