

# **The financial effects of sustainable strategies in the Austrian construction industry**

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Bachelor of Science

International Management

Submitted to Sebastian Vlasich, MSc, BSc, LL.B. (WU)

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## **Affidavit**

I hereby affirm that this Bachelor's Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

The thesis was not submitted in the same or in a substantially similar version, not even partially, to another examination board and was not published elsewhere.

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## **Abstract**

In the Austrian society, sustainability is more relevant than ever before. Almost no other word better describes the Zeitgeist of the year 2022. That is why sustainable management with the help of constant innovation is the order of the day, also in business. However, the primary goal of a company is usually not to save the world but rather to maximize profits.

Therefore, this thesis questions how profitable a sustainable corporate culture is, what effects it has and whether it can even be an obstacle to profit, focusing on one of the dirtiest industries in Austria, the construction industry. For this reason, the following pages will first analyze the existing literature on the subject, including an analysis of existing sustainable strategies in the sector and an empirical analysis with data from the Austrian construction group, Strabag SE. The analysis tests the company's profitability in terms of EBIT margin from 2011 to 2021 against three different aspects of sustainability according to the Global Reporting Initiative, the proportion of women in the company, the emission of greenhouse gases, and the accident incident rate.

The data obtained gives an insight that can be seen as representative of the major three sizeable Austrian construction companies.

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## List of Abbreviations

CSR – Corporate Social Responsibility

SE – Societas Europaea

AG – Aktiengesellschaft

EIA – Environmental Impact Assessment

HDI – Human Development Index

EBIT – Earnings before Interest and Taxes

GDP – Gross Domestic Product

EU – European Union

UNDP – United Nations Development Programme

KPI – Key Performance Indicator

NGO – Non-governmental Organization

ESG – Environmental, Social Governance

UNEP – United Nations Environment Programme

STURE – Stakeholder and Urban Evaluation model

GRI – Global Reporting Initiative

UN – United Nations

CO<sub>2</sub> – Carbon Dioxide

SME – Small and Medium Enterprises

## 1 Introduction

According to (Zuo, Zilante, Wilson, & Davidson, 2012), humankind is affected by the construction industry in three ways, socially, economically, and environmentally. The sector arguably has a significant impact on these aspects of human life, so the recent trend of sustainability has also reached the construction industry. While this sector provides much value to the public by creating infrastructure, housing, and employment, it also creates numerous negative externalities, like air and noise pollution, and it causes lots of waste. (Afzal, Lim, & Prasad, 2017) argues that combining and balancing the three above mentioned aspects of sustainability is essential for the construction sector, calling the meta-level of economic, social, and environmental sustainability, organizational sustainability. (Afzal, Lim, & Prasad, 2017) also argues that when breaking down the three pillars of sustainability in the construction industry, one can think of the environmental aspect as having the goal of limiting the exploitation of natural resources, diminishing the negative environmental effect of construction activity, and making sure to leave the environment intact for future generations to come. The economic aspect aims to achieve growth and wealth, which creates long-term value. The social pillar of sustainability can be seen as part of corporate social responsibility (CSR), as it mainly focuses on ethical business operations, especially when conducting business in less developed nations.

According to (Heemskerk, Pistorio, & Scicluna, 2002), sustainability for businesses can be summarized as "Adopting business strategies and activities that meet the needs of the enterprise and its stakeholders while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future."

This thesis aims to describe the profitability of sustainability among large firms in the Austrian construction industry. This means that research will focus on the cost, benefits, and opportunities of adopting a sustainable strategy and how



construction businesses can establish a more sustainable way of doing business by adopting and analyzing sustainable strategies in the whole value chain.

The construction industry is a significant component of Austria's economic environment, with 315 075 people employed in this sector in 2019. It consists of 36 871 firms, most of them being small or medium enterprises. However, it is dominated by big international players like Strabag SE, which is also the 14<sup>th</sup> biggest construction enterprise in the world, with a net revenue of around 16.6 billion euros, Porr AG, with a net revenue of around 5.57 billion euros, and Swietelsky AG with a net revenue of around 3 billion euros. The construction sector also makes up 7.3% of Austria's GDP (Statista, 2020).

(Vijfvinkel, Bouman, & Hessels, 2011) claims that investing in a sustainable strategy benefits firms financially since consumers value a business's efforts to operate sustainably and are often willing to pay a higher price for greener products. Such strategies also can lessen the cost of labor and capital by reducing the amount of sick leave, avoiding potential fines and regulatory risks caused by supervising governmental institutions, a better reputation, and improved productivity since employees tend to value the job more. (Vijfvinkel, Bouman, & Hessels, 2011) also argues that sustainable practices might discourage potential investors, which could decrease a corporation's market value, but also points out that unprincipled corporate behavior might lead to consequences that harm a corporation's reputation and is thus damaging to business.

In general, sustainability plays a growing role in people's everyday lives, especially in Western societies. Investments in renewable energy sources are more prominent than ever before in Europe as many countries aim to become CO2 neutral. Also, the EU requires every newly constructed building in the nation bloc to have a neutral effect on climate change which primarily impacts the construction industry and will drastically change daily business operations for firms. In 2022 the EU proposed a legally binding package named "Fit for

55" which is part of its plan to become climate neutral by 2050. The package is an intermediate step to decrease emissions by 55% in 2030, including the previously mentioned climate-neutral buildings. (European Council, 2022)

## **1.1 Research outline**

This thesis will examine these two countering points of view and find a potential balance between them. Not much research has been conducted on combining financial performance with sustainable strategies in the construction sector. This thesis will aim to fill this knowledge gap and thus contribute to future research. It will also review current strategies already in use, like the life cycle assessment model or the Environmental Impact Assessment and evaluate potential shortcomings of those models. Finally, it will also aim to propose ways of improving business operations regarding the whole life cycle of a construction, from the raw resources being exploited to the rubble being disposed.

The research question for this bachelor thesis is formulated as follows: "Does better performance on Global Reporting Initiative metrics imply better economic performance in the Austrian construction industry, especially concerning the largest corporations?"

The Independent Variable of this research question is the performance of the companies in terms of Global Reporting Initiative metrics.

The dependent variable of this research question is the performance of the companies in terms of financial key performance indicators.

## **2 Literature review**

### **2.1 Definitions**

#### **2.1.1 Austria**

With its approximately 9 million inhabitants, Austria is a relatively small landlocked country located in the center of Europe (Austrian Embassy Washington, n.d.). With an HDI of 0.922, Austria is currently ranked 18th and can thus be considered a highly developed country. In addition, Austria has a Gross National Income of \$56,197, making it one of the wealthiest countries in the world. (UNDP, 2022)

For this bachelor thesis, Austria was chosen as the target country, partially due to the tremendously large proportion of value added by construction companies compared to other countries. Austrian construction companies are also highly active in Eastern Europe due to their geographical proximity. Primarily since the disintegration of the Soviet Union and the accompanying opening of Eastern European economies, Austria's accession to the European Union and the EU Eastern enlargements in 2004, 2007, and 2013 have opened the door to lucrative business in emerging economies for the Austrian construction industry. (Bundesministerium für Digitalisierung und Wirtschaftsstandort, 2022)

#### **2.1.2 Key performance indicators**

According to (Parmenter, 2010) Key Performance Indicators are corporate key figures that primarily deal with the economic performance of a company. Therefore, they are primarily relevant for management decision-making processes and thus play a vital role in the success or failure of a corporation.

In order to be considered a key performance indicator, the following 7 points must apply to the key figures, according to (Parmenter, 2010).

1. The ratio must not be financial, which means that it must not be presented in a currency.

2. The key figure must be measurable at constant intervals. Possible intervals are daily, weekly, quarterly, semi-annually, annually, and so on.
3. Must be relevant to the business area in which the respective company operates.
4. If a KPI does not show the desired result, it must be clear what actions can be taken to improve the performance of that KPI. Thus, KPIs must be actively influenceable by decisions made by decision-makers.
5. KPIs must be measurable numbers that tie responsibility to a team, meaning top-level management can consult lower-level managers who can take the necessary steps.
6. KPIs must have a critical impact on day-to-day business operations.
7. KPIs must have been tested, which means that it must be clear what steps need to be taken to influence them in a specific direction.

### **2.1.3 Case study**

The term Case Study is challenging to define, as there are already over 25 accepted definitions in the academic literature. (Rob VanWynsberghe, 2007) describes the case study method as a research approach that allows for the most profound and most comprehensive understanding of a diverse topic in a real-life setting.

Since this bachelor thesis aims to evaluate possible links between sustainable business operations and overall better financial performance, the case study method is a well-suited approach, especially since natural data from the real world are analyzed (Volchkov, 2021). The correlation of two different types of natural data will be analyzed, the key performance indicators of the Global Reporting Initiative and conventional financial key performance indicators.

## 2.2 Low-impact construction

According to (Halliday, 2019), low-impact construction is a term for adapted construction processes. Such adoptions include the usage of only organic construction materials and the avoidance of chemically manipulated materials. To reduce fuel and thus emissions, many construction firms emphasize on improved process management and need to create an adequate, sustainable waste management for the tons of waste construction projects cause. The construction sector is responsible for 35% of global CO<sub>2</sub> emissions and about half of the total waste disposed. This is why construction firms rethink their way of doing business to either meet their own ethical standards or to meet customer expectancies (Lima, Trindade, Alencar, Alencar, & Silva, 2021). According to (Statista, 2019), 14.1% of all surveyed employees in the construction sector stated that environmental protection is very important for their employer, and 34.6% stated it is important to their employing firm. On the other hand, 14.7% indicated that such measures are less important, and 10.6% declare that such measures are unimportant. Unfortunately, 26% of the surveyed employees were not able to give an answer to this question.

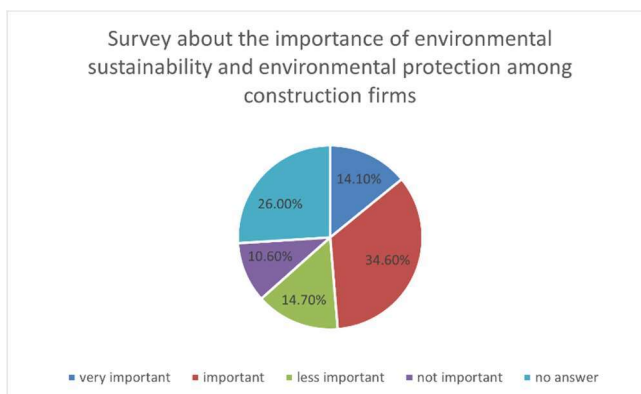


Figure 1: Survey about the importance of environmental sustainability and environmental protection among construction firms (Statista, 2019)

According to (Ugwu & Haupt, 2007), sustainable construction methods are especially complex at projects regarding infrastructure and civil engineering. While there is already much knowledge and high-quality instruments to keep

the impact of structural engineering on the environment as small as possible, there is still room for improvement regarding civil engineering projects. This is because those responsible for regional policy generally regard infrastructure construction activities rather from a macro-level point of view with little to no civil engineering planning focusing on the micro perspective of local environmental factors.

### **2.3 Environmental Impact Assessment**

(Glasson, Therivel, & Chadwick, 2012) asserts that the term environmental impact assessment stands for a profound process whose goal is to prevent negative impacts on the environment from the outset through of a project. The unique feature of EIA is that, unlike other environmental protection measures, it aims to prevent an unnecessarily high environmental impact before it happens.

(Glasson, Therivel, & Chadwick, 2012) also states that "The term 'environmental assessment' describes a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgements on whether the development should go ahead."

#### **2.3.1 Environmental Impact Assessment in Austria**

The environmental impact assessment was introduced in Austria as a legally binding requirement for major projects as early as 1994 following a decision by the European Union. Since then, the environmental impact assessment for Austrian construction projects has played a tremendous role compared to other European countries. While in Germany, the EIA is only conducted as an appendix to the usual approval of a construction project, a separate and independent procedure is conducted in Austria. Due to the special strictness of

the EIAs in Austria, clients of larger projects try to avoid an objection in the EIA, by paying particular attention to the environmental guidelines, although this is not always successful. As many parties have often criticized this strictness, there have been several attempts to weaken the law in force in Austria. However, each attempt was met with complaints from NGOs, which eventually resulted in the European Commission initiating contract infringement proceedings against Austria. (Stephan Heid, 2020)

The following are the aims of the Environmental impact assessment in Austria, according to (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, n.d.) .

- "To prevent environmental damage from the outset by following the precautionary principle
- To consider the environmental impacts holistically and comprehensively, not only regionally delimited
- To achieve better preparation of projects and approval procedures
- To give environmental concerns the same importance as other concerns in the planning and decision-making process
- To make the approval procedures for projects involving the public more transparent and comprehensible"

The author of (Arbeiterkammer , 2008) claims that the introduction of the EIA has brought a lot of benefits to the Austrian society and environment. Positive aspects that the author mentions are

- A qualitative improvement of construction projects, especially in terms of environmental protection. In addition, the introduction of the EIA made effective project management necessary, which sustainably increases the general quality of the undertakings carried out.
- Before the introduction of the EIA, not considered marginal areas which the construction process has large effects on, like soil protection, regional planning and effects on traffic were often disregarded.

- The environmental requirements for projects have become much more detailed and precise since the introduction of EIA. This makes it easier for project planners and clients to comply with the set standards.
- The EIA process is very transparent, as the Ministry of Climate Protection is obliged to inform the National Council about the results. In addition, the EIA is documented in great detail.

The author sees weaknesses in the EIA in the following points:

- One of the main environmental problems in Austria is the ever-increasing soil sealing. However, the EIA is not a valuable tool for easing this problem since only the largest construction projects, and thus only a tiny part of all projects, are subject to EIA. Soil sealing is primarily caused by a large number of small projects rather than a handful of large ones.
- The EIA only considers the direct impact of a project on the local environment. Therefore, the impact on the macro-ecological situation, such as the emission of CO<sub>2</sub>, is not taken into account.

## **2.4 Life cycle assessment in the construction industry**

The so-called life cycle assessment aims to estimate the environmental impact of a product in every stage of its life cycle. Especially in the construction sector, this is a standard method of evaluating the effect bigger projects have on the environment in every part of the value chain. Every step in the process, from the extraction of the raw resources to the demolition of the building and the following disposal of debris, is considered in the life cycle assessment. It has been in use since the 1990s, and numerous projects have been evaluated with its help. Since its first introduction to the construction sector, it has been developed and advanced quite a lot. The most common methods to assess the life cycle are sorted into three categories. Level three aims to evaluate the project as a whole.



Level two aims to support design decisions of a construction project, also on aspects of sustainability, and level one intends to compare different goods with each other. Of course, the sole use of a life cycle assessment is not sufficient for a company to operate eco-friendly. However, it is a fundament for helping businesses and countries with becoming more sustainable. (Ortiz, Castells, & Sonnemann, 2009)

## **2.5 The construction industry from a macroeconomic viewpoint**

The construction sector is an essential pillar in the economy of a country. Not only is it a big employer and contributor to a nation's income, but it is also a basis without which many other sectors would not be able to run, as it provides other sectors with the necessary infrastructure to operate. In developed nations, construction usually makes up for 7 to 10% of the nation's GDP, while in developing countries, it usually makes up for 3 to 6% of GDP. In times of recession, the construction industry proved to be an efficient tool to stimulate the economy through deficit spending and fiscal policy. In times of economic stagnation or regression, fiscal policy is a highly effective tool governments can use to stimulate the economy. Thereby, the state attempts to equalize potential declines in consumer behavior with governmental monetary reserves. Due to the close links to other sectors, investments in construction allow for a multiplier effect, making it an investment in other sectors as well. The multiplier effect for construction projects is often indicated as 2.5, meaning that every Euro invested into the industry brings 2.5 euros to the economy. About half of a developed nation's gross fixed capital formation and approximately one-third of a country's accumulated investments lead back to this industry. (Wibowo, 2009)

Fiscal policy is often linked to an over-indebtedness by the state since governmental revenues decrease in times of economic stagnation while expenses rise. The primary goal of fiscal policy is to prevent losses in gross domestic product and overall prosperity. There are two main kinds of fiscal

policy, typical investments, where the public hand stimulates the economy by funding more significant infrastructural projects, or the modernization of publicly owned buildings like schools or official buildings. The other form of fiscal policy, which is not as effective as the primary form of fiscal policy and is rather a tool to stabilize the economy than actual deficit spending, are subventions for private households or businesses. When governments decide which products will be subsidized, they also have political goals in mind. In the closer past, primarily products that helped the country achieve specific environmental protection goals were often subsidized. Concerning the construction industry, relevant subsidies were housing subsidies and modernization of buildings. Thereby the political goal was to provide the public with affordable housing and reduce the environmental impact of badly isolated buildings, while still stimulating the economy. (Schaffler, 2020)

## **2.6 The Austrian construction sector**

As this thesis examines the financial implications of sustainable strategies for big firms in the Austrian construction sector, it is reasonable to give a quick overview of the sector. (Schaffler, 2020) argues that with a contribution of 6.9% to Austria's accumulated gross value added, the construction sector is a significant pillar in the national economy and is significantly above the EU average of 5.7%. 6.9% of the working population in Austria found employment in this sector. Comparing this number to the EU average of 6.5%, the Austrian construction sector appears to be disproportionally big. This thesis considers the Austrian construction industry as one entity. However, according to (Statistik Austria, 2020), it can be divided into three categories, structural engineering, and civil engineering, where 36% and 23% of the sector's revenue is generated, and other construction activities, with a share of 41% of the industry's revenue. The industry's biggest client is the public sector, which is responsible for about half of the income acquired in civil engineering and for around 10% in structural engineering. The majority of firms, around 80%, only employ nine people or

less. The sector has an accumulated gross value added of 53.86 billion euros and a total workforce of 315 078 people employed in 36871 firms. The biggest firm is Strabag SE with a net revenue of 16.617 billion euros, followed by Porr AG with a net revenue of 5.57 billion euros and Swietelsky AG with 2.805 billion euros. These firms are the three most prominent players in the Austrian construction sector and have an accumulated income of around 28.5 billion euros. The Austrian construction sector index calculated with the basis year of 2015 accumulated 114.6 in the first quarter of 2021, meaning that in the first quarter of 2021, construction prices increased by 14.6% compared to 2015 in Austria. (Statista, 2020)

## **2.7 The profitability of sustainability in business**

According to (Ansari, 2018), going green is often associated with high costs and low performance. However, this assumption is mostly incorrect because companies using so-called sustainability reports, which is a tool with which businesses report the impact their operations made, tend to have higher growth rates and greater valuations. Such reports often go hand in hand with more trust from consumers. This is why the author states that investments in sustainability should be considered investments in a company's corporate performance. (Gillan, Koch, & Starks, 2021) argues that corporate sustainability can be seen as being committed to issues of "environmental, social governance" (ESG) and "corporate social responsibility" (CSR). Sustainability had a significant boost in the last decade in the corporate world, and the share of businesses making use of sustainability reports has multiplied. The author argues that firms with a high priority on ESG and CSR are less affected by crises. Also, by serving a different consumer group and a different product differentiation strategy, firms that value sustainability face a lower price elastic demand and are thus less prone to systematic risks coming from elastic prices than firms that do not evaluate their strategies on aspects of sustainability.

The aspect of place in the context of sustainability should not be underestimated since the general attitude towards sustainability in a country plays a major role in the financial effects of ESG and CSR. In countries where sustainability is important to the general population, ESG and CSR usually lead to a more pleasing bond rating and thus decrease the cost of capital. In countries where sustainability is not essential to the public, it is the opposite, and ESG and CSR are likely to have a negative effect on a firm's cost of capital. (Statista, 2019) shows that sustainability is indeed an essential criterium for the purchase decision of Austrian consumers. 78.3% of the surveyed stated that they are willing to overpay for a sustainably produced good. While the survey focused on groceries and not on constructions, it still shows that sustainability is a high priority among the Austrian population.

## **2.8 Corporate social responsibility**

Corporate social responsibility (CSR) is a broad term, but it generally deals with the relationship between firms, governing institutions, and citizens. According to another definition of corporate social responsibility, it is concerned with enlarging the positive and mitigating the negative impacts of operations on the corporation's stakeholders. Following literature draws a connection between organizational behavior and utilitarianism. According to that, firms that act according to a high standard of corporate social responsibility should rather focus on making life better for the highest possible number of people, not only for the shareholders. Meaning for firms, focusing on achieving the best possible outcome for their stakeholders should be the highest priority. By ensuring social responsibility for current generations and future generations, corporate social responsibility thus should also focus on easing the environmental harm by operating as sustainably as possible (Crowther & Aras, 2008).

"Corporate social responsibility (CSR) is a concept whereby companies integrate social and environmental concerns in their business operations and in

their interaction with their stakeholders on a voluntary basis. It is about enterprises deciding to go beyond minimum legal requirements and obligations stemming from collective agreements in order to address societal needs. " (EU Commission, 2006)

Since corporate social responsibility aims to create value for a firm's stakeholders, managers are asking whether it pays off for the firm itself.

According to (HEC Paris) a high commitment to CSR pays off in most cases. It leads to higher brand loyalty by customers, a decrease in ESG risks, and an improvement in the organizational commitment delivered by the workforce. On the other hand, the non-use of CSR methods may come at a very high opportunity cost because well-managed CSR can protect firms from public backlashes and damage to a firm's reputation. A collection of studies on the rentability of CSR concluded that in 31% of all cases when CSR is applied, it provides the firm with a significant financial benefit. In 61% of studies, CSR had a moderate beneficial effect on a firm's profitability. In 4% of all cases, CSR had a slight negative impact on a firm's performance, and only in 2% it had a significant negative impact. So, according to this collection of studies, investments in CSR pay off in most cases.

## **2.9 Financial management in the construction industry**

Financial management in general, deals with making the soundest financial decisions for firms. These decisions can either be investment, financing, or asset-related. (Horne & Wachowicz, 2005)

This thesis aims to propose sustainable strategies for construction operations, which are also financially feasible from a corporate finance standpoint. It is crucial to examine how financial management in the construction sector differs from other sectors. Financial management aims to relocate a firm's financial resources most efficiently. Financial management in the construction industry

does the same, but it faces different challenges than in other sectors. (Peterson, 2019)

(Peterson, 2019) states that the critical difference between a construction business and other businesses is that the construction business is project-oriented and not process-oriented. Unlike manufacturing firms, where every product is the same, or at least similar, every project is different in construction operations. The processes of the construction of a skyscraper cannot be compared to the construction of a road. Even if some processes, like installing windows or an elevator, might appear repetitive, they usually are not because the building site is never identical. Therefore, the sizes of amenities and the installation of those are always unlike. This means that due to the nature of construction work, every project needs to be calculated independently. Another implication for construction projects is that the creation process does not occur at a centralized location. Due to this decentralized production process, it is harder for firms to keep track of the position of equipment and employees.

Construction workers barely work on a project from the beginning to the end since many of them are specialized in one task, and if this task is completed, they move on to the next project. (Peterson, 2019)

Cashflow frequency also differs for the construction industry. Most construction projects are being conducted during spring, summer, and fall. When firms undertake several projects at once, they are often run on a similar billing cycle, which creates spikes of cash inflow and a longer period of no inflows. Therefore, construction firms often face difficulties in maintaining a healthy financial situation in the periods before the cash inflows. Another difficulty construction firms might face is that they often take over the responsibility and management of the whole project. Therefore, firms frequently need to make subcontracts with other firms. One construction firm is usually not capable of conducting the whole project on its own and needs specialized firms for specific tasks. The whole progress of projects often depends on the completion of one single task,

and if subcontracted firms are negligent, the whole business activity might have to be put on hold. (Peterson, 2019)

All those implications are what make financial and overall management activities in construction work special. They are the reason why the sector has by far the highest business failure rate, according to (Statista, 2020). As shown in the graph below, the construction sector has the most immense bankruptcy rate in the Austrian economy. Even in 2020, when the hospitality industry was unable to operate accordingly, the business failure rate in the construction industry was almost double compared to the hospitality industry. Of course, the construction industry generally also suffered from the economic downturn due to an overall decrease in national income and other special regulations to prevent the spread of covid-19. However, as a whole, the measures affected businesses in the hospitality industry much more than in the construction industry, where operations were never stopped.

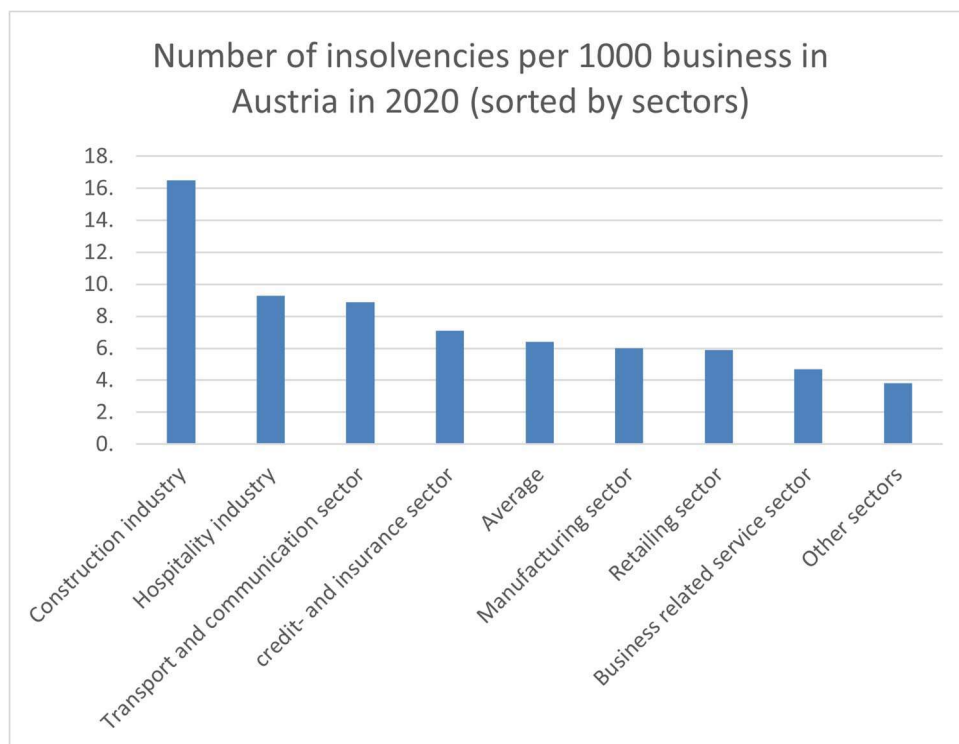


Figure 2: Number of insolvencies per 1000 businesses in Austria in 2020 (sorted by sectors) (Statista, 2020)

According to (Persson, Landin, Olander, & Persson, 2008) implementing sustainable processes in the construction industry makes financial management in construction projects even more complicated. To make the building project the most sustainable as possible, the authors of the paper suggest the so-called "STURE" model. "STURE" is an acronym for stakeholder and urban evaluation model. The author also mentions the "International standard for sustainability in building construction" (ISO 15392) and the "triple bottom line of sustainability" which includes aspects of environmental protection, human development, and economic development. If a construction firm is committed to these rules and models in the management process of a project, it can achieve the best ideal outcome in terms of sustainability.

## **2.10 Global reporting initiative**

The Global Reporting Initiative (GRI) was first introduced in 1997 by the North American Coalition for Environmentally Responsible Economies. However, the true internationalization of the initiative occurred two years later, in 1999, when the UN-led United Nations Environment Program (UNEP) began partnering with the GRI.

The goal of the Global Reporting Initiative is the worldwide dissemination of sustainability reports for public companies. The GRI seeks to provide enterprises with a standard to more accurately and effectively document their impact on people and the environment. Nevertheless, the GRI is also beneficial for investors and stakeholders, who can make better investment decisions by incorporating a company's GRI metrics into their decision-making process.

The GRI cannot replace the regular financial reports of businesses, but it complements them. The GRI thus enables anyone to assess the sustainability of a public company and compare it with other public companies. It is divided into several sections, labour ethics, economic and social factors, environmental



factors, humanitarian aspects, and factors related to the safety of the product or service offered by the company. The GRI is thus based on the so-called "triple bottom line," which states that a company's performance can be measured based on its achievements in the areas of economy, humanity, and environmental sustainability. (Marimon, Alonso-Almeida, Rodríguez, & Alejandro, 2012)

### **3 Research design**

#### **3.1 Methods**

A research design gives a scientific paper a framework that guides the work from the first step, the data collection, to the last, the interpretation and dissemination of the findings.

According to (Universität Leipzig, n.d.), the research design describes the following aspects of a thesis.

- The general topic of the thesis
- The research design describes the question, which is investigated by the thesis.
- It describes the goal with which the research question of the thesis is considered and analyzed.
- It describes the type of data used to analyze the thesis question and interpret the findings.
- The basic assumptions on which the whole thesis is based.
- It describes the means and tools to analyze the research question.
- In addition, it describes the general framework under which the data collection up to the data analysis and interpretation of the research question takes place.

Qualitative, quantitative, and mixed methods approaches are the three significant research designs in academic work.

A Quantitative approach is best suited for testing a correlation between two or more variables. For quantitative approaches, data collection is usually conducted with the help of instruments. The collected data is then analyzed with statistical methods. The hypothesis is tested in a deductive way, meaning that general laws are narrowed down to be more specific. (Creswell, 2014)

Qualitative approaches are mainly used for evaluating social issues. The process of data collection in a qualitative approach takes place in the natural environment of the subjects of the study. The collected data is then analyzed inductively, which means that the researcher intends to derive a broader subject from a smaller one. (Creswell, 2014)

The third approach is called mixed methods. It is a mixture of qualitative and quantitative methods. The main motivation of a researcher choosing a mixed-methods approach is that it encompasses more aspects and is therefore able to evaluate more findings than a qualitative, or quantitative approach on its own could do. (Creswell, 2014)

According to (Will Kenton, 2020) quantitative analysis is widely used to analyze financial ratios. Generally, it is used almost exclusively for the analysis of numerical data. Since this bachelor thesis aims to analyze real world data and, since the collection of data about the effects of sustainable strategies in an Austrian construction firm is an operation primarily centered around the collection and analysis of raw numeric data, the preferred research design for this study is a deductive, quantitative method.

### **3.2 Hypotheses**

As stated in the introduction of this bachelor thesis, the research question is as follows: "Does better performance on Global Reporting Initiative metrics imply better economic performance in the Austrian construction industry, especially

among the largest companies?", where variables of sustainable performance of Strabag SE are the independent variables, and the economic performance of the company, presented in this paper as the EBIT- margin, are the dependent ones. Considering the research question, three one-tailed hypotheses were formulated. Each hypothesis deals with a different aspect of a sustainable corporate culture. The author assumes that the better the performance in sustainability, the better the company also performs in the financial sense.

### **3.2.1 Hypothesis 1**

The first research question deals with the proportion of women in the company Strabag SE. This hypothesis is relevant for the company's sustainability, as gender equality is the fifth sustainable development goal of the UN. The hypothesis is as follows:

H<sub>0</sub>: A higher proportion of women has no positive impact on the financial performance of Strabag SE.

H<sub>1</sub>: A higher proportion of women has a positive impact on the financial performance of Strabag SE.

### **3.2.2 Hypothesis 2**

The second hypothesis deals with one of the most socially relevant issues regarding sustainability, namely greenhouse gas emissions. This hypothesis alludes to the sustainable development goal number 13, climate action. The hypothesis is as follows:

H<sub>0</sub>: A higher contribution to the reduction of greenhouse gas emissions has no positive impact on the financial performance of Strabag SE.

H<sub>1</sub>: A higher contribution to the reduction of greenhouse gas emissions has a positive impact on the financial performance of Strabag SE.

### **3.2.3 Hypothesis 3**

The third and last hypothesis deals with the accident incident rate of the employees of Strabag SE. The sustainable development goal which this hypothesis is based on, is number 3, good health and wellbeing. The hypothesis is as follows:

H<sub>0</sub>: A lower accident incident rate has no positive impact on the financial performance of Strabag SE.

H<sub>1</sub>: A lower accident incident rate has a positive impact on the financial performance of Strabag SE.

### **3.3 Data collection**

Since this study aims to demonstrate a possible link between the sustainable strategies of large construction groups in Austria and better financial performance, secondary data from the Austrian company Strabag SE was used. This construction company started to publish data regarding the Global Reporting Initiative in its annual stockholder report earlier than comparable firms. For this reason, this company has much more data available on sustainability that can be dated back to 2010. All data to be analyzed in this paper are therefore taken directly from the annual reports of Strabag SE between the years 2010 and 2021 and are representative of the three major players in the Austrian construction sector, namely Strabag SE itself, Porr AG, and Swietelsky AG. It is striking that all three companies are public corporations and therefore have the same legal form, which increases the comparability of the companies. Furthermore, even though Strabag has adopted a "Societas Europaea" legal form, the legal forms are insignificantly different. As mentioned above, financial performance data is compared with data relating to the Global Reporting Initiative. Now, the data on financial performance is pervasive since this is the central part of the interest of the stockholders, so it was necessary to decide which data would be used in the analysis and would therefore be relevant for the data collection.

### 3.3.1 EBIT margin

The key figure of the EBIT margin, which is primarily used by Strabag SE in the presentation of its financial performance, is used and selected for closer analysis. The collected data regarding the EBIT margin date back to the year 2011, as the EBIT from the years 2010 and earlier is irrelevant because only from 2011 on relevant data regarding sustainability has been collected and published in the annual report of Strabag SE. A gradual increase in the EBIT margin can be observed over the years, with the lowest value in 2012 at 1.6% and the highest value in 2021 at 5.9%.

Year	EBIT margin
2011	2.4% (Strabag, 2012)
2012	1.6% (Strabag, 2013)
2013	2.1% (Strabag, 2014)
2014	2.3% (Strabag, 2015)
2015	2.6% (Strabag, 2016)
2016	3.4% (Strabag, 2017)
2017	3.3% (Strabag, 2018)
2018	3.7% (Strabag, 2019)
2019	3.8% (Strabag, 2020)
2020	4.3% (Strabag, 2021)
2021	5.9% (Strabag, 2022)

*Table 1: EBIT margin of Strabag SE between 2011 and 2021*

### 3.3.2 The proportion of women among Strabag employees

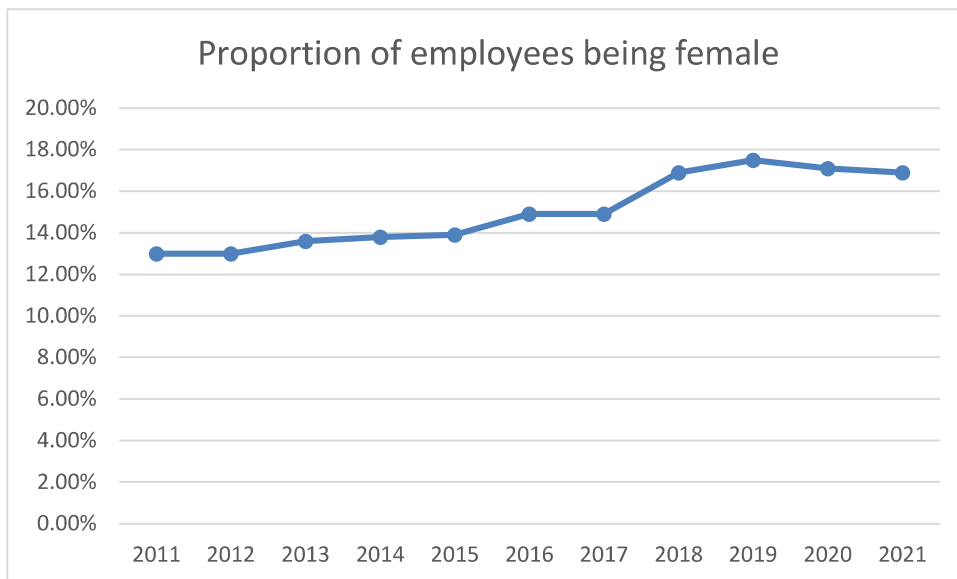
The data sets that are tested concerning sustainability are, on the one hand, the quota of women in the entire group, which refers to humanitarian sustainability, namely equality between men and women (reference: sustainable development goal number 5, gender equality).

Year	Proportion of female employees in the Strabag group
2011	13% (Strabag, 2012)
2012	13% (Strabag, 2013)
2013	13.6% (Strabag, 2014)
2014	13.8% (Strabag, 2015)
2015	13.9% (Strabag, 2016)
2016	14.9% (Strabag, 2017)
2017	14.9% (Strabag, 2018)
2018	16.9% (Strabag, 2019)
2019	17.5% (Strabag, 2020)
2020	17.1% (Strabag, 2021)
2021	16.9% (Strabag, 2022)

*Table 2: Proportion of female employees in Strabag SE between 2011 and 2021*

A slight increase can be observed in the table above, with the proportion of female employees climbing from 13% in 2011 to 17.5% in 2019. However, from 2019 to 2021 the number thereafter decreased by 0.6 percentage points to

16.9%. This means that there was a total growth of female employees from 2011 to 2021 of 3.9 percentage points, or 30%.



*Figure 3: Visualizing of the female proportion among Strabag SE employees*

### **3.3.3 Kilograms of greenhouse gas emitted per Euro of revenue generated**

The second sustainability data set relates to the annual kilograms of greenhouse gas emissions per Euro of revenue generated by the group. Although this data is not published directly by the Strabag Group, it can be calculated by dividing the annual revenue generated by the annual greenhouse gas emissions in kilograms. Therefore, these data sets relate to environmental sustainability and can be directly associated with sustainable development goal number 13, climate action.

Year	Euros of revenue generated per 1 kg of CO2 emitted (in Euros)
2011	16.73966103 (Strabag, 2012)
2012	13.29031558 (Strabag, 2013)
2013	12.7895586 (Strabag, 2014)
2014	13.735659 (Strabag, 2015)
2015	14.70598125 (Strabag, 2016)
2016	14.82817257 (Strabag, 2017)
2017	15.41092179 (Strabag, 2018)
2018	18.0287109 (Strabag, 2019)
2019	18.79311503 (Strabag, 2020)
2020	21.32100911 (Strabag, 2021)
2021	20.95172904 (Strabag, 2022)

*Table 3: Euros of revenue generated per 1 kg of CO2 emitted (in Euros) between 2011 and 2021 by Strabag SE*



### 3.3.4 Accident incident rate

The third set of data related to sustainability is the company's accident incident rate. Unfortunately, data on this has only been published directly in the annual report since 2015. However, it is still used in the data analysis to assess the group's sustainability concerning sustainable development goal number 3, good health and wellbeing. According to (Strabag, 2020) the accident incident rate shows the number of occupational accidents per 1 million productive working hours in the group. An accident incident rate of 17.6, as in 2015, means that 17.6 accidents occurred per 1,000,000 working hours. However, a gradual decrease in those numbers can be observed over the years, from 17.6 in 2015 to 15.6 in 2021.

year	Accident Incident Rate
2015	17.6 (Strabag, 2016)
2016	17.6 (Strabag, 2017)
2017	17.4 (Strabag, 2018)
2018	15.9 (Strabag, 2019)
2019	15.9 (Strabag, 2020)
2020	15.9 (Strabag, 2021)
2021	15.6 (Strabag, 2022)

*Table 4: Accident Incident Rate among Strabag SE employees between 2015 and 2021*

## 4 Data analysis

### 4.1 Pearson's Product Moment Correlation Coefficient

According to (Sneirson, 2009), in the past, sustainability has often been seen as an obstacle to a financially prosperous company. Nevertheless, innovation and social change in recent years have created an environment in which a sustainable corporate culture promotes rather than hinders the organization's profitability. Thus, sustainability and corporate performance should be positively correlated.

(Sedgwick, 2012) claims that the Pearson product-moment correlation coefficient is the best fit to establish a correlation between two or more numerical variables. In the case of this bachelor thesis, these are, on the one hand, the financial performance, represented as EBIT margin. On the other hand, the company's sustainability is represented by the women's ratio, Euros of sales generated per kilogram of greenhouse gases emitted, and the accident incident rate.

The Pearson product-moment correlation coefficient is necessarily a number between 1 and negative 1. A result of 0 to 1 indicates a positive correlation between two variables, a coefficient of 0 indicates that there is no correlation between the variables, and a coefficient of 0 to negative 1 indicates a negative correlation. (Sedgwick, 2012)

A significance test between the variable of financial performance and variables representing sustainability is also performed, where the hypothesis H1 is to be accepted at a p-value of  $<0.05$  and rejected at a p-value of  $>0.05$ . (Sedgwick, 2012)

The meaning and interpretation of Pearson's product-moment correlation coefficient is discussed in more detail in the table below. The data are retrieved from (Akoglu, 2018).

Correlation coefficient	Meaning in terms of correlation
1	Perfect, positive
0.99 - 0.7	Strong, positive
0.69 – 0.40	Moderate, positive
0.39 – 0.01	Weak, positive
0	None
-0.01 - -0.39	Weak, negative
-0.4 to – 0.69	Moderate, negative
-0.7 to -0.99	Strong, negative
-1	Perfect, negative

*Table 5: Interpretation of the Pearson's Product Moment Correlation coefficient*

## 4.2 Testing correlations between metrics of sustainability and profitability

### 4.2.1 Hypothesis 1

As described in section 3.2.1, this hypothesis deals with the proportion of women in the company and a possible concomitant increase in profitability. The result of Pearson's product-moment correlation coefficient is as follows:

#### Correlation Matrix

		EBIT margin	Females
EBIT margin	Pearson's r	—	
	p-value	—	
Females	Pearson's r	0.846	—
	p-value	0.001	—

*Figure 4: Correlation Matrix between the EBIT margin and the proportion of female employees*

The statistical test with a Pearson correlation coefficient of 0.846 indicates a strong positive correlation between the proportion of women at Strabag SE and the profitability of the group. Furthermore, the p-value indicated a result of 0.001, which means that the result is significant. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted.

#### 4.2.2 Hypothesis 2

The table below shows that the Pearson correlation coefficient between the EBIT margin and the euros in revenue generated by every kilogram of CO<sub>2</sub> emitted is 0.871, meaning that there is a strong positive correlation between these two variables.

#### Correlation Matrix

		EBIT margin	Euros/Co2
EBIT margin	Pearson's r	—	—
	p-value	—	—
Euros/Co2	Pearson's r	0.871	—
	p-value	< .001	—

*Figure 5: Correlation Matrix between the EBIT margin and Euros of revenue generated per 1 kg of CO<sub>2</sub> emitted (in Euros)*

Moreover, it can also be observed that the p-value of the test is less than 0.001, which indicates the significance of the H<sub>1</sub> hypothesis, so the null hypothesis should be rejected, and the alternative hypothesis should be accepted.

### 4.2.3 Hypothesis 3

The third hypothesis concerns a possible relationship between profitability, represented by the EBIT margin, and the occupational injury rate. The Pearson coefficient, in this case, is -0.758, indicating a strong negative correlation. In contrast to the other hypotheses, there is a negative correlation because the occupational injury rate has continuously decreased over the years, while the EBIT margin has increased.

#### Correlation Matrix

		EBIT margin	AIR
EBIT margin	Pearson's r	—	—
	p-value	—	—
AIR	Pearson's r	-0.758	—
	p-value	0.048	—

*Figure 6: Correlation Matrix of the EBIT margin and the Accident Incident Rate*

The P-value is just below the 0.05 threshold with a value of 0.048, indicating that the alternative hypothesis should be accepted while the null hypothesis should be rejected.

## **5 Conclusion**

At the end of this thesis, it can be stated that all three alternative hypotheses can be accepted. A higher quota of women and a better CO<sub>2</sub> balance have thus had a positive effect on the company's financial performance. A lower accident rate at work also had a positive effect on the company's financial performance, although not quite as strong as the other two aspects of sustainability. Even if the construction industry, as stated in the literature review, is still one of the dirtiest sectors, the figures show that there have been noticeable improvements over the last ten years. In addition, reporting based on the Global Reporting Initiative has been introduced and has become more explicit and detailed over the years.

After completing all statistical tests and interpreting the results, the research question "Does better performance on Global Reporting Initiative metrics imply better economic performance in the Austrian construction industry, especially among the largest companies?" can now be answered. Yes, there is a positive connection between the tested aspects of sustainable corporate culture and the profitability of large Austrian construction companies.

Literature regarding sustainability in the construction industry generally suggests a positive correlation between firms with a high commitment to sustainability and sound financial performance, especially in Western European countries. Since sustainability plays a big role in most Austrian consumers' purchasing decision-making processes, it is very likely that a high commitment to sustainability also positively affects an Austrian construction firm. For the issue of profitability of sustainability, it can be stated, that according to most literature, businesses with a priority on sustainable processes do in general, have advantages over firms that do not. However, sustainability also requires financial investments, and these investments are undoubtedly more challenging to sustain for SMEs than for larger corporations. In general, most literature agrees that sustainable processes reduce the cost of capital and labor and

increase employee satisfaction. However, one downside of implementing sustainable processes most academic literature agrees on is that it can scare off investors.

### **5.1 Future outlook and implications**

Even though this thesis could answer the research question regarding some aspects of sustainability, there are many more relevant sustainability data sources in the construction industry, such as the share of recycled asphalt. However, some of the data for these indicators do not go back further than 3 years, which poses a problem for the statistical evidence of the figures. Nevertheless, should the data situation concerning sustainability improve in the coming years for large construction groups, or at least remain at the level of 2021, the author of this thesis considers further statistical tests between sustainability and profitability to be feasible.



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