KCC Schriftenreihe

Band 5

Linda O'Riordan / Piotr Zmuda (Hrsg.)

Corporate Digital Responsibility

The Influence of Digitalisation on Sustainable Corporate Development

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Constantin Wilkinson

FOM Hochschule | KCC

KCC KompetenzCentrum für Corporate Social Responsibility
der FOM Hochschule für Oekonomie & Management

Constantin Wilkinson

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KCC Schriftenreihe der FOM, Band 5

Essen 2023

ISBN (Print) 978-3-89275-324-7 ISSN (Print) 2196-9884
ISBN (eBook) 978-3-89275-325-4 ISSN (eBook) 2569-5746

Dieses Werk wird herausgegeben vom KCC KompetenzCentrum für Corporate Social Responsibility der FOM Hochschule für Oekonomie & Management gGmbH

Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliographie; detaillierte bibliographische Daten sind im Internet über http://dnb.d-nb.de abrufbar.

MA Akademie Verlags-
und Druck-Gesellschaft mbH
Leimkugelstraße 6, 45141 Essen
info@mav-verlag.de

Corporate Digital Responsibility – The Influence of Digitalisation on Sustainable Corporate Development

Constantin Wilkinson

Contact Information
Constantin Wilkinson B.A.
Email: const.wilkinson@gmail.com

Preface

In this well-timed work, Constantin Wilkinson expertly draws our attention to the frequently underestimated impact of digitalisation in social, ecological, and economic spheres.

The increasing salience of the role of digitalisation within the context of the various persistent challenges facing the world highlights the significance of taking collective responsibility to carefully consider how digitalisation can both support and simplify our daily activities, while simultaneously potentially posing significant threats.

The qualitative research study contributes to the extant literature by offering a sound theoretical review of Corporate Digital Responsibility (CDR) from the perspective of German IT firms. Based on data collected via the interview method, the various influencing factors, the inherent opportunities and threats, as well as the implications for management practice are insightfully presented.

In his perceptive exploration of the impact of digitalisation on sustainable corporate development, Constantin Wilkinson encourages both general reflection and particular consideration for the responsibilities of leaders and other decision-makers in the IT sector. The role of corporations in serving as best case examples of sustainable practice is exemplified. Mindset change to capture value not merely in terms of financial gain is recommended.

The study analytically and critically reflects on how business leaders can serve as multipliers in rethinking, changing, and thus realising meaningful change in society. The research enhances our appreciation of how business decision-makers can choose to respond to the complexities of the digital era.

Dr. Linda O'Riordan

Professor of International Business

FOM University of Applied Sciences

Essen, July 2023

Abstract

Climate change, the loss of biodiversity, increasing pollution, and the constant consumption of natural resources are just some of the many challenges our world is currently facing. Digitalisation has entered almost all areas of our lives. It supports us every day and simplifies our lives. At the same time, however, the digitalisation of our world also harbours massive dangers that we have to face. In recent years, the world's population has grown steadily and terms such as "digitalization" and "sustainability" have become global buzzwords, not only in niche topics but also in major policy and economic areas. Particularly present is the topic of global climate change with its fight, and all its consequences. Digitalisation has a greater impact on the economy and society than is generally assumed. The demand for an overarching social responsibility for our planet and the people who live on it is becoming increasingly relevant, so that all people have a fair chance of a future in social, economic and ecological terms.

This paper deals with the current challenges the world is facing, such as climate change, loss of biodiversity, pollution and the constant consumption of natural resources. It highlights the role of digitalisation in our lives: digitalisation supports and simplifies our daily activities, but also poses significant threats that need to be addressed. The work emphasises the importance of taking responsibility for our actions in order to create a more sustainable world and working together to achieve this. This paper encourages reflection that prosperity should not be measured only in terms of financial gains but that solutions, such as sharing, and the circular economy require people who can implement and realise them while rethinking and changing structures. Companies have a responsibility to serve as multipliers by setting a good example. Global challenges, such as meeting basic needs, combating climate change, increasing population growth, and the demand for sustainable consumption and production behaviour, mean that companies must face ecological challenges, as well as social and economic ones.

This paper explores the main influencing factors of digitalisation on sustainability from the perspective of German IT companies. It explores the opportunities and threats for the environment, the economy and the society that result from increasing digitalisation. It highlights that there is no second earth – no plan B. The time to declare the road to sustainability as Road to Mainstream is now.

Keywords: Sustainability, CSR, CDR, Digitalisation, Digital Carbon Footprint, Business Ethics

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List of Abbreviations

CDR	Corporate Digital Responsibility
CE	Circular Economy
CER	Corporate Environmental Responsibility
CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	CO_2 Equivalents
CSR	Corporate Social Responsibility
C2C	Cradle to Cradle
GHG	Greenhouse Gas
GHGP	Greenhouse Gas Protocol
GRI	Global Reporting Initiative
HFC	Hydrofluorocarbons
IoT	Internet of Things
N_2O	Nitrous Oxide
NF3	Nitrogen Trifluoride
NOX	Nitrogen Oxides
PFC	Perfluorocarbons
SDGs	Sustainable Development Goals
SME	Small and Medium-sized Enterprises
VR	Virtual Reality
WBCSD	World Business Council on Sustainable Development
WCED	World Commission on Environment and Development
WRI	World Resource Institute

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1 Introduction

Background

Digital transformation, Industry 4.0, cloud computing, artificial intelligence, robotics, Internet of Things (IoT) – these are global buzzwords that are being used more and more frequently, not only in politics, business and society, and are becoming increasingly important these days. All these terms are often summarised under the synonym digitalisation. The boundaries between these terms or concepts are often fluid and not always clearly delineated (Obermaier, 2019, p. 5). Digitalisation refers to the comprehensive networking of all overlapping areas of economy and society and the ability to collect all relevant data, evaluate it and translate it into action. In simple terms, digitalisation describes the transfer and transformation of analogue data into digital data (BFWU, 2015). The term or synonym “digital transformation” is also sometimes used in the context of digitalisation. This term is to be considered far more superordinate than the pure digitisation of processes and companies. Rather, digital technologies are used to completely redesign or restructure value creation processes (Kreutzer & Land, 2016, p. 353).

In recent decades, the world’s population has grown steadily and gained access to new technologies through increasing globalisation. We are the most educated and informed generation living on planet earth (BR, 2021, p. 49). Digitalisation permeates and changes almost every aspect of our lives. It is becoming progressively clear that the current path we are taking and the way we live, do business and act is having negative consequences for our planet (BMBF, 2019, p. 6). Geographical boundaries and limitations have almost completely disappeared, giving today’s society the ability to know what is happening in the world at all times. It provides opportunity to share information with the world 24/7 through various digital channels, post one’s opinion about companies or discuss political or social issues – whether positive or negative (Kreutzer et al., 2015, pp. 4-10). But digitalisation has not only arrived in the private sphere – companies are also using the latest technologies to optimise their processes, increase their profits or take care of their employee’s needs (Rückert-John, 2013, pp. 79-80). Digitalisation opens new opportunities for companies, but also requires a completely new kind of responsibility in order to meet social and ecological requirements. Today’s society has expectations and uses its voice to ensure that companies do the right thing. Consumers are changing their buying behaviour and engaging critically with companies, demanding a change in the corresponding values towards a more sustainable orientation and increasingly demanding environmentally

friendly solutions in the production, distribution, marketing and disposal of goods or services. Consumers are also demanding more commitment and responsibility from companies and more sustainability overall (IDC, 2022).

Even more present than the topic of digitalisation, the topic of global climate change and a more stringent sustainable action has become a topic that interests the whole world. The burning of fossil fuels and the massive destruction of our forests are just two of the problems with which we as humans are negatively influencing the climate and destroying our planet in the long term through increasing temperatures (European Commission, 2021b). This rise in temperature is due to the presence of certain greenhouse gases (GHG), such as methane (CH_4) and carbon dioxide (CO_2). These greenhouse gases in our atmosphere, which literally shield our earth, prevent heat from escaping from the surface of the earth, causing the temperature to rise even further (European Commission, 2021b). According to the Brundtland Report of 1987, sustainability is defined as follows: “Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). The resources of our planet, e.g., fossil fuels or rare metals, are finite and are reaching their limits at the current pace of digitalisation and globalisation, also in combination with the accompanying lack of sustainability measures. In particular, the sharp rise in energy consumption due to increasing digitalisation is pushing the earth more and more to its limits (C. I. I. T. & BCS, 2012, pp. 1-5).

Digitalisation is already determining many areas of life and work to a high degree, and it is undisputed that the importance of digital technologies and business models will continue to increase. For example, in the years from 2005 to 2020, the number of internet users worldwide increased from 1,023 billion to 4,585 billion (Statista, 2021). In 2020, we thus had an annual generated or replicated data volume of 64.2 zettabytes (1 Zettabyte corresponds to 10.000.000.000 Gigabytes) (Statista, 2022b). This global increase and expansion of digitalisation has given rise to completely new business opportunities over the past decades. It is particularly evident in the big tech giants (Apple, Microsoft, Google and Amazon). Within just 10 years, Apple’s market capitalisation, for example, has increased fivefold from 191 billion to 1,224 billion (Statista, 2019). More than 15 years ago, companies with the largest market capitalisation worldwide were a heterogeneous group from various sectors, including oil and energy companies, corporations from the financial sector and the healthcare sector. Today the five major US tech companies occupy the top ranks of the world’s largest companies by Market capitalisation. For example, Amazon, Apple, Google and Microsoft had a combined

brand value of 2,164 billion in 2021 (Statista, 2021). By 2020, energy consumption impact was responsible for by far the most GHG emissions worldwide, accounting for 73.2 percent (energy consumption by industries, transport and energy consumption in buildings). This is followed by agriculture, forestry and land use with 18.4 percent, cement and chemical industries with 5.2 percent and waste with 3.2 percent (Ourworldindata, 2020). If we compare the emissions consumption of these five sectors between 1990 – the year in which the internet was commercialised and the era of the big tech companies began – and 2019, we can see an immense impact growth in the energy sector. In 1990, the emission value in the energy sector was still 23.24 (CO_2e) gigatonnes and increased to 37.64 (CO_2e) gigatonnes by 2019 (Climatewatch, 2022).

Digitalisation has a much greater impact on ecology and society than is generally assumed. Especially in everyday life, life without digitalisation is hardly imaginable. Streaming videos, series and films in particular has emerged as one of the biggest drivers of growing data traffic. In a study by the Öko-Institut in Darmstadt from 2021, an annual CO_2 footprint of 372 KG CO_2e is calculated for a usage time of 3.5 hours and a data stream of 2 giga byte per hour (Gensch et al., 2021, p. 90). The demand for an overarching social responsibility for our planet and the people who live on it is becoming more and more relevant so that all people have a fair chance for a future in social as well as economic and ecological stability (Schneider & Schmidpeter, 2015, p. 18). It is important to bring this corporate responsibility into the digital transformation and thus strengthen sustainable awareness both within the company and towards society. Sustainability also has something to do with the relationship with the employees. Companies have a responsibility to serve as multipliers by setting a good example. Global challenges such as meeting basic needs, combating climate change, increasing population growth and the demand for sustainable consumption and production behaviour mean that companies now have to face ecological challenges as well as social and economic ones. Companies are faced with the challenge of obtaining and maintaining a “licence to operate” in the sense of social acceptance. Sustainability and digitalisation are viewed more strongly as a joint design task and must be thought of and lived as such. For many people, the facets of digitalisation have already become part of everyday life. However, they are often underestimated, or it is not clear in what way which of the factors of digitalisation impact the environment.

A cross-sector study conducted by the International Data Corporation (IDC, 2022) in Germany in December 2021 revealed the biggest challenges in implementing

sustainability goals with and through IT. The study shows that the topic of sustainability has already taken on a high priority in German companies. The IDC sees more and more IT providers as responsible for making their own companies more sustainable, but also for supporting their customers in doing so. In this study, possible influencing factors as well as opportunities and threats from the perspective of IT providers were not sufficiently considered. A study by the WHU – Otto Beisheim School of Management Institute for Family Businesses deals intensively with various influencing factors of digitalisation and digital transformation but does not establish a link to the topic of sustainability. Furthermore, this study does not refer to IT companies but to small and medium-sized enterprises (SMEs) and family businesses (Kammerlander et al., 2020, pp. 4-6). Other studies clearly show that IT companies act as enablers for the interaction between digitalisation and sustainability. However, clear factors and their effects are often vague.

For this reason, it is important to include in this work the various factors of the influence of digitalisation from the perspective of German IT companies on the environment and thus also indirectly social influencing factors in order to get a better overview of possible opportunities and threats in order to develop a possible recommendation based on this.

Research Objectives

The objective of this paper is to explore the topic of digitalisation and the various influencing factors of digitalisation on society and the environment in addition to the conventional economic factors. Particular attention is paid to the question of what Opportunities and Threats German IT companies face due to increasing digitalisation on the one hand when attempting to consolidate their own profitability and market position, while simultaneously striving on the other hand to take the needs of the environment and society into account. The ensuing arising possibilities for strategic change and recommendations for corporate action are presented.

Research Questions

Based on these objectives the main questions are developed:

Main Question:

Which sustainability responsibility opportunities or threats arise for German IT companies in the areas of environment, economy and social affairs resulting from the increasing digitalisation?

More concretely and specifically, this question will be analysed and evaluated based on various expert interviews to explore the challenges for companies. The following sub questions will be pursued.

Sub Questions:

1. What are the main influencing factors of digitalisation on sustainability from the perspective of German IT companies?
2. What are the main opportunities and threats of digitalisation with regard to sustainability for German IT companies?
3. What are the implications of the findings for theory and practice?

Research Design

This work adopts a qualitative methodology based on both secondary and primary data collection. A theoretical analysis of a variety of literature for definitions and 'setting the stage', will be followed by a series of expert interviews that are intended to support the literature findings and to provide new perspectives on the topic. The basic method of this paper is a qualitative approach. The interview method will be employed as a data collection instrument to provide a well-founded overview of the perspectives of individual experts in the field of study.

Six different experts will be interviewed:

- E1 – Leading position in an IT company
- E2 – CEO in an IT company
- E3 – Leading position in an IT company
- E4 – Head of Sustainability in an IT company
- E5 – Sustainability expert
- E6 – Leading position in an IT company

Due to my professional connection to these people, they all agreed in advance to an interview for this research. The interview method was chosen because it was the easiest way to gain the perspectives necessary for my work and additionally because it allows sufficient indepth discussion to achieve a deeper understanding of the phenomena under investigation.

Structure Outline

In the first section, the reader is guided towards the topic of the paper. The problem and objective are explained. The research questions, which are to be answered in this study, comprise a key part of the section. Section 2, the literature

review, defines and describes the most relevant terms of the work. This provides the reader a basic understanding of the theoretical concepts and framework of digitalisation, sustainability, possible business challenges and possible opportunities and threats regarding digitalisation. In the subsection on digitalisation, the historical development of digitalisation is described, as well as overarching areas such as Industry 4.0, the digital carbon footprint, and the concept of green IT. In the subsection on sustainability, the basic framework of sustainability is substantiated with principles. In the third subsection of section 2, the basic framework of corporate challenges is defined in relation to the topic of sustainability and digitalisation. In the fourth subsection, the possible opportunities and threats are defined and explained. The final subsection identifies the research gap, thereby justifying the need to undertake the primary research to answer the identified research questions which the literature does not sufficiently address. Section 3 explains the research design and which method is helpful to answer the research questions. The fourth section evaluates the data obtained from the interviews, which are presented in a classified form. In the fifth section, the data that was gathered is critically considered, the theoretical and practical implications of the findings are reflected, and possible limitations of the findings are mentioned. In the final section, the research questions from section 1 are taken up again and answered based on the available data. The paper ends with a summary of the key overall results, a proposal for further research and an outlook on future developments.

2 Literature Review: Key Underpinning Concepts & Frameworks

2.1 Digitalisation

The term “digitisation” has gained popularity over the past several years and is now frequently used in a number of contexts. The word “digitalisation” currently dominates every agenda from politics to business and society. For most people, digitalisation has become a natural part of everyday life – especially with the advent of the corona pandemic, which has forced digitalisation to take an enormous leap forward (Wintermann, 2020, pp. 657-661).

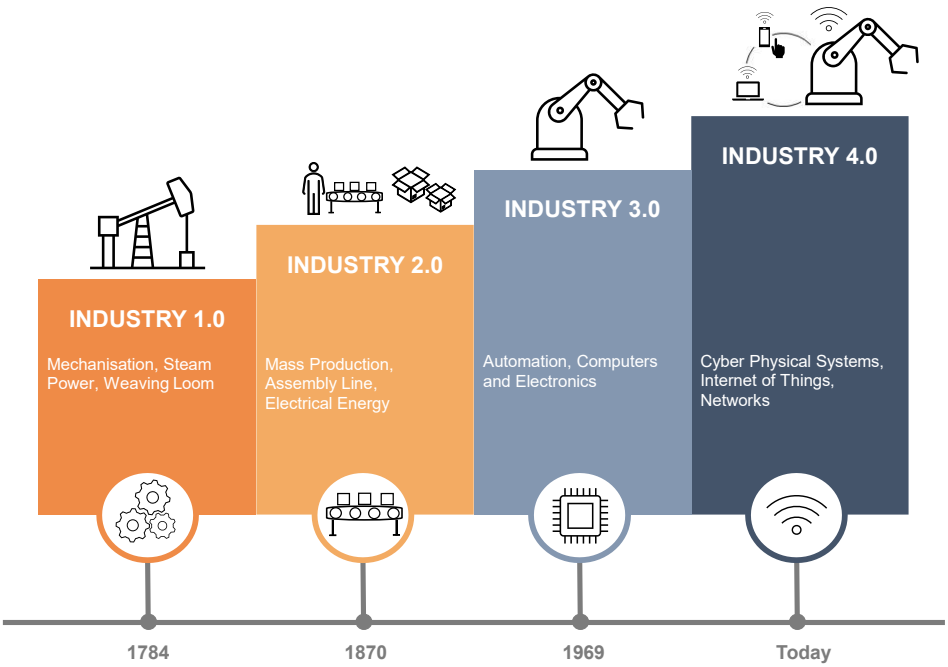
2.1.1 Definition

In German research literature, various definitions of the term “digitalisation” can be found. Often the boundaries between different terms are vague and not always clearly defined. Synonyms such as “digital age” or “digital transformation” are often used (Becker et al., 2019, p. 24). The technical term “digitisation” comes from the fields of computer science and electronics and means the transfer and conversion of analogue data and the recording of physical objects for processing or storage in digital systems (Mertens et al., 2017, pp. 35-41). In Germany, the term digitalisation is often used relatively broadly to mean the introduction of digital technologies in companies (Mertens et al., 2005, p. 190). Examples often given are the transformation of music from a record to a CD or the conversion of analogue slide images or videos for use on digital media. In English, on the other hand, there is a clear distinction between the term digitalisation and the term digitisation. Digitisation in English only stands for the technical conversion of analogue information into digital information, whereas the term digitalisation stands for a larger scale. Here, the focus is on the conversion of entire companies to digital functions and the associated transformation in order to improve the efficiency of the company through the use of digital technologies (Rijswijk et al., 2020. pp. 1-2). The German Federal Ministry for Economic Affairs and Energy (2015) describes the word digitalisation as a comprehensive networking of overlapping areas such as society and the economy. Digitalisation has the ability to collect relevant data, to analyse it and translate it into action. This emerging change offers both advantages and opportunities, but also completely new challenges (BFWU, 2015).

2.1.2 Industry 4.0 and Digital Transformation

The term Industry 4.0 is used to describe the fourth industrial revolution. The first industrial revolution at the end of the 18th century is characterised by the mechanisation of manual skills. Just under 100 years later, electrification and mass production made possible by assembly lines ushered in the second industrial revolution. At the end of the 20th century, computers and electronics conquered the production halls (BDI, 2022). We are currently in the fourth industrial revolution with complete digital networking of all areas. This is determined by so-called “cyber-physical systems” that connect the real world with the virtual world and enable worldwide networking (Reinheimer, 2017, p. 18). Figure 1 shows the four different industrial revolutions:

Figure 1: Industrial Revolution



Adapted from: Europäischer Rechnungshof, 2020.

Industry 4.0 is the term used to describe the intelligent networking of machines and processes in industry with the help of information and communication technology and relates to the transformation and digitalisation of the manufacturing processes and process chains powered by information technology (Matt, 2020, p. 5). Industry 4.0 describes a continuous revolution in the manufacturing industry

worldwide. Many buzzwords have developed around the topic of digital transformation in recent years, buzzwords such as Big Data, which are understood as larger and more complex data sets, especially from new data sources. This includes data sets that are so large that they can no longer be managed with classic data processing methods (Oracle, 2022), particularly through greater digitalisation and the resulting massive increase in data flows, for example in the private sphere through the increased use of social networks or the consumption of videos on demand, and in the business environment through the networking of machine data (Fasel & Meier, 2016, pp. 39-41).

Augmented Reality refers to a computer-aided perception or representation in which the real world is augmented by virtual aspects or even Virtual Reality (VR), where a simulated reality or artificial world is created by means of computers into which people can be interactively integrated with the help of technical devices and associated software (De Witt & Gloerfeld, 2018, pp. 126-127). Cloud Computing provides users with the possibility to share a tremendous amount of data with the whole world and is one of the most important drivers of digitalisation and digital transformation. The enormous scalability of cloud services enables companies to adapt their business processes quickly and dynamically (André, 2019, p. 4). IoT is considered one of the most important topics of digitalisation (Deutscher Bundestag, 2016). The term IoT refers to the networking of devices connected to the Internet, whether they are everyday devices or machines in the industrial environment, which can communicate with each other independently through artificial intelligence and take on tasks on their own (Microsoft, 2020).

In the private environment, IoT is mainly used to network everyday objects for more convenient use. For example, by using these smart services, the lighting and temperature in one's home can be regulated via an app on the mobile device or even via voice control alone in order to achieve more comfortable use (Knorre et al., 2020, p. 73). Other areas of application for the IoT in the private sector are to increase resource efficiency, for example, through intelligent control of the heating system, or in the area of security through camera-based access control, right up to damage prevention through sensors that detect water damage, for example, and independently switch off the water supply (Knorre et al., 2020, pp. 74-76). In the industrial sector, it is mainly about connecting machines and plants in such a way that entire industrial processes can be automated. This makes production processes more efficient and cheaper (Microsoft, 2020). With these features, Industry 4.0 aims to address the current challenges of increasing complexity and shortening innovation cycles or increasing market volatility. In addition, Industry 4.0 aims to enable more efficient value creation through flexibility

and adaptability of both products and services. Digital transformation therefore goes far beyond internal organisational changes and requires an adaptation of the overall business concept to the evolving market environment (Westerman et al., 2011, pp. 16-18).

One of the main drivers of digital transformation is IoT and increasing automation and Big Data Analytics, which are increasingly transforming existing business models into the digital age and changing entire value chains and business relationships (Reinheimer, 2017, p. 106). Digital transformation triggered by the use of the latest digital technologies and changed user expectations of these technologies affects all sectors. These digital technologies form the basis of the digital transformation, in contrast to the purely technical transformation process, and their increasing and rapidly spreading use has a lasting impact on our industries and our society. Digitalisation is both a catalyst and a component of change that affects all areas of our society (IMD Global Center for Digital Business Transformation, 2021).

Digitalisation and the associated new challenges are changing established business models, but also consumer behaviour. For example, in today's world, without digital transactions, the growth of businesses is at risk. A study by the German Bundesbank in 2020 showed that cashless payment has gained in importance. Whereas in the payment behaviour study of 2017 the percentage value of transactions paid by card in Germany was still 21 percent, in 2020 the value is already 30 percent (Deutsche Bundesbank, 2021). There has also been a strong growth in cryptocurrencies through blockchains in recent years. Blockchains are considered the technology of the future. Blockchains make it possible to constantly record and store data or transactions unalterably and chronologically. However, this technology requires a lot of energy – Bitcoin farms in particular are considered very harmful to the environment (VDE Verlag, 2021, pp. 32-34). Especially younger target groups are becoming increasingly demanding in terms of new technologies and shopping experiences, and the customer experience when shopping online is becoming more significant (Appelfeller et al., 2018, pp. 2-4).

But companies also face challenges, in particular, the ability to restructure and adapt in a radically changing market environment. On the one hand, the topic of digitalisation cannot simply be ignored. The digital transformation affects the most diverse fields of action in the company. From procurement to sales and distribution to strategic orientation. There is no standard solution for every organisation – the digital transformation must be specifically adapted to the company (Hess, 2019, pp. 3-5). Therefore it is essential for companies to constantly review their own competences and knowledge of the latest digital technologies or, if not, to

adapt them to new circumstances (Schuh et al. 2017, p. 32). The world of work is and has already been strongly changed by digitalisation. Therefore, it is important for companies to prepare and adapt to the disruptive changes at an early stage and to view digitalisation as an opportunity rather than a challenge and to implement their own transformation quickly (Fink & Kunath, 2019, p. 24). Despite considerable potential for savings and optimisation, digitalisation in Germany is still very sluggish, according to a study by the Fraunhofer Institute in March 2022 (Fraunhofer Institut, 2022). The digital transformation can be described as a process of continuous and constant development of digital technology that has a significant and lasting impact on our society (Kühner, 2020, pp. 144-145).

2.1.3 Carbon Footprint and Digital Carbon Footprint

The carbon footprint is treated as a measure that represents total carbon dioxide emissions. It considers direct as well as indirect actions or life stages of people or products and how much CO_2 is emitted by their actions or production cycle (Wiedmann & Minx, 2008, p. 2). In literature or in the media, we often speak of a CO_2 equivalent. In addition to the carbon dioxide values, the GHG methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs), perfluorocarbons (PFC) and nitrogen trifluoride (NF3) are also included in the assessment (First Climate, 2022). The media often speak of the ecological footprint. However, this goes beyond the dimensions of the carbon footprint. It is a tool for calculating a global balance of our consumption of natural resources. This helps to ask the question of how long we can continue to live on our planet in this way (Wackernagel & Rees, 2013, p. 23). On the societal level, if we as humans become aware of the impact of consumption on the environment and understand what a carbon footprint consists of, even banal changes in everyday life can make a big difference in the long run. For example, this pertains to a focus on buying seasonal and locally grown fruit and vegetables, on avoiding excessive meat consumption, reducing waste, working mostly from home and avoiding long journeys or simply travel by bicycle or public transport instead of by car (Europäische Union, 2021).

Despite the many benefits that the digital transformation has brought us, also in terms of CO_2 emission reduction, the production and use of these technologies causes high CO_2 emissions. These are summarised under the term digital carbon footprint (Myclimate, 2021). According to a study by the private environmental research institute Öko-Institut in 2020, emission levels from information technol-

ogy in Germany can be narrowed down to four main areas. The areas of manufacturing, data centres, use and networks of digital technology cause an estimated 849 kilograms of CO_2 emissions per person per year in Germany. The use of critical raw materials in electronic devices is increasing worldwide. The challenge is to make these devices and infrastructures more resource and energy efficient and to ensure their supply with electricity from renewable sources. By far the largest CO_2 polluter in Germany is the area of energy-related emissions. We speak of energy-related emissions whenever fossil fuels are converted into thermal or electrical energy. In 2020, for example, these energy-related emissions accounted for 83 percent of Germany's GHG emissions (Umweltbundesamt, 2022b).

On a global level, this value is reflected in the world's biggest environmental problems. According to Earth.org, fossil fuel energy production is the main cause of global warming (Earth.org, 2022). Since 2017, large capital-market-oriented companies as well as credit institutions and insurance companies in the European Union have been required to provide non-financial reporting. Such sustainability reporting can, for example, be based on the standards of the Global Reporting Initiative (GRI). When reporting CO_2 emission values according to the GHG Protocol, the emission values of Scope 1 and Scope 2 must currently be accounted for (European Union Law, 2021). With 36 standard modules, the GRI guidelines help companies in sustainability reporting to transparently present economic, ecological and social aspects and performance in a sustainable global economy (GRI 101, 2016, pp. 3-7). In the GRI 305 Guideline – Emissions, the mandatory reporting requirements on the company's GHG emissions are based on the GHG Protocol (GHGP). The GHGP was developed by the World Resource Institute (WRI) and the World Business Council on Sustainable Development (WBCSD). Three separate scopes are used by the GHG Protocol to categorize GHG emissions. Direct GHG emissions fall under Scope 1. Scope 2 covers GHG emissions connected to indirect energy, while Scope 3 addresses all other indirect GHG emissions (GRI 305, 2016, p. 4).

2.1.4 Green IT

Information technology, its development and expansion have increased dramatically in recent years, and with it, energy consumption has skyrocketed exorbitantly. The energy consumption of information and communication technology is approx. 58.4 TWh per year. Data centres account for 20 percent of this value (BMUV, 2022). The term Green IT covers several areas, both in the business

sector and in the social context. It is often defined as a resource-saving use of technology. The resulting measures for implementation range from production and use to final disposal (Loeser, 2013, pp. 1-3). The beginnings of Green-IT go back to 1992, when the Environmental Protection Agency of the United States first published its ENERGY STAR Product Labelling programme, an innovative approach to protecting the environment. This label served both companies and society as a seal or standard for energy-efficient products (EPA, 2010, p. 6).

The currently largest energy consumers within IT have already been described in section 2.1.3. This section does not deal with the causes but with the opportunities of using IT to save resources and optimise existing processes and procedures. IT has been increasingly used in recent years to respond more quickly to emerging market changes in a global world. This not only increases energy consumption, but also the associated CO_2 emissions worldwide (Seidel et al., 2012, p. 11). A distinction is often made in green IT between the areas of hardware, software and the integration of new “green” concepts. New, more energy-efficient technologies contribute to sustainability, as does running the hardware directly on green power (Uckelmann et al., 2019, pp. 141-150). Digitalisation is often seen as an enabler, especially in the area of energy transition. The use of technologies such as artificial intelligence, IoT or big data computing helps with the complex interaction of technical components to enable more efficient and intelligent use of hardware and infrastructures (Fraunhofer ISE, 2022). Digitalisation is also playing an increasingly central role in energy research. Technologies such as SmartGrids (Umweltbundesamt, 2013), which represent an intelligent power grid and flexibly and intelligently control energy generation, storage and consumption, would not be possible without digitalisation (Fraunhofer ISE, 2022). Large internet companies such as Google, Microsoft, Amazon and others are already contributing to climate neutrality. Nevertheless, one of their biggest energy sources are still fossil fuels (Greenpeace, 2020). Without digitalisation, technologies such as the digital twin would be unimaginable. This creates a complete digital image of a physical object. This allows, for example, the complete life cycle of a product or a building to be represented digitally. Maintenance or emerging problems in the production of the physical object can thus be recognised in advance and avoided (Li et al., 2020). The latest technologies also make a significant contribution in view of the increasing population, changing weather patterns and the growing demand for food. Vertical farming, for example, allows fresh fruit and vegetables to be grown all year round under optimal conditions. Without the influence of digitalisation, such technologies would not be possible (Marvin et al., 2022, pp. 3-5).

2.2 Sustainability

“For most of the last century, economic growth was fuelled by what seemed to be a certain truth: the abundance of natural resources. We mined our way to growth. We burned our way to prosperity. We believed in consumption without consequences. Those days are gone” (Ban Ki-moon – United Nations, 2011).

2.2.1 Definition

The word “sustainability” is used frequently right now. We hear or read it almost daily, and the eco-trend is booming. The word “sustainability” appears in practically every context, including politics, health care, business ventures, and shopping for food and clothing. Hans Carl von Carlowitz used the term “sustainability” for the first time in his 1713 book “Sylvicultura oeconomica” in reference to the dilemma of the time’s timber shortage. According to his writing, a forest should only be cleared as far as it can naturally regrow (Von Carlowitz, 1732, p. 5). In the 1970s, the book “The Limits to Growth” was considered another milestone with the first computer-based forecasts. The major point from the findings is that global equilibrium, as opposed to ongoing dynamic expansion, is what is essential. The potential, immediate benefits of using current technologies were already covered in the report’s review (Meadows & Club of Rome, 1982, p. 157). The World Commission on Environment and Development (WCED) was established in 1983 as a result of several discussions, conferences, studies, and gatherings as well as growing public awareness of the many elements of sustainability (United Nations, 1987). The report “Our Common Future” by the World Commission on Environment and Development, which was published in 1987, is regarded as a turning point and the inspiration for the creation of various sustainability models and was the main triggering factor for the 1992 environmental conference in Rio de Janeiro where the Agenda 21 was established, and it defined one of the most common descriptions for the term sustainability (Purvis et al., 2019, p. 684). “Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future” (Brundtland, 1987). The term “sustainable development” and the creation of the three-pillar model of sustainability are both credited to the Brundtland Report of 1987 and the Rio de Janeiro meeting. Nevertheless, this model was already mentioned in research literature in years prior to the meeting, such as by Barbier in 1987 (Purvis et al., 2019, p. 687).

The most significant environmental issues on the planet, such as climate change, biodiversity loss, and the deterioration of soil, air, and water quality, are addressed by all of these initiatives (United Nations Environment Programme, 2021). The 2030 Agenda is now the most widely accepted concept in the field of sustainable development and is viewed as a notion for shared peace and prosperity for both people and the planet itself. It was ratified by 193 United Nations member states at a summit in New York on September 25, 2015. The 17 Sustainable Development Goals, which are shown in Figure 2, lay the groundwork for the foundation (SDGs) (United Nations Department of Economic and Social Affairs, 2022). There are several indications about the relevant subject under each of the 17 headings. The basis of the SDGs deals with the topic of natural resource base, followed by production and consumption topics and, at the top, well-being topics at the societal level (United Nations Environment Programme, 2021).

Figure 2: Sustainable Development Goals

Source: SDGs, 2022.

2.2.2 The Tragedy of the Commons

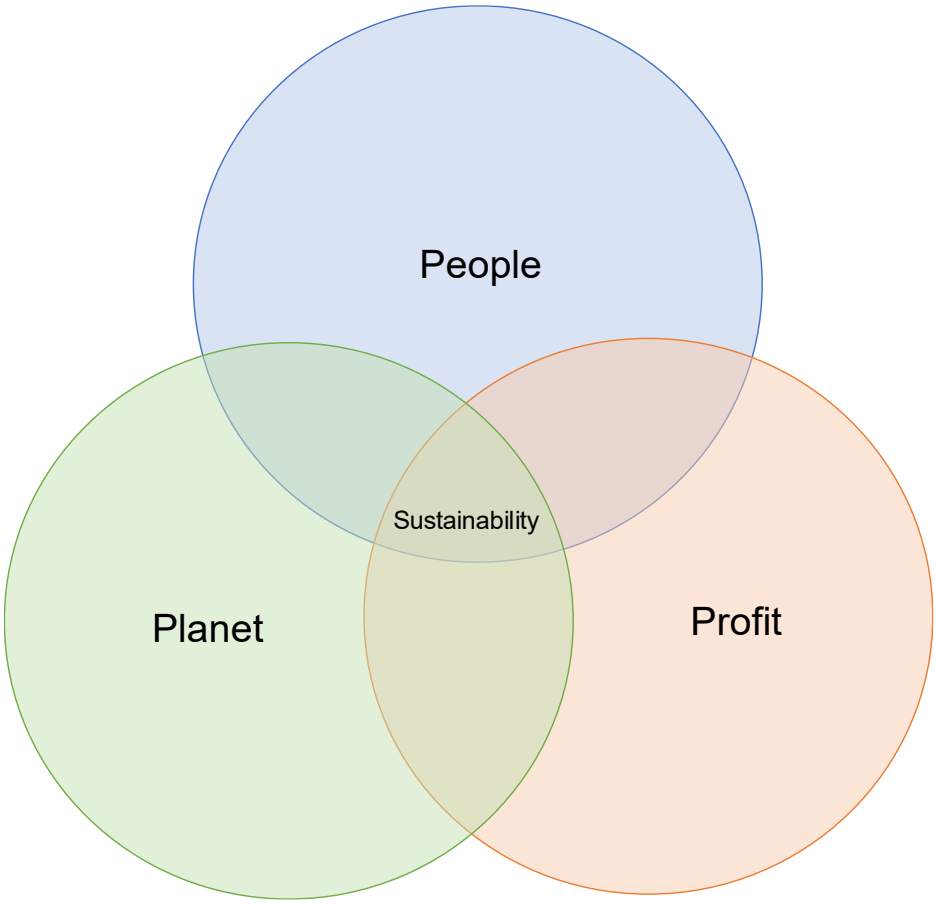
“What is common to the greatest number gets the least amount of care” (Aristotle, 384 BC–322 BC, Greek Philosopher, Dartmouth’s WordPress, 2020).

The issue of overuse of a resource is addressed in “The Tragedy of the Commons” (Hardin, 1968, pp. 1243-1248). This is a dilemma that arises when several parties, acting individually from each other, use up a shared but limited resource in their own interests, even if they know beforehand that in the long run it will do more harm than good to the community (Hardin, 1968, pp. 1243-1248). A dilemma arises, for instance, when we believe we must choose between two things that are equally important to us. A dilemma can be regarded both positively and negatively, but it typically refers to a bad circumstance in which we are either forced to make a decision or are required to make one. Hardin’s starting point for his study was the problem of population growth and society’s quest to maximize goods for each individual. Hardin (1968) uses as an example the image of two cattle herders sharing a common grazing area. This grazing area is sufficient for both users until a personal advantage is to be achieved by both to increase their own social stability by enlarging their own herd. On the one hand, the larger herd improves the economic situation. However, on the other hand, a deterioration of the pasture by overuse and thus a deterioration of the performance of the herds is achieved. Each pastoralist decides to consistently raise his own herd in order to avoid this negative impact. As a result, the shared pasture is degrading rapidly. Hardin’s representation forms the core of our problems for sustainable action and living in this world. The tragedy of the commons can also be applied to a recent event in our history – the COVID-19 pandemic. As a result of the pandemic, many people overstocked on food and supplies. People assumed that everyone else would do the same, so the only solution was to get ahead of the others. People thought logically, but not collectively. Each individual took the opportunity to help him- or herself, but the effects of this overconsumption were spread to the rest of society (Earth.org, 2021). Since the middle of the 20th century, there has been increasingly more scientific proof of the connection between environmental issues and human activity. For instance, Rockström produced a paper titled “Planetary Boundaries” that is regularly quoted and gives a clear and comprehensive description of the range of human activity (Stockholm Resilience Centre, 2022).

2.2.3 Triple Bottom Line

The three-pillar model of sustainability, shown in Figure 3, was developed by the UN World Commission on Environment and Development on the basis of the 1987 Brundtland Report and the Rio de Janeiro conference that followed as well as the final report of the Enquete Commission “Protection of the People and the Environment”, as previously discussed. This approach strives to create a sustainability policy – which is to say, a social policy – in which the three pillars of ecology, social/cultural diversity, and economy coexist side by side (Purvis et al., 2019, pp. 681-695). Precautionary economic management, fair trade, an environmental management system, and innovative technology that are ecologically friendly are the main concerns of the economic dimension.

Figure 3: Triple Bottom Line



Adapted from: Elkington, 2022.

The ecological dimension includes preserving the ecological conditions that support human life, including sparing resource consumption, preserving biodiversity, maintaining ecological circulation networks, using renewable energy sources, and avoiding stressing the ecosystem. The promotion of human health, equal rights to the use of natural resources and to development, taking into account the vital interests of future generations, consumer awareness, global responsibility, as well as the democratisation and participation of all population groups in all spheres of life are all addressed by the social-cultural dimension (Hasenmüller, 2013, pp. 52-58). In his 1997 book “Cannibals with Forks”, John Elkington goes one step further. In his approach, the corporate goal of pure profit maximisation is expanded to include ecological and social goals. He calls this approach the “Triple Bottom Line” or 3Ps, People, Planet and Profit, contrary to the conventional and traditional understanding of accounting, which business people have historically used to convey either profit or loss. This principle of going beyond pure profit maximisation is based on the principle of sustainability (Elkington, 1997, p. 5). With strong parallels to the three-pillar model, Elkington sees the TBL concept as a kind of catalyst to encourage companies to consider both a social and an environmental bottom line in their decisions and long-term decision-making in addition to the bottom line (Purvis et al., 2019, pp. 681-695). Elkington describes that the Triple Bottom Line agenda is only the beginning and provides a basic framework. Additional approaches will be needed that involve and coordinate a wide range of stakeholders (Henriques & Richardson, 2013, p. 13). A competitive advantage would not only result from a “greener” product improvement, but from structural changes within value chains and markets (Elkington, 1997, p. 306).

2.2.4 Stakeholder Theory

In 1984, F. Edward Freeman transformed Milton Friedman’s shareholder theory (Zimmerli & Richter, 2007, pp. 173-178), which was prevalent at the beginning of the 20th century and which basically stated that companies are only obliged to their shareholders and should generate profit and further growth should be forced. Freeman built on this and lay the foundations for his stakeholder approach (How et al., 2019, pp. 133-135). According to the literature, stakeholders are all groups that can influence the common goal of the organisation and are divided into internal and external stakeholders, including all groups that have the potential to affect the organisation, such as shareholders, consumers, suppliers, governments, and employees (Freeman, 1984, p. 35). Freeman argues in his publications that the core concepts of stakeholder theory are value creation, trade, and

efficient business management. This entails producing as much value as you can (Freeman, 2010, pp. 7-9). Stakeholder theory was not initially created to deal with difficult sustainability difficulties and issues. However, it is one of the pillars on which corporate sustainability research is built (Montiel & Delgado-Ceballos, 2014, pp. 113-139). In order to motivate and develop optimal synergies between the different participation groups of a company, Freeman speaks of never losing focus on or ignoring the different participation groups. Bridoux described that through targeted motivation and training of employees, for example, collective value creation can be achieved and ultimately lead to inter-firm performance improvement (Bridoux et al., 2011, pp. 711-730). The idea of putting long-term value creation at the centre of the process and thus focusing on a common good also requires compromises between the different stakeholder groups at some points (McKinsey & Company, 2020). The organisation must be aware of its stakeholders' identities and modes of participation in order to engage them appropriately. It is crucial to determine which values matter more to specific stakeholders than others. What does value, in simple terms, mean for the relevant group and how is it measured (Freeman et al., 2010, p. 173)? For example, for investors, profits are paramount, whereas for employees, high income and security are priorities (Freeman et al., 2007, pp. 61-64). On a management level, Freeman's term "stakeholder analysis" is often mentioned in the literature. Stakeholder analysis is an attempt to rationally challenge political influences. Freeman explains this in his model Stakeholder Strategy Formulation Process (Freeman, 1984, p. 34). A distinction is made between "observable behaviour" and "behaviour with cooperative potential" that could be seen in the future to help the organisation achieve its goals and "competitive, threatening behaviour" that would contribute to the goal in the first section, the stakeholder behaviour analysis (Mintzberg et al., 2005, p. 250). The next step is to look for an explanation for the stakeholder's behaviour. Coordination analysis is the last step, which creates a framework for stakeholders to find a coalition among various stakeholders (Mintzberg et al., 2005, p. 251). The stakeholder approach has become dominant in recent years, especially due to increasing media transparency and transparency that makes it impossible for companies to pursue their own interests purely for profit (McKinsey & Company, 2020). It follows that knowing management's responsibility towards its stakeholders is essential to achieving its goals.

2.2.5 Circular Economy

The term Circular Economy (CE) was first defined by David William Pearce in his book “Economics of Natural Resources and the Environment”. Pearce describes a process adapted from the prevailing linear economy model, also known as the throwaway economy model, which is a model of a product cycle in a closed cycle (Pearce et al., 1990, p. 13). It is a system in which the use of resources and the production of waste and energy is minimised, and the product can be maintenanced, repaired, reused, remanufactured or refurbished, in order to achieve a more durable product life cycle. These products can be used productively again and again and thus have an economic value again (European Parliament, 2022). In 2002, William McDonough and Michael Braungart described the Cradle to Cradle (C2C) approach. This approach describes, differentiated in biological and technical cycles, a constant and continuous CE. Products and industry should imitate the processes of nature in order not to waste finite and precious resources but to use them again and again (McDonough & Braungart, 2010, p. 103). Cradle to Cradle already starts with the design and production process. The C2C approach is based on three core principles. Firstly, nutrient remains nutrient, all raw materials in production can be fully reused or biodegraded. Secondly, renewable energy, production is done exclusively with renewable energy and thirdly, the use of natural diversity (Kopnina, 2018, pp. 119-134). There is also strong political support for these concepts, for example in the European Commission’s 2020 Circular Economy Action Plan for a cleaner and more competitive Europe (European Commission, 2020).

2.3 Corporate Challenges

In this chapter, the terms digital, social and environmental responsibility are defined and explained from a corporate perspective.

2.3.1 Corporate Digital Responsibility

With increasing digitalisation, constantly evolving technologies and constantly rising data volumes and data transfers and the associated benefits, digitalisation also entails some threats and risks. These concern, for example, data protection or vulnerability to crime and terror (BKA, 2022) or, in the social environment, social segregation and lock-out effects (Foley et al., 2022, p. 7). Digitalisation also brings some advantages. For example, social inclusion has never been easier than in today’s world. The possibilities for acquiring knowledge through digital

media are almost limitless, and new jobs and entirely new business models have grown as a result of digitalisation (Herden et al., 2021, pp. 13-29). Nevertheless, digital technologies have become vital for carrying out daily activities. This raises the question of who should take responsibility in the area of digitalisation. As an individual, one has the option to choose not to use the technologies one wants, but the choice of alternatives is often limited. The government has the possibility to exert influence by means of laws and to guide the way, but it is often slower in the implementation than the digital development.

Companies are often the pivot point in the production, marketing and introduction of new technologies (Fraunhofer IAO, 2020). Corporate responsibility can be extended in the course of digitisation. In this context, the term Corporate Digital Responsibility (CDR) has become established, which refers to responsible action in all areas related to digitalisation. As with CDR, companies take on a passive obligation to respond appropriately to ethical expectations and challenges, while protecting user privacy and ensuring data security, and minimising the environmental impacts associated with digitalisation. CDR describes a voluntary extension of corporate responsibility that goes beyond the legal framework to consider the ethical and moral opportunities and challenges of digitalisation and to actively use digitalisation as an advantage (Lobschat et al., 2021, p. 880). Many areas are now finding their way into the CDR concept, for example in the areas of the environment through intelligent energy use and reduction of the carbon footprint and in the social area of digital cooperation or in the governmental area through data collection, data storage and data security (Herden et al., 2021, pp. 13-29).

Through CDR, part of the responsibility shifts towards companies to use new technologies to solve or at least improve the most pressing environmental and social problems by contributing to the creation of digital social innovation. The aim is to bring innovators, users and communities together to use technology and knowledge for social and environmental issues (Cangiano et al., 2017, p. 3558). For example, through access to an open knowledge network, information can be used to help combat biodiversity loss through machine learning and artificial intelligence. Companies can create value not only for themselves but also for society by adopting a comprehensive and coherent set of digital corporate responsibilities and advancing the sustainability agenda (Cangiano et al., 2017, p. 3547).

CDR can be derived from a classical understanding of corporate responsibility, for example from the basics of Carroll's CSR pyramid from 1991. There, responsibilities are divided into four different levels (economic responsibilities, legal responsibilities, ethical responsibilities, and philanthropic responsibilities) (Mueller, 2022, p. 3). To look at this pyramid from a digital perspective, it is important for

the first level, the economic level, that companies develop new business models and incorporate digitalisation (Koch & Windsperger, 2017, p. 25). On the second level, the legal level, it is obligatory for companies to comply with legal requirements and regulations, for instance the General Data Protection Regulation (Voigt & Von dem Bussche, 2017, pp. 9-30). The third level deals with all ethical issues surrounding new technologies such as artificial intelligence or robotics. And on the philanthropic level, the comparison to Carroll would be, for example, to share acquired knowledge of the latest technologies and data to enable more sustainable development globally (Harvard Business Review, 2014). CDR has long since stopped being a topic for only selected sectors, but is now a cross-sectoral issue in all areas in which digitalisation has found its way (Dörr, 2020, p. 55).

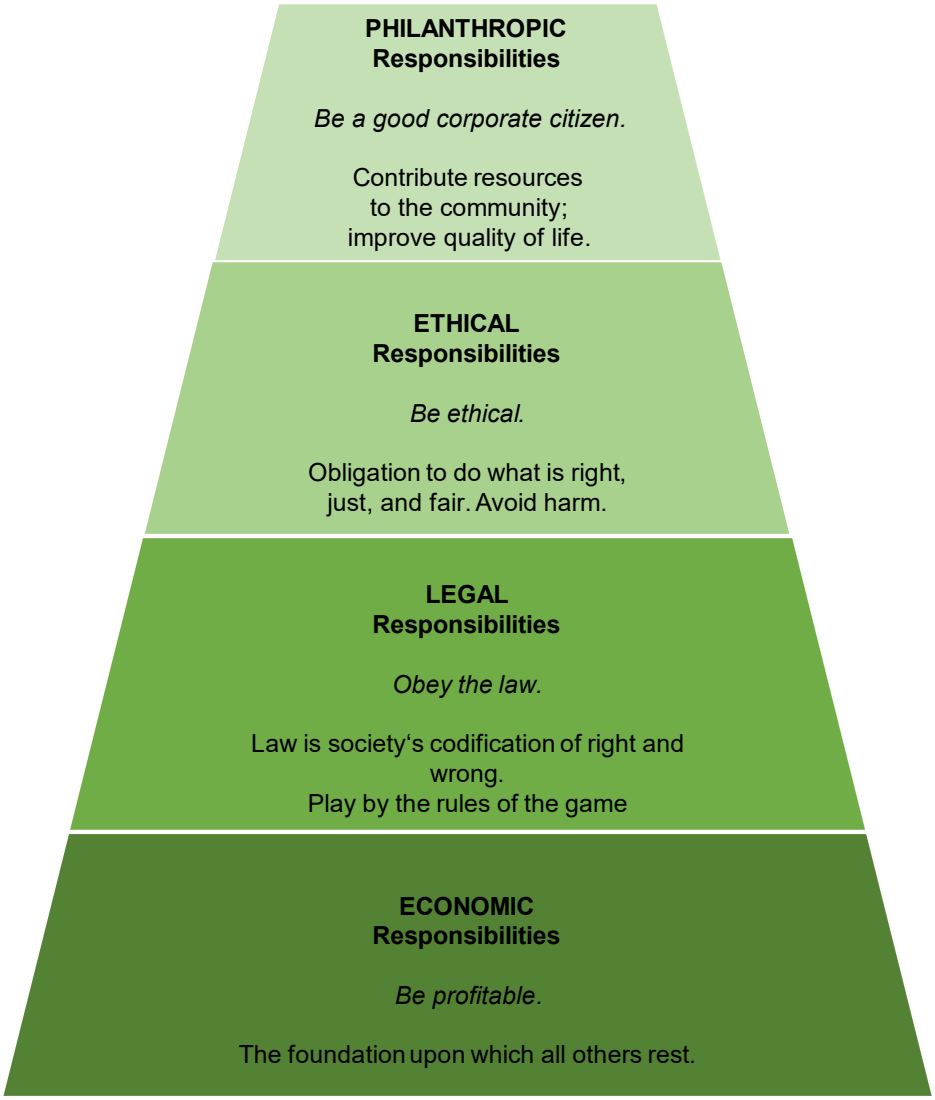
2.3.2 Corporate Social Responsibility

The Triple Bottom Line (Elkington, 1997) and Stakeholder Theory (Freeman, 1984), which contends that managers must balance their objectives in the interests of everybody and not just shareholders, serve as the foundation for Corporate Social Responsibility (CSR), also known as Corporate Responsibility (CR). In research literature it is difficult to find a clear and unambiguous definition for the term Corporate Social Responsibility. In 1953, in his book “Social Responsibility of the Businessmen”, Bowen used the term “Corporate Social Responsibility”. He defines it as a company’s obligation to pursue policies and make decisions that have a positive effect on the goals and desires of society. He also used synonyms such as “public responsibility”, “social obligation” and “business morality” as early as 1953 (Bowen, 2013, p. 13). Votaw and Sethi in 1973 affirmed the interpretability of the term CSR by stating that CSR means something and is understandable but does not always mean the same thing to everyone (Hack et al., 2014, pp. 46-55).

To the present day, the concept of CSR is very imprecise, which can often lead to false expectations and thus to disappointment. The concept should promote the corporate strategy and act according to ethical principles. The pillars are economic growth, ecological balance and progress on a social level (Schneider & Schmidpeter, 2015, p. 311). In 2001 and in 2002, the European Commission published a definition in the Green Paper describing CSR as a concept that should serve as a basis for companies to integrate social and environmental concerns into their business activities on a voluntary basis (Europäische Kommission, 2001). CSR should not simply be imposed, but rather serve as a form of corporate

management (Schneider & Schmidpeter, 2015, p. 1128). In 2011, the Commission broadened its definition to focus on the integration of social, environmental, ethical and human rights concerns into companies' business processes as a core strategy (European Commission, 2011). The ISO 26000 standardisation, which was completed at the end of 2010, provides a detailed implementation of seven principles. The principle of social responsibility is based on the principles of accountability, transparency, ethical behaviour, respect for the interests of stakeholders, respect for the rule of law, respect for international standards of conduct and respect for the human rights of each individual (BAMS, 2011). ISO 26000 is considered one of the most detailed approaches to a global CSR concept (Schneider & Schmidpeter, 2015, p. 27). One of the best known and most widely used scientific models in the world, which often serves as a basis for explaining the CSR concept, is Carroll's CSR pyramid. The pyramid is a sustainable stakeholder framework. Carroll differentiates corporate responsibility into four types that are in dynamic tension with each other. The basis and foundation of the pyramid is economic responsibility. Profitable management is the basis and primary entrepreneurial goal. All other levels of the pyramid are based on the foundation of responsibility to provide goods, commodities and services for society and to be profitable in the process (Carroll, 1979, pp. 497-505). Economic responsibility as the basis of Carroll's pyramid is only possible in combination with the second irrevocable level of corporate legal responsibility. On the societal level, this requires companies to comply with governmental and political laws and rules. Economic and legal responsibility form the ethical standards for fairness and justice (Carroll, 1991, p. 42). The third level addresses ethics and morals in addition to economic and legal responsibility. Companies should carry out any activities and norms that are not codified in law but are nevertheless expected by society in an ethical and moral form. Often, the distinction between legal and ethical expectations is not always clear. Ethical expectations can go far beyond legal boundaries (Carroll, 1991, p. 44). The following graphic shows the concept of Carroll's CSR-Pyramid.

Figure 4: Carroll's CSR-Pyramid



Adapted from: Carroll, 1991, p. 42.

Far from Friedman's approach that the only responsibility for business is to generate profit, the top of Carroll's pyramid takes a philanthropic view and thus encompasses all forms of corporate engagement. This includes voluntary commitment such as donations. These activities are not mandatory but expected by society on an unspoken level. Examples include monetary donations, product and service donations, volunteer work or voluntary contributions to community groups

or interest groups that have a high status in society (Grigore, 2010, pp. 167-174). The altruistic motive is not always in the foreground, but rather a practical way for companies to demonstrate their good citizenship. These four parts of the pyramid form a conceptual framework that encompasses the economic and legal, but also the ethical and philanthropic expectations that society has of a company (Carroll, 1991, p. 40).

2.3.3 Corporate Environmental Responsibility

Bringing increasing digitalisation in line with sustainable development is one of the biggest challenges currently facing politics, society, companies and industries especially due to the continuously increasing use of information and communication technologies in society through the development of ever newer products and solutions (Herden et al., 2021, pp. 13-29). On the one hand, new technologies can be used as tools to make almost every area more sustainable and climate-friendly, while on the other hand, high energy and resource consumption as well as raw material consumption are climate killers (DesJardins, 1998, p. 828).

In parallel, the COVID-19 pandemic has not only exacerbated global economic and geopolitical problems, but also ecological problems. Species extinction and climate change have accelerated, and the overexploitation of natural resources continues unabated (BMZ, 2021). Companies have the potential to make an important contribution to our society, like the European government has done by banning various disposable plastic products (European Commission, 2021a). This potential is especially prevalent in the information and technology sector through fair pricing, protecting consumers from harmful materials, energy consumption and CO_2 emissions (Crane et al., 2019, p. 15).

As part of the CSR concept, there is no clear or unambiguous definition of the term Corporate Environmental Responsibility (CER). A definition by Gunningham (2009) says that CER consists of the practices that are beneficial to the environment or can prevent environmental damage far beyond the legal framework (Gunningham, 2009, pp. 215-231). The basic idea of CER is to create awareness of people's impact on the environment. An awareness of the carbon footprint that all natural resources leave behind. One of the most important factors is precisely this reduction of the carbon footprint and the avoidance of CO_2 emissions (González-Rodríguez et al., 2019, pp. 88-98).

Core drivers for CER are, on the one hand, the government through laws and regulations, competitive advantages or competitive pressure vis-à-vis competitors or strong awareness raising within society through, for example, the media (Hopkins et al., 2009, p. 22). On the other hand, costs arising from compliance and government regulations, as well as costs arising from environmental management activities, are also seen as a challenge (Hopkins et al., 2009, pp. 20-26; Mazurkiewicz, 2004, p. 9). As already described in section 2.1.3, the GRI standards, for example, help a company or organisation to better assess its own external impacts on the environment and to be able to react to them. Regardless of some of the negative impacts, such as high energy and resource consumption including minerals like tantalum, gold, tin, tungsten and rare earths that come from conflict areas or the increased electronic waste due to digitalisation, IT also offers the opportunity to act as an enabler of sustainable solutions such as sharing platforms, dematerialisation of products, more flexible location-independent working through home office options (Hofmann et al., 2021, p. 16).

2.4 Opportunities and Threats

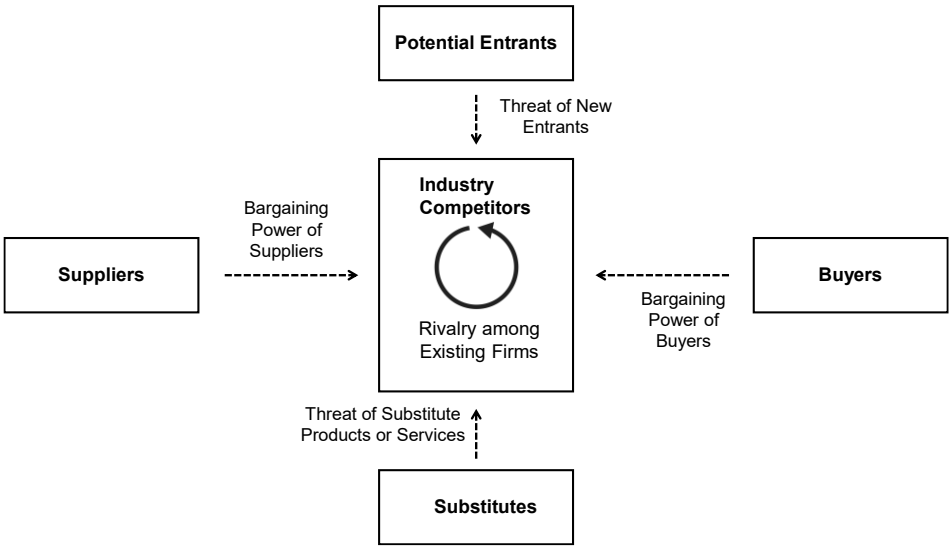
In this chapter, the opportunities and dangers of increasing digitalisation in relation to the environment, economy and social society are addressed. Which influencing factors play a role? What influence does the topic of ethics have in this context and what are the possible competitive advantages for companies?

2.4.1 Influencing Factors

Organisations are understood as independent systems characterised by defined boundaries to the external environment. The environment consists of a multitude of influencing characteristics. The influencing characteristics that are relevant for the company are called influencing factors. They can be internal, external and global influencing factors (Thom & Wenger, 2021, p. 64). Global factors of influence are, on the one hand, the economic, ecological, technical, political, legal and socio-cultural environment (Mauersberger, 2018, pp. 45-47). In the economic context, one of the best-known theories for identifying opportunities and risks, and additively also strengths and weaknesses, is the “Five Forces” theory by Michael E. Porter. His theory refers to the direct environment of a company and what influence this environment has. Porter (2008) defines that the most important and essential thing in formulating a competitive strategy is to take into account the environment and its factors in relation to a corporate strategy (Porter,

2008, p. 85). Porter's five-forces model comprises five core elements for which a company can develop strategies: suppliers, new competitors, customers, substitute products and industry competition. These five elements correspond to five challenges the company faces: the threat of new entrants, the threat of substitutes, bargaining power of buyers, bargaining power of suppliers and rivalry between competitors within an industry (Chesula & Kiriinya, 2018, p. 2). Using this framework, we can determine what the overarching strategy should be to be successful in the industry – success is identified by the ability to develop a sustainable and competitive advantage. It can also be used to evaluate which sector tendencies may be opportunities or risks (Tang, 2014).

Figure 5: The Five Competitive Forces



Adapted from: Porter, 2008, p. 27.

In every environment, increasing digitalisation is finding a high profile as a benchmark for one of the biggest influencing factors. Digital technologies can support and accelerate sustainable development in many areas – be it through data-driven efficiency gains or digital innovations, for example for sustainable urban development, CE and the energy transition (BMBF, 2020). A prerequisite for successful socio-ecologically sustainable development through digital transformation is that digitisation is understood as an environmental global issue. Its design is the joint responsibility of business, politics, research and civil society and requires coordinated action across all fields of action in order to mitigate the negative impacts of digitalisation (Umweltbundesamt, 2022a). However, this model does not

take sustainability into account. It assumes that a business model can in principle be continued without ever reaching environmental limits (Lucius, 2018, pp. 437-439).

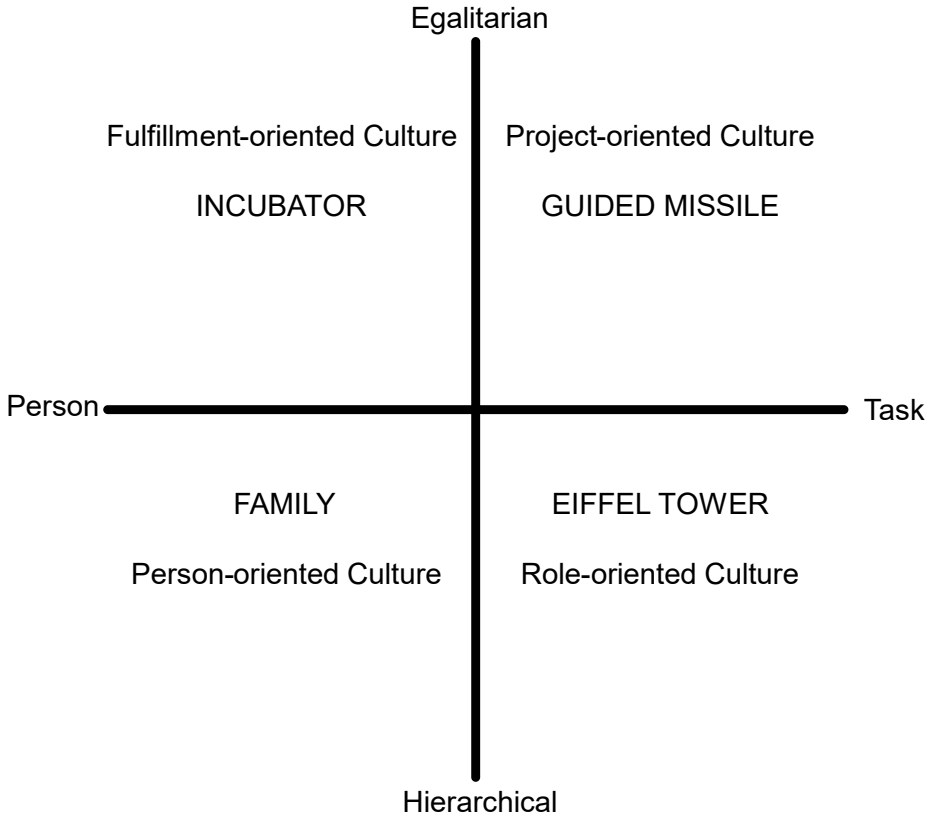
Another important environmental analysis to identify and respond to opportunities and threats is the PESTEL model. Originally developed by Aguilar as the ETPS model which stands for Environment, Technical, Political and Social. PESTEL stands for Political, Economic, Socio-cultural, Technological, Environmental and Legal analysis (Katko, 2006, pp. 126-138). The PESTEL analysis provides two basic functions for a company. Firstly, it helps and supports companies in identifying the environment with which the company is in contact and, secondly, to be able to adapt this data and information to possible situations and circumstances (Yüksel, 2012, pp. 53-54). This model and analysis helps companies to identify and evaluate influencing factors, for example the political factors of influence and all aspects of state organisation, economic factors of influence such as economic developments or economic risks, demographic characteristics and norms, values and attitudes of diverse cultures. It also refers totechnical factors, such as the degree of innovation or access to new technologies, and ecological factors, which include climate aspects, environmental awareness and attitudes towards sustainability, and legal factors at the national level (Ionos, 2020).

2.4.2 Corporate Culture

Sir Edward Burnett Tylor first defined the term “culture” around 1835, defining culture as a holistic and all-encompassing whole that encompasses intellectual, moral, social and political philosophy, art, law and all the other faculties that a person has as a member of society (Tylor, 1871, p. 401). Corporate culture therewhile is the set of beliefs, values and behaviours that are shared by all members of the company. It is often referred to with the phrase “the way we do things around here” (Hampden-Turner, 1990). It refers to the beliefs and behaviours that define how organisations interact both internally and externally.

In their book “Riding the Waves of Culture”, Fons Trompenaars and Charles Hampden-Turner (2008) define three essential aspects that are important for determining corporate culture. One is the general relationship between the employees and their organisation, the general feeling of the employees for the goals and purpose of the organisation and the hierarchy system that separates employees from their superiors (Hampden-Turner & Trompenaars, 2008, p. 215).

Figure 6: Four Types of Corporate Culture



Adapted from: Trompenaars & Hampden-Turner, 2004, p. 217.

The result was a two-dimensional idea divided into four quadrants, horizontally defined between person or task, vertically between equality for all and a hierarchical approach (Hampden-Turner & Trompenaars, 2008, pp. 216-217). The resulting types are described as follows:

- Family: Person/Power-oriented culture – it is based on the network, and relationships and managed through subjectivity.
- Guided Missile: Task-oriented culture – it is based on a strategy, goal-oriented management, and employees are paid according to performance.
- Eiffeltower: Role-oriented culture – based on structure and management by job description.

- Incubator: Person/Fulfilment-oriented culture – management by passion and employees readiness to learn (Hampden-Turner & Trompenaars, 2008, pp. 216-217).

It is important to develop an awareness of the values of another culture or group. Apart from morals and ethics, there is no right or wrong. Often, one's own culture as well as the corporate culture changes the perspective on how we see something. A deep embedding of sustainability in the culture of a company results in many advantages. For one, it improves employee performance and engagement. A company's reputation as well as its market value can be improved (Galpin et al., 2015).

2.4.3 Ethics

The topic of ethics with all its facets and niches is so extensive and all-encompassing that in the context of this paper only a definition is given and an outlook on current incidents triggered by increasing digitalisation on an economic and social level. The area of environmental ethics and its different approaches (anthropocentrism, pathocentrism, biocentrism and ecocentrism) are unfortunately not addressed in this work for the same reason. Nevertheless, companies should use their opportunities to deal with the environment in a sustainable and ethical way.

The term ethics is derived from the Greek word "ethos", which means habit, custom or usage (Fenner, 2020, pp. 16-17). Often the word morality is used as a synonym. However, morality refers to when norms correspond to the ideas of meaning or values of a community of action. Ethics refers to norms and values that can be used to judge actions as positive or negative, whereas norms reflect what is understood as reasonable. At the corporate level, business ethics refers to the application and implementation of norms and values in business decisions (Küpper, 2011, pp. 34-35). The term "business ethics" also represents an ongoing effort to examine our own moral beliefs and behaviour and to ensure that we and the institutions we help to shape live and act by reasonable and sound standards. Especially through the increasing globalisation of the economy in all areas, the increase in digitalisation, the economy changed and raised new ethical questions, for example about the protection of privacy (De George, 2005, p. 351).

The term "digital ethics" is emerging as a result of digital development. The focus here is on acting correctly under the conditions of digitalisation. The focus is on

examining the social, ecological and economic compatibility of digital technologies in their development and application. German companies, however, see a lack of qualified personnel with the appropriate skills, and a low level of awareness of the topic as the biggest current showstoppers in the area of digital ethics (PWC, 2019). Dealing with the ever-growing amounts of data is also a much-discussed topic. Laws help to get these barriers under control. For example, in 2018, the European Parliament adopted an EU regulation on the protection of personal data – the General Data Protection Regulation (dt. DSGVO) (Europäisches Parlament, 2022).

A hot topic at the moment is the impact of digitalisation on society from an ethical point of view. Social networks/social media such as Facebook, Instagram and Twitter as collections of digital technologies in the form of apps or sites to enable a digital environment of interaction for users have become an increasingly indispensable part of society in recent years (Appel et al,. 2020, p. 80). Whereas in 2021 there were 4.2 billion social media users in the world, we are now at over 4.62 billion this year (Statista, 2022a) and the number is rising. We are more connected than ever, but are we really? The advantages of social networks are obvious: On the one hand, they promote communication from a private point of view and profitable communication from an entrepreneurial point of view (Appel et al., 2020, p. 82). On the other hand, despite all the glamorous advantages, this use also harbours dangers, such as loss of reality, addiction to social recognition and a fading boundary between public and private sphere (Kross et al., 2013).

One of the most influential Silicon Valley greats, internet pioneer and “father of virtual reality”, Jaron Lanier is sharply critical of some aspects of digitalisation – also from an ethical point of view. Lanier talks about the need to base responsibility in a digital environment on a broader and more general principle of accountability. Ethics is the key to this (Lanier, 2017, 4:24). As the inventor of VR, he criticised one of the newest technologies of our time – the Metaverse (a fusion of virtual world, augmented reality and physical world into one online world (Cloud-computing-Insider, 2022)) in a Forbes article, saying, “If you run [the metaverse] on a business model that’s similar to the one that Facebook runs on, it’ll destroy humanity” (Forbes, 2021). Lanier also warns of the dangers of social media (dopamine-driven feedback loops). In his book “Ten Arguments for deleting your social media accounts right now” he reveals how much our behaviour is being modified (Lanier, 2019, p. 10). Social networks bring whole new dimensions of stimulation – social pressure (Lanier, 2019, p. 16) and explosive amplification of negativity in human affairs (Lanier, 2019, pp. 81-84). The only skill that helps social media make money is essentially the ability to persuade its users and change

their behaviour – which results in them losing their own will in the process (Lanier, 2019, 23) as well as the ability to empathise with others (Lanier, 2019, 78).

2.4.4 Competitive Advantage

When it comes to competitive advantage, the focus is usually on value creation and a drive and action to increase profitability (Porter & Advantage, 1985, pp. 167-206). Digital technologies offer sustainability far-reaching potential for reducing GHG emissions and resource consumption in many areas. At the same time, however, various ecological areas of tension are becoming increasingly apparent as a result of increasing digitalisation, for example, as already discussed in this paper, among other things through increasing energy consumption. However, there is often a lack of transparency about digitalisation processes and data, which is seen as one of the stumbling blocks for sustainability initiatives (Alsdorf et al., 2022, p. 10). Digitalisation means automation, autonomisation and algorithms, for example artificial intelligence. Digitalisation is omnipresent and thus fundamentally changes all areas of life (Reinheimer, 2017, p. 17). However, it includes not only technological changes, innovations and novelties, but also social and political processes of change, all of which have an impact on the social and natural environment. A vivid example is provided by the field of agriculture, which is one of the biggest climate problems in the world (Foer, 2018, p. 58).

Before the advent of digitalisation, work in agriculture was hard manual labour – now, robots take over routine tasks in the barn or in the field, or government-guided field vehicles make the work easier. These optimisations could counteract the increasing problems in the world. When considering the impact of IT in the context of economic, environmental, and social factors, the focus is often on efficiency. In the industrial sector, the intelligent use of IT can save time, resources, and labour, leading to increased efficiency and increased profitability. At the management level, new technologies help to develop effective strategies or to open up new market shares or improve one's own image through the use of the latest communication channels. Effective and skilful use changes entire business areas. Companies that avoid this issue or completely sleep through the change can quickly find themselves in an uncompetitive position. It is important to use the potentials of digitalisation (Keuper et al., 2013, p. 29). The traditional approach to competitiveness sees technological change as the decisive factor for innovation and growth, while market forces determine the competitive strategy and positioning of a company and its products (Lucius, 2018, pp. 139-152). Improving the

strategic competitive position is one of the top priorities for companies (Fraunhofer IAO, 2020).

2.5 Summary of Research Gap and Explanation of Research Questions

In this section, a brief and condensed summary of the literature review is given. In summary, digitalisation is part of our planet, and it is hard to imagine many areas without it. Since the end of the 17th century and the beginning of the first industrial revolution up to the fourth and current revolution, a lot has changed in the field of technology and digitalisation. The latest innovations have conquered markets, such as the use of smartphones, and have become a part of our daily lives. Large amounts of data flow into almost every part of our world every day, connecting people on every continent. Especially the effects of the global COVID-19 pandemic have shown that in some areas digital transformation has been well implemented and expanded – in other areas, unfortunately, it has been very slow.

For companies, too, much has changed since the introduction of the internet and the resulting rapid increase in the need for digital technologies. In order to continue to maintain or strengthen their own market position, a planned and strategic approach to these technologies is required. For companies, digital transformation is no longer a question of “if” but rather a question of “when” and “how” it will be used. With the increase of digitalisation and all its facets, an increase in GHG was also noticeable. Through globalisation and the associated strong increase in population, an awareness in the area of the environment also increased. Global warming can no longer be denied. Hand in hand, there is now increasing talk of a dual transformation, not only digital but also sustainable. The core problem and the starting point for all environmental problems lies in the concept of the tragedy of the commons and a rigid focus on pure profit maximisation. To build a bridge between the concept of the Triple Bottom Line and the shareholder and stakeholder approaches, it can be said that the shareholder approach operates almost exclusively in the profit sector with the aim of increasing profit and company value and only takes other stakeholders into account if this has a positive impact on company turnover. It is only through Freeman’s stakeholder theory approach of balancing all internal and external stakeholders affected by the company’s activities and their interests that no one is dissatisfied that the other two Ps of the Triple Bottom Line (Planet and People) are also taken into account. For example, a company should advocate for its employees and ensure safe working conditions. From an external perspective, companies should address environmental

issues and abide by rules and laws, such as respecting human rights. Nowadays, it is no longer possible to ignore the values of a stakeholder group, as stakeholders create the most value. For example, a company can no longer simply dump its toxic waste into a river to save on disposal costs, as this would impact on the company's other stakeholders – the environment is polluted and society suffers. In such a transparent world with a strong media presence, this is no longer possible without causing a scandal.

Many concepts and strategies help companies to act responsibly on both a social and digital level especially when companies take responsibility for the impact of their social activities (CSR) and their digital activities (CDR). With the development of the 17 SDGs of the United Nations, a framework has been created that provides both clear goals and clear and unambiguous recommendations. The days of following the values and ideas of shareholders alone no longer exist. It is rather an interplay of many internal as well as external factors that play a role in the strategic planning and orientation of a company as well as have a strong influence on the actions of an organization.

Culturally, too, the boundaries on our planet are blurring. Especially from a business perspective it is essential to adapt to cultural changes. As already mentioned, technologies are developing rapidly. In many areas, we are still at the beginning of an innovation transformation. However, these technologies, such as the area of VR, are not only opposed by advocates. In recent years, it has become clear how complex, opaque and transparent these topics are and that the long-term consequences can often neither be recognized nor assessed. Technologies have been developed further, but often an ethical framework has not been rethought. Digitalisation has enormous potential to achieve new milestones in the preservation of our planet, if applied and implemented ethically and correctly. Despite many organisations recognising the importance of sustainability, the implementation of an effective and sustainable strategy often remains a challenge, especially when coupled with digital transformation. Especially the interplay between digitalisation and sustainability and possible opportunities and threats and influencing factors has not been sufficiently described and analysed in the literature in the field of German IT companies.

3 Research Design

3.1 Research Method

The aim of this study was to investigate how digitalisation affects sustainability and what influencing factors as well as opportunities and risks arise for German IT companies. This paper is based on the fundamentals of empirical social research, which is understood as a set of methods, instruments, and techniques for conducting research in a scientifically correct manner. Empirical Research searches for insights through a targeted evaluation of experiences and knowledge (Häder, 2010. p. 12). Methods are a component of empirical social research. Methods represent systems of instructions and rules in order to realise specific findings or results and to collect information (Häder, 2010. p. 13).

The research method used in this study consists of conducting qualitative expert interviews. Qualitative methods are particularly well-suited to presenting opinions and attitudes and views of people on certain topics in their complexity (Brosius et al., 2008, pp. 4-5). The opinions and findings of the experts interviewed are intended to provide a deeper insight into the topic already presented and to open up the possibility of using the findings to answer the research questions posed above or to explore a possible solution. Detailed preparation was necessary to conduct the expert interviews. On the one hand, the focus was on a thorough and coherent preparation of the interview guideline with regard to the research questions to be answered, as well as on contacting the experts and making appointments for the interviews. A survey was chosen as the data collection method for this work. The form of the survey is a qualitative survey.

Specifically, the guideline-based expert interview was chosen as the survey technique (Häder, 2010, p. 13). Expert interviews are a sub-area of qualitative social research and differ from quantitative research methods in that you understand and analyse more complex social issues. Qualitative social research usually has a relatively small sample, in contrast to quantitative research methods. In a qualitative research method, hypotheses are not established in advance, but scientific results are derived from the statements of the interview partners (Häder, 2010, pp. 13-19). The special feature of expert interviews is the specificity of the target group. The general and fundamental principles of social science research apply (Baur & Blasius, 2014, p. 559). In addition to the principle of openness, the rule-governed approach and the principle of understanding, the principle of the theory-guided approach is particularly important. This means that it is essential to analyse existing theoretical knowledge about the topic to be researched before starting a qualitative study in order to expand it through further investigations (Mayring

& Fenzl, 2019, pp. 161-163). In qualitative research, the focus is on addressing the full complexity of an issue. Due to the explorative character of the research work, a qualitative method in the form of guided expert interviews is suitable. Experts are characterised on the one hand by their subject-specific knowledge and proximity to the subject under investigation. It is not the experts themselves that are the object of the investigation, but rather their knowledge, thoughts and statements on the topic(Gläser & Laudel, 2010, p. 12). Qualitative interviews form a communication situation in which essential and decisive data are generated subjectively by the interviewees in a complex situation. This also means that the quality of the data is crucial due to the survey situation (Helfferich, 2011, pp. 7-9).

3.2 Research Design and Implementation

A survey was chosen as the data collection method, more specifically, a guideline-based expert interview, which is defined by its survey instrument, the guideline (Baur & Blasius, 2014, p. 560). The evaluation method is presented in the form of a qualitatively structured content analysis according to Mayring, which is an evaluation method that processes texts that arise in the course of a research project in data collection (Baur & Blasius, 2014, p. 543). For this purpose, the transcriptions were presented in tabular form using Excel for simplified presentation. The entire transcript of the respective expert was chosen as the contextual unit for the respective expert. Further categories were not formed, since all categories necessary for this research were already formed in the questionnaire. Due to the brevity of the interviews, the transcripts were not compressed. Transcriptions were made following the transcription rules of Kuckartz (2012; quoted in Baur & Blasius, 2014, p. 391). Accordingly, verbatim transcription was used and language and punctuation were slightly smoothed. Transcribing data material means transferring it from an auditory to a written form. For example, interviews, group discussions, or even natural conversations that were recorded for the purpose of data collection must be transcribed (Höld, 2009, p. 657).

The guide used can be found in the appendix. Since all experts are native speakers of German, all interviews were conducted in German in order not to jeopardize a continuous flow of conversation. The interview guide was prepared in both German and English, but the transcripts were left in their original language and not translated.

The interview guide was prepared in two forms, on the one hand, in plain text form to make it available to the participants in advance (if desired) and on the

other hand to attach it as Appendix 1 to this work.[1] For a better overview and to ensure an easier evaluation later on, the guide was also supplemented in tabular form and categorised with the answers of the transcripts including the page number of the respective interview.

The interview guide was divided into six sections. In the first section, the respective participant is welcomed, and the interviewer briefly introduces himself. Furthermore, the interviewer gives a brief overview of the topic to be researched and addresses the guiding questions of this paper. The second part starts with a consent request. In the third part, the initial questions are asked to reflect the respondents' first insights into the topics of digitisation and sustainability. The fourth part of the questionnaire asks more specific questions specifically related to answering the research question. In the fifth part, further questions are asked in order to identify a possible outlook or trend. Finally, in the sixth part, the interview was brought to an end and the expert given the opportunity to ask questions.

Measuring the quality of a dissertation requires the definition of and compliance with quality criteria. These overarching criteria are, first, transparency, which requires adequate documentation, disclosure, and explanation of the entire research process, as well as comprehensibility of the evaluation and interpretation of the data. Another criterion is intersubjectivity, which states that an evaluation should be plausible, unambiguous, and confronted with alternative interpretations. A third important criterion is scope, which focuses on the extent of generalizations that are possible based on this research. All criteria were considered and adhered to in this paper. This is the purpose of chapter 3, "Research Design," in which these framework criteria were applied (Mey & Ruppel, 2018, pp. 236-238).

3.3 Sample Description

In this study, the form of expert interviews was chosen to collect the data. Experts are characterised by their long-standing expertise in a particular role and their high level of expertise (Gläser & Laudel, 2010, p. 12.). Due to the complex and specific topic of this study, experts were chosen who have many years of experience in the field of IT, in the field of sustainability or preferably both. One reason

[1] Appendices 2–7 (transcriptions of the expert interviews) are not included in this publication for reasons of length and data protection.

was also the associated awareness and adeptness in dealing with new technologies and innovations. Some of the experts also had a multi-layered perspective on the researched topic due to increased customer contact. The expert interviews were an excellent tool for discussing their experiences and observations in detail with the experts in order to gain deeper impressions in the areas of digitisation and sustainability (Echterhoff et al., 2013, pp. 225-228).

During the recruitment process of the experts, each potential expert was contacted in advance by telephone in order to present the research topic in a clear and compact way and to check the qualification of the experts in order to ensure that a meaningful database could be expected after the interviews. In addition, two interviews were conducted in advance for practice purposes in a private setting. The experts were selected deliberately and systematically. All of the experts demonstrated high expertise through their position in their specific areas of expertise and thus it could be concluded that interviewing them would obtain meaningful data from their findings.

Since this is a qualitative and not a quantitative survey or data collection, demographic data such as age and gender of the experts was not requested. These are not relevant data for this evaluation. The person interviewing is indicated by an “I:”, the person being interviewed by an “E:” (for Expert). Reception signals such as “hm, aha, yes, exactly,” which do not interrupt the other person’s flow of speech are not transcribed.

3.4 Conducting the Interviews

Interviews were conducted via video conference using Microsoft Teams between 17th October 2022 and 4th November 2022. The average duration of the interviews was about 33 minutes. A test run was performed to check the survey instrument’s functionality, question comprehensibility, and interview duration before the actual interviews. The experts received the questionnaire in advance via email for preparation. The interview guide presented in section 3.2 was used for a clear and structured interview process, and each participant received an invitation to the video conference and a copy of the guide via email. All interview partners had a one-hour time slot for participation.

“Yes” or “no” questions were asked during the interview only to introduce specific questions. Furthermore, recapitulation questions were asked during long monologues to ensure that the statements were correctly understood in order to guarantee a consistent basis for further evaluations. Private conversations during the

interviews, which had no relevance for a later evaluation, were audio-visually recorded but not transcribed in the next step.

4 Findings

This chapter presents the information obtained through the interviews with the six experts. As in the interview guide, the data obtained from the interviews is presented in different main themes and sub-themes to underpin a stringency in the structure of this paper and to ensure a concrete reference to the research questions. Section 4.1 shows the answers to the general initial questions (see Appendix 1 – Interview Guide). Section 4.2 looks at the answers to the first main questions, influence factors and challenges (see Appendix 1) Section 4.3 deals with the experts' answers that specifically address the main research question. The section 4.4, looks at the experts' responses in relation to the strategic directions, ethical and cultural perspectives and the final questions of the guide (see Appendix 1). Section 4.5 ends with a summary of the given answers and a tabular overview of the core answers to each question.

4.1 Digitalisation and Sustainability in General

The interviews show an advanced understanding of the participants of the distinction between digitalisation and digital transformation as well as an understanding in the area of sustainability and sustainable development in the economic, ecological and social areas. The experts gave one answer each to both questions (question 1 and 2). Thus, there are six answers per question.

Fundamentally, the understanding of digitalisation is a process of change (E4, 2022, line 14-20) that enables a digital image of analogue processes (E2, 2022, line 15-22 & E3, 2022, line 17-30). In this context, digitalisation is seen as much more than just developing or introducing new software or hardware (E1, 2022, line 15-32). Each of the experts interviewed sees digitalisation and digital transformation as tools that primarily drive the optimisation and simplification of existing processes (E5, 2022, line 14-20), for example, the optimisation of communication, documentation and quality assurance (E2, 2022, line 15-22). However, digitalisation is also understood as a topic that cannot be implemented or adapted in a very short time. It remains a process in which, although the focus is on optimisation, the needs and digital participation of users cannot be neglected (E1, 2022, line 15-32). The change and optimisation does not only apply to processes, but rather to entire business models (E6, 2022, line 31-48). In this context, it is not enough to look at the pure transformation of models and processes, but to evaluate the overall cultural mindset and the meaningfulness of individual areas of implementation in order to perceive digitisation not only as a compulsion to digitise, but rather as a business driver (E6, 2022, line 31-48).

All six experts demonstrated an equally wide-ranging understanding and basic knowledge on the topic of the second question, “What does sustainability mean to you?” Like the topic of digitisation, sustainability is also seen by the experts surveyed as a global, far-reaching topic with a strong media presence (E1, 2022, line 41-59), a topic that currently has the status of a megatrend (E6, 2022, line 11-25). The three-pillar model, ecological, economic and social sustainability, was mentioned as a basic principle (E6, 2022, line 11-25 & E4, 2022, line 30-44 & E5, 2022, line 27-56). The basic idea of the Brundtland Report, “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987), can also be seen in the answers (E3, 2022, line 41-46 & E2, 2022, line 30-34). Parallel to the first question, sustainability is also seen as a topic that cannot be successfully implemented in a short period of time and without a strategy (E1, 2022, line 41-59). E1 gives the example, “if now all people start to buy e-cars, and the power grids are not designed for this, or the electricity, which often comes out of the socket is not green, but generated in some coal-fired power plants, that is not a sustainable process” (E1, 2022, line 41-59). Sustainability is therefore not a topic that centrally affects one place, one organisation or one person, but society as a whole. From an ecological point of view, keywords such as CO_2 reduction, CE (E4, 2022, line 30-44), environmental protection and climate activism were mentioned (E5, 2022, line 27-56). From a social point of view, topics such as working conditions in the supply chain, occupational safety and due diligence were listed (E4, 2022, line 30-44). Economically, the focus was placed on sustainable management, as well as the fact that the survival of companies leads to the current society continuing to have the standard of living that it has today (E6, 2022, line 11-25). The mention of the SDGs as a benchmark, indicator and guide for the implementation of a sustainable development of our planet was striking (E5, 2022, line 27-56). A balance or a harmony of the three-pillar-model respectively the triple bottom line offers the basis to live in a way that we survive in the long run (E6, 2022, line 11-25).

4.2 Influencing Factors and Challenges

In this section, the interview questions were addressed which deal with the factors influencing digitalisation on sustainable development as well as the question of which challenges companies face in the implementation of set sustainability goals. Each of the three questions was answered by the experts. This means that there are six answers per question (question 3, 4 and 5).

When asked what challenges German IT companies currently face with regard to the implementation of the sustainability goals, four of the six experts answered that setting the goals is already one of the biggest challenges. A clear definition of the goals set is the first step (E5, 2022, line 65-73). Furthermore, the maturity of the defined goals often varies greatly (E4, 2022, line 52-81). However, setting and defining goals only makes sense if they are also measured and monitored (E3, 2022, line 56-70). When defining goals, it is also important to consider the extent to which a goal is to be achieved. It is not enough to pursue only one's own internal goals. Rather, all stakeholders (suppliers, customers, employees) must be included in the target planning and measurement of sustainability goals, for example, in the GHG emissions assessment (E5, 2022, line 52-81 & E3, 2022, line 56-70). Due to the explosive and dynamic nature of this topic, laws and government regulations are often still "too" vague and unclear (E6, 2022, line 62-93). E4 said: "...the legislation, which is becoming very complex, where you really have to look very closely at what needs to be changed and to what level of detail" (E4, 2022, line 52-81).

Another major challenge that should not be underestimated is the adaptation and implementation of the mobility issue in the coming years in connection with CO_2 reduction (E2, 2022, line 43-53). E1 sees a particular need for action in the area of e-mobility. More precise regulations are needed in the future, especially on the issue of costs and benefits as well as cross-financing through state funds (E1, 2022, line 71-90). Despite the complexity of the fields of action of digitalisation and sustainability, it is important to reconcile them in the coming years and to respond to the emerging social desires. Companies are under massive pressure to cope with the speed of change and at the same time satisfy societal needs and be profitable (E6, 2022, line 62-93). In this context, it is also important to adapt earlier theoretical concepts and strategic tools to today's time and needs (E6, 2022, line 62-93). As a positive influence of digitalisation on the areas of sustainability, all six experts focused on new technologies and innovations such as cloud computing, AI, VR, etc. On the one hand, these technologies offer the opportunity to deal with the rapid change of digitalisation and to optimise processes and areas (E1, 2022, line 101-129). The use of these technologies makes it possible to create completely new standards in the area of communication and transparency (E5, 2022, line 105-141), not only within the company but throughout the entire supply chain (E4, 2022, line 92-110). The conscious use of the latest technologies also opens up immense potential for saving resources in terms of energy efficiency. Smart grids, smart homes and others are all possibilities of digitalisation that contribute positively to sustainability (E6, 2022, line 105-141), especially since the development of these technologies has made a certain measurability

possible in the first place (E3, 2022, line 80-121). The possibilities of how and where work can be done (digitally or on site) have also grown through the use of digital technologies. Events that were previously associated with high travel costs are now possible digitally (E2, 2022, line 63-74). An improvement in one's own work-life balance can also be realised through more flexible working models and location-independent working options (E6, 2022, line 105-141). Positive influencing factors through the use of the latest technologies are thus recognisable both on an economic level (through process optimisation and the latest communication options, for example), on an ecological level (through energy efficiency), and on a social level (work-life balance).

Nevertheless, digitalisation with its technologies and effects also has its downsides. Data growth and the associated energy demand continue to increase (E2, 2022, line 82-92). This is particularly evident in the growth of streaming services and the use of digital technologies in the field of electronic currency (Bitcoins and co.) (E2, 2022, line 82-92 & E3, 2022, line 133-169). These two points, growing data volumes and high energy demand, are the two most frequent responses from the experts in the field of the negative factors of influence of digitalisation on the areas of sustainable development. E1 also points out that the digital transformation is still progressing far too slowly in some areas: "...that the German federal government is still working with fax systems in the wake of the Corona pandemic as well as many doctors' practices or pharmacies..." (E1, 2022, line 138-159). In addition, some experts see a danger precisely in the borderless communication possibilities and the transparency of the individual that goes with it. This point, which was also part of the positive factors, can conversely also take on strong negative and manipulative features (E6, 2022, line 144-180). New media can give correct and true information, but at the same time they can also only pretend to tell the truth (E3, 2022, line 133-169). Increasing digitalisation also has a negative impact on society. On the one hand, as already mentioned, through the increase in streaming platforms, but, on the other hand, also very clearly in the mindset and culture of society itself. The short life span of mobile devices, for example, is changing society into a consumer society where "newer," "better," "bigger," and "faster" are more important adjectives than "sustainable" (E6, 2022, line 144-180). E6 even draws a comparison to one of the seven deadly sins – society's greed and gluttony.

4.3 Opportunities and Threats of Sustainable Development

In this section, the interview questions deal with the responsibilities that companies are currently facing in relation to increasing digitalisation and which opportunities and threats have arisen about sustainable development. Each of these two questions (question 6 and 7) was answered by the experts. This means that there are six answers per question. In addition, questions 11, 12 and 13 were brought forward in this section, as they fit better with the content of this section. Question 11 deals with ethical concerns raised by increasing digitalisation. This question was answered by each of the six experts. Question 12 is provocative with the question: “The digital transformation – a climate killer?” E2 was not asked this question due to time constraints. Question 13 was only answered by participants E1 and E3.

Question 6 deals with which responsibilities have arisen due to the increasing digitalisation on the development of the company. The focus is on a high degree of responsibility on the part of the companies (E1, 2022, line 171-198). This includes adapting and optimising existing processes (E2, 2022, line 100-111), but also dealing with a changing corporate culture (E6, 2022, line 193-236, E4, 2022, line 149-163 & E5, 2022, line 167-187). The core of a company is to ensure its profitability (E3, 2022, line 180-202). This basis forms the foundation for driving process optimisations in the areas of digitalisation and sustainability. Three of the six experts argued that there must be a central role in the company that drives forward the areas of digitalisation and sustainability (E2, 2022, line 100-111, E4, 2022, line 149-163 & E6, 2022, line 193-236). The content of this role could be, on the one hand, to deal with the topic of data security and information security (E2, 2022, line 100-111) or also with the topic of the ethical handling of data (E4, 2022, line 149-163) in particular, but also with the topic of digital participation and digital inclusion. E4 describes it as a kind of duty of care for companies. The aforementioned role combines the topics of CSR and CDR and requires sufficient in-depth knowledge (E6, 2022, line 193-236). In order to promote the increase in knowledge and the development of digital participation, E6 speaks of proceeding methodically and professionally. An example of integration would be the possibility of knowledge and understanding about digitalisation and sustainability in a playful form.

In the questioning of possible opportunities and threats that influence sustainable development through digital transformation, the focus was on saving finite resources and reducing CO_2 emissions. Digitalisation and sustainability currently play a significant role for companies. Nevertheless, optimisations must always be in relation to costs (E1, 2022, line 212-226). Optimising processes purely for the

sake of digitalisation and neglecting economic efficiency carries a threat (E1, 2022, line 212-226). Digitalisation and digital transformation certainly offer the opportunity to create standards that both move a company forward and achieve sustainability goals (E3, 2022, line 215-249). Especially the field of e-mobility is a strong lever for sustainable development (E2, 2022, line 120-127). Likewise, the latest technological possibilities in the field of VR and AI can have a strong influence on positive sustainable development: E6 states that "…using augmented reality and virtual reality in production is totally difficult, but it can be done. The resources we save there, unimaginable" (E6, 2022, line 250-290).

Corporate culture and the digital participation it requires were also mentioned again on this question (E5, 2022, line 198-205). From a global perspective, increasing digitalisation also poses the threat of widening the gap between rich and poor (E3, 2022, line 215-249). Manipulation through the transparency created by digitalisation also poses a threat that both companies and entire social groups have to deal with (E3, 2022, line 215-249). Digitalisation has the potential to have both a positive and a negative influence (E2, 2022, line 120-127). Another threat that cannot be ignored is the change in society as a cause of increasing digitalisation. Unbridled consumption and blind growth can be seen as a consequence (E6, 2022, line 250-290).

All six experts agreed that ethics and digitalisation in combination is a very difficult and comprehensive topic. In this context, it is important that a distinction between humans and machines can be clearly made (E1, 2022, line 280-299). Ethical concerns arise where digital processes are processed exclusively digitally and can no longer be implemented in analogue form, which in turn leads to the question of where data sovereignty should lie and who has access to it (E2, 2022, line 198-207). All data, especially that of the entire supply chain, is a central issue that should be considered (E4, 2022, line 264-281). E3 is also of the opinion that morals and ethics are a very difficult topic in the context of digitalisation. Digitalisation can function as a tool in both positive and negative ways (E3, 2022, line 363-396).

Digitalisation should be used in such a way that it promotes sustainable development and brings the world into balance from a global perspective (E3, 2022, line 363-396). Especially in the global context, the ethical "right or wrong" faces some challenges. Even companies that are heavily criticised by society must have the opportunity to align their core business more sustainably through digital transformation. Here, there is a risk of prematurely misjudging such actions (E5, 2022, line 356-412). E6 clearly states that it is not the machine that is the problem but

the human being. Accordingly, it is the human being's responsibility to use technology ethically and morally and thus to serve the common good (E6, 2022, line 338-353).

In response to the provocative statement "Digitisation – a climate killer", the consensus of all respondents is that although digitisation has the potential to do harm to global climate developments, the truth lies somewhere in between. Humans could make it so (E6, 2022, line 362-372) if they continued to be careless with technology. Streaming services in particular were mentioned by the experts (E1, 2022, line 314-334 & E3, 2022, line 404-412), furthermore, technologies that process large amounts of data and thus consume resources, such as Bitcoin technology (E3, 2022, line 404-412). It is important to create framework conditions in order to use technologies positively (E1, 2022, line 314-334). Particularly through state-of-the-art technologies, such as digital twins (E4, 2022, line 288-308) and the optimisation of energy-efficient data centres, increasing digitalisation offers the opportunity to influence more sustainable development (E4, 2022, line 288-308). The goal should be to view digitalisation as an opportunity (E5, 2022, line 419-440). E4 sees the topic of CE and longer product life cycles as particularly important: "…you actually have to talk about longer product life cycles and repairing things and keeping resources in the cycle much more" (E4, 2022, line 288-308). If this process is properly thought through and does not lead to a two-tier society, digitalisation can help us to meet the challenges ahead in terms of a more sustainable life (E1, 2022, line 344-351 & E3, 2022, line 421-425).

4.4 Sustainable Strategy

In this section, the interview questions dealing with the strategic orientation of the companies were addressed. Question 8 deals with the importance that sustainability currently has in corporate culture. This question was answered by all six participants. Questions 9 and 10 deal with concrete measures or projects. Question 9 was not asked by E6 due to time constraints. Question 10 was not asked for time reasons E1, E3 and E6.

On the question of how important the topic of sustainability is in the company, all the participants surveyed stated that the topic is growing strongly. Whereas it was a niche topic in most companies just a few years ago, it is currently coming to the fore across all sectors (E2, 2022, line 135-143). Along with a central sustainability strategy and learning opportunities for employees, it is increasingly noticeable that the topic is becoming more present and also more transparent. A cultural change towards sustainable thinking is recognisable (E4, 2022, line 170-185).

Especially in recent years, virtual working and working from home have made the issue more present than ever (E6, 2022, line 303-324) – travelling to work is becoming less frequent and mobile working is on the rise (E6, 2022, line 303-324). The issue of greenwashing in this area currently poses a risk. Many companies advertise climate neutrality, but whether this was achieved on their own initiative or only through the purchase of CO_2 certificates is often not transparent for the end consumer (E5, 2022, line 214-269). It is important to reduce CO_2 emissions and not only to disguise them by purchasing certificates (E5, 2022, line 214-269). The consideration of a carbon footprint should be achieved at all levels (E3, 2022, line 268-294). An important aspect in the future will be to put resources into more sustainable research, for example in the cooling of data centres or also in the construction of new buildings according to sustainable specifications (E5, 2022, line 214-269).

In response to the question of which projects to reduce the carbon footprint are being planned or have already been implemented, many technologies were mentioned that reduce CO_2 emissions or produce energy efficiency, like photovoltaics and geothermal energy (E2, 2022, line 155-189). Multiple answers were given on the topic of e-mobility and digital working from home, this, however, under the premise that the electricity for the e-cars is also green (E1, 2022, line 240-267). As E5 already stated in the previous question, the sustainable construction of buildings and the maintenance of these buildings is an important factor for the future (E3, 2022, line 306-346). The distinction between climate neutrality and reduction to compensation (e.g., through CO_2 certificates) should always be considered (E4, 2022, line 198-222). A particularly noteworthy competitive advantage is the fact that the topic of sustainability has gained so much influence in society that it is becoming a decisive factor in the area of application processes and the associated employer attractiveness (E4, 2022, line 198-222). Exciting examples included using geographical locations for data centres that require less cooling or operating entire data centres deep in the sea where there is constant cooling and this does not have to be produced artificially and energy inefficiently. Also, examples for the building sector were mentioned, for instance, the use of wood (as a CO_2 binder) instead of concrete (E5, 2022, line 283-347).

4.5 Findings Summary

The last section of this chapter deals with the closing statements of the individual participants. All responses have been summarised and tabulated (with the exception of questions 13 and 14). The summary was limited to the two to three most discussed key points.

E1 sees both the topic of sustainability and digitisation in combination as elementarily important. Especially in the area of employee recruitment, a certain level of maturity in digitalisation is essential. Many young people want to work in an agile and “cool” way – but this must also be guaranteed in the long term (E1, 2022, line 361-376). E2, for example, sees the topic of energy from sustainable hydrogen in the industrial sector as having potential (E2, 2022, line 220-229). E3 sees potential in digitalisation, especially through the fact that digitalisation with all its facets offers the possibility of measurability. This measurability reaches into every area worldwide. E3 sees potential in the development of a measuring system that can determine a more exact and minutely accurate world resource consumption date. According to E3, life and business should be geared towards this date – and that on a global level without exceptions (E3, 2022, line 435-488). E4 sees the need for both topics, digitalisation and sustainability, to be brought together and harmonised more strongly. Sustainability aspects must be considered in IT decisions (E4, 2022, line 317-326). It is also important to recognise whether something is really sustainable, has been implemented sustainably or whether it is simply greenwashing. Just because something looks good and sustainable at first glance does not necessarily mean it is. Concepts and processes should be rethought (E5, 2022, line 448-502). The key is to act and live responsibly and not immoderately (E6, 2022, line 380-383).

Table 1: Empirical Findings Summary

Ref	Theme	Findings
1	Knowledge about digitalisation	• Process optimisation • Digital participation • Changing analogue to digital
2	Knowledge about sustainability	• Environmentally friendly technology • Ecological living • Global theme
3	Challenges in the implementation in the area of sustainability	• Clear goals/strategy • Considering actors • Mobility
4	Positive influence of digitalisation on sustainability	• New innovations/techniques • Energy efficiency • Communication skills and transparency
5	Negative influence of digitalisation on sustainability	• Energy consumption • Growing amount of data • Slow change/adaptation
6	Advantages of digitisation in the area of business development	• Digital participation • Ownership of the companies • Special role for sustainability
7	Opportunities and threats of digitalisation on sustainable development	Threat: • Digital participation is not realised • Manipulation through digitalisation • Excessive consumption Opportunity: • Mobility • CO_2 savings • Economic growth
8	Importance of sustainability in corporate culture	• Increased strongly in the last few years • Corporate culture is planned in a more sustainabe fashion
9	Strategy for reducing the carbon footprint and competitive advantage	• Technologies that emit less CO_2 • E-mobility • Digital work

10	Implemented projects in this area	• More sustainable technologies • Building optimisation • Photovoltaics/geothermal energy
11	Ethical concerns due to increasing digitalisation	• Ethics in IT very difficult • Ethical handling of data • Using digitisation in a morally correct way
12	Digital transformation – a climate killer?	• Streaming services • Digitisation, if used correctly, is an opportunity • Technology is a tool – people misuse it as a killer

5 Discussion of Opportunities and Threats of CDR

The objective of this study is to address the questions defined at the beginning. Chapter 2 (Literature Review) serves as a theoretical basis and knowledge foundation for the following reflection and implication. The aim of this paper is to provide recommendations for action and implementation at management level based on the explorative research and the associated expert interviews. The implications are divided into theoretical implications for the theories described in chapter 2 and implications for management practice. The six expert interviews provide detailed initial insights into the previously defined questions and offer the basis for drawing the first possible conclusions. For further research, it would be worth considering expanding this qualitative research to include quantitative research. Further recommendations for further research are discussed in section 6.2.

The core element of this chapter is to give an implication between the literature and the results of the qualitative research on the research questions posed. The following research questions need to be answered.

1. Which sustainability opportunities or threats arise for German IT companies in the areas of environment, economy and social affairs resulting from the increasing digitalisation?

Sub questions:

2. What are the main influencing factors of digitalisation on sustainability from the perspective of German IT companies?
3. What are the main opportunities and threats of digitalisation with regard to sustainability for German IT companies?
4. What are the implications of the findings for theory and practice?

5.1 Implications of the Findings for the Literature

This section presents the implications of the expert interviews with the theoretical foundations of the literature review from chapter 2. It has been shown that the experts' statements strongly confirm the literature bases. All experts showed deep knowledge in the areas of digitalisation and sustainability. On the one hand, this was confirmed by the position in which they were currently working, and on the other hand, it was reinforced by the answers given in the individual interviews. As already presented in the literature research, digitalisation is understood as the process of representing or implementing analogue processes digitally. This was

confirmed by the experts. Digitalisation and digital transformation play an important role in the optimisation of existing processes. In the industrial sector, it is mainly about connecting machines and plants in such a way that entire industrial processes can be automated. This makes production processes more efficient and cheaper (Microsoft, 2020). The experts confirmed this. For example, E4 stated: "For me, digitalisation means optimising processes, making processes simpler, making processes accessible to everyone..." (E4, 2022, line 14-20). In the literature review, Westermann said: "Digital transformation therefore goes far beyond internal organisational changes and requires an adaptation of the overall business concept to the evolving market environment" (Westerman et al., 2011, pp. 16-18). This statement was also confirmed by the experts. E1, for example, said that digitalisation is a big issue and far more than just the introduction of new hardware or software. Rather, it is a process or change that not only involves individual groups but requires adaptation at all levels in order to be part of the changing market. Confirmed in the literature by the Global Center for Digital Business Transformation – Digitalisation is both a catalyst and a component of change that affects all areas of our society (IMD Global Center for Digital Business Transformation, 2021). In addition to the research literature, the topic of "digital participation" was increasingly raised by the experts. This area was addressed in the literature in the context of CSR and CDR. For the experts, it was nevertheless a crucial point that goes hand in hand with digital transformation and must be considered centrally. The experts' answers were also consistent with the literature in the areas of energy, resource consumption and energy savings. "Digitalisation is also playing an increasingly central role in energy research, for example technologies such as SmartGrids" (Umweltbundesamt, 2013).

In the area of sustainability and sustainable development, the experts' statements also confirmed the basic principles presented in the literature. "Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future" (Brundtland, 1987): This definition can also be found in the experts' answers. Just like the topic around digitalisation, the topic of sustainability is seen by the experts as a community topic that affects every person or society (E1, 2022, line 41-59). The SDGs were also mentioned as an indicator and explanation, which provide a good overview of the current needs of the world in the area of sustainability. The experts also drew initial conclusions about a connection between digitalisation and sustainability. E2 and E4, for example, stated that they use environmentally friendly technologies, CE and CO_2-reducing technologies as much as possible.

In the area of emerging challenges that German IT companies have to face, the experts indicate a clear line. E6, for example, cites the extreme speed of change in IT: “As a company, you have to be profitable, you have to keep growing. But on the other hand, the company has to invest, innovate to become sustainable and that is just very difficult...” (E6, 2022, line 52-81). On the one hand, sustainability goals must be defined realistically, influencing laws must be understood and implemented, and centrally there must be measurability. The experts see clear advantages in new technologies that offer energy efficiency (CO_2 reduction), increase transparency and communication, and promote more flexible working. The latter point not only offers advantages from a business point of view, but it is also a clear advantage in the area of work-life balance (E6, 2022, line 105-141). In this area, too, the experts confirmed the literature. As Crane et al. state, advantages can be seen “(e)specially in the information and technology sector through fair pricing, protecting consumers from harmful materials, energy consumption and CO_2 emissions” (Crane et al., 2019, p. 15). In addition, it is seen as a challenge to harmonise the areas of economy, ecology, and society, based on Elkington’s concept of the triple bottom line. Digitisation with the latest technologies offers the potential to achieve this on the one hand through the possibility of transparency and measurability and this in all areas across secure data handling, education, climate and resource protection, employee engagement and digital inclusion.

The experts consider digitalisation to be disadvantageous in the area of massive energy requirements. Data volumes are growing, just to name a few, streaming and bitcoin technologies require more and more resources and energy. These statements also confirm the literature, for example in this statement: “In particular, the sharp rise in energy consumption due to increasing digitalisation is pushing the earth more and more to its limits” (C. I. I. T. & BCS, 2012, pp. 1-5). E3 also sees a threat of digitalisation in the manipulation of societies resulting from the high level of transparency. This draws a clear bridge to Lanier’s statements – “...it reveals how much our behaviour is being modified” (Lanier, 2019, p. 10). In the area of responsibilities that have arisen for German IT companies as a result of increasing digitalisation, as well as which opportunities and threats have arisen with regard to increasingly sustainable development, the majority of the experts named the umbrella terms CSR and CDR as well as a central IT security officer as important.

These roles should be carried out by a person or a team of persons who on the one hand have the necessary know-how and experience and on the other hand can also take on responsibility. CSR person, or CDR person, or as E6 described

it – a Chief Sustainability Manager – who is available for sustainable or ethical questions and tasks, but who should also have a say in technical implementation questions. Especially in the area of ownership and the leadership role model of companies, the experts confirm the literature – companies are often the pivot point in the production, marketing and introduction of new technologies (Fraunhofer IAO, 2020). On the one hand, E2 sees a great opportunity for digitalisation in the area of making mobility superfluous or in the increased use of e-mobility. Nevertheless, E2 strongly rejects the idea of a one-to-one link between digitalisation and sustainability. E6, on the other hand, sees the digital transformation as offering an incredible number of opportunities to advance sustainable development – especially in the inclusion of as many stakeholder groups as possible, both internally and externally (E6, 2022, line 139-236). In his statements, approaches from stakeholder theory can be found, which means that here, too, the research literature has been confirmed. The idea of putting long-term value creation at the centre of the process and thus focusing on a common good also requires compromises between the different stakeholder groups at some points (McKinsey & Company, 2020).

The experts also confirmed the literature presented in the area of business ethics. Especially in the ethical handling of data and the manipulation of data (with regard to greenwashing). E6 also sees possible threats, for example, in the cultural image that has developed into a consumer culture in recent years, also due to digitalisation. E4, E5 and E1 also see a clear change in corporate culture in recent years, which is increasingly moving in the direction of sustainability. “People are thinking more, questioning more, you always get a lot of feedback and feedback on things that were not even necessarily self-evident years ago” (E4, 2022, line 170-185). E3 also sees this change, and warns of an emerging imbalance in the world, or one that is growing even stronger. Such an imbalance becomes a threat for any society or living being, if said society has used up the natural resources at its disposal.

5.2 Implications of the Findings for Management Practice

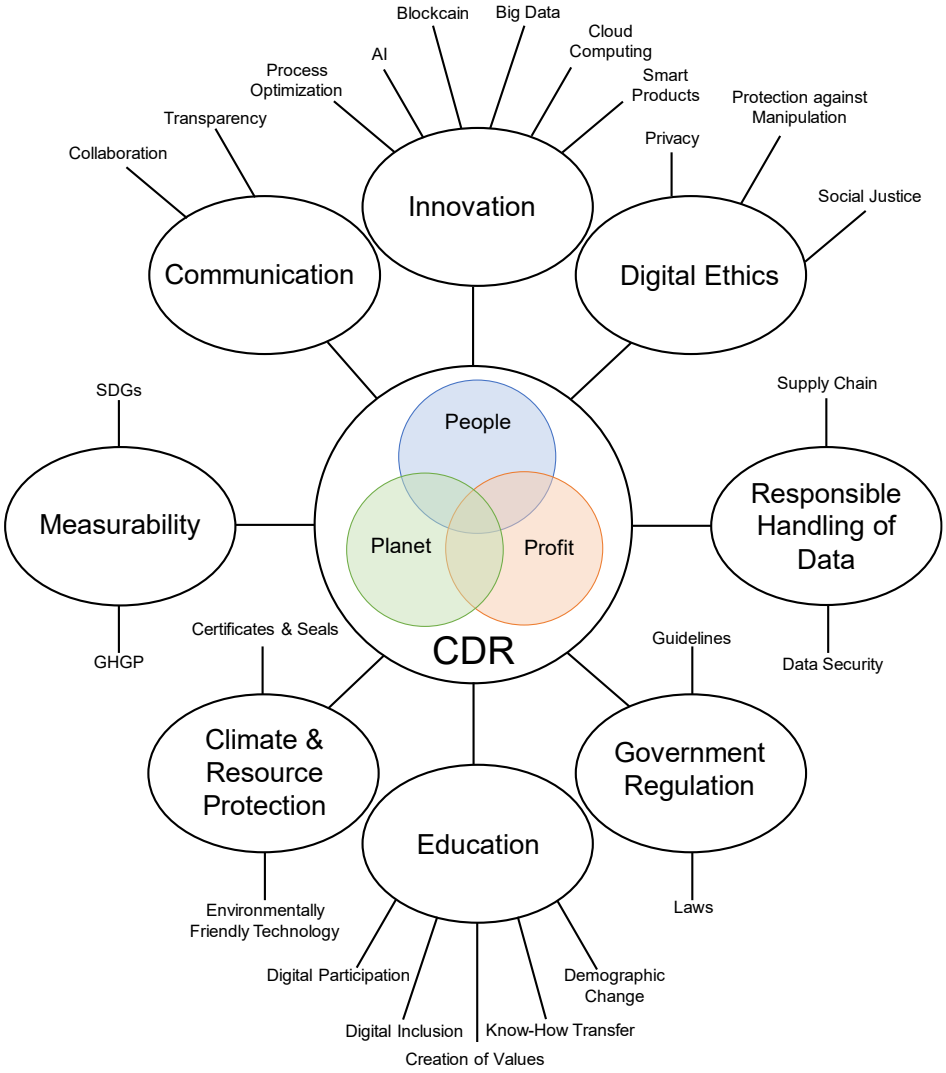
In this section, the responses obtained from the expert interviews are used to provide implications and recommendations for action at the management level. The focus is on the previously defined research questions. Comparisons are made with existing concepts and theories from chapter 2. In addition, a kind of guideline is drafted which is intended to serve as a guide for management and

their decisions to accelerate and promote a more sustainable corporate development. This section shows the possibilities offered by the findings presented in chapter 4, how they can be used to answer the research questions posed at the beginning and what recommendations can be derived.

Considering climate change and the resulting global consequences, the digitalisation of our world and a constantly growing awareness of sustainability, it is currently essential for companies to assume responsibility and leadership (Crane et al., 2019, p. 15). A change in cultures is evident both internally and externally to companies. Internally, companies are working out their own climate targets, attaching importance to sustainable work and resource-saving operations, and externally, the topic of sustainability is increasingly coming to the fore, both with customers and suppliers, but also with entire sections of society. At the political level, a change is also discernible, be it the German Sustainability Strategy viewed nationally, or the 2030 Agenda for Sustainable Development and the SDGs often associated with it. If we look at Elkington's concept of the triple bottom line in today's world and compare it with the most recent measures and implementations of the past few years, it becomes clear that a harmonisation of the three core areas is inevitable.

Sustainable management means acting in an ecologically compatible and forward-looking, socially fair, and economically efficient manner. Companies that follow such principles and concepts and want to act and operate according to them are increasingly confronted with the need to pursue, measure and implement sustainable business models. Anchoring sustainable structures, ways of thinking and the integration of digitalisation in these processes is often difficult. A clear goal must be defined, and the know-how to work out, plan and implement these goals is needed. Sustainable development is not the task of a single person or a single department in the company. Rather, all stakeholder parties must be included in an overall consideration. The results of the qualitative research of this study have shown that many of the experts see the IT sector as a kind of key function of sustainable development, through the use of the latest and resource-saving technologies, but also by enabling digital participation and inclusion of individual stakeholder groups. The IT sector functions as a lever to present and implement the values and ideas of a company and also to influence the corporate culture itself.

Figure 7: CDR – Influencing Factors



In summary, as already presented in chapter 4, the factors influencing digitalisation on sustainable development can be divided into positive and negative factors. As already confirmed by the research literature, the ability to innovate through the latest technologies, for example, which goes hand in hand with digital transformation, is very clearly considered to be a positive influencing factor. In addition, energy efficiency through the latest technologies as well as improved transparency and communication skills were mentioned both in the literature and

by the experts. Negative influencing factors mentioned included slow change/ slow adaptability or adaptation of digital processes and a massive increase in data volumes. As a result of this data growth, the experts see a further and rapid increase in energy consumption. Another negative factor mentioned by the experts is the cultural change resulting from the digitalisation of our world – towards a consumer society that prefers to "buy new" instead of recycling. Among the greatest opportunities and threats of digitalisation on a more sustainable development, the experts see that digitalisation can go both ways. While energy efficiency can be achieved through process optimisation, the need for increasingly resource-consuming technologies grows with increasing digitalisation. Nevertheless, the experts see the use of the latest technologies as a great opportunity, especially from an economic point of view – also in conjunction with maintaining competitiveness on the economic market. The experts see risks in not being able to implement digital participation and the transformation of their own corporate culture.

The aim is to create a blueprint for management and corporate culture that promotes, measures and evaluates sustainable corporate development. This guideline/blueprint is divided into five categories:

- Why is sustainable corporate development important?
- Which areas/factors play a role for sustainable corporate development?
- How is it possible to motivate the individual business units of a company (intrinsically and extrinsically)?
- What further developments are possible?
- What opportunities and threats arise from the implementation/how can it be implemented?

This question and its elaboration offers the company a basis for establishing sustainable development in the company and for generating synergies in the area of co-creation through the associated knowledge building.

Why Is Sustainable Corporate Development Important?

Globally, the effects of climate change have been felt massively in recent years (European Commission, 2021b) and are forcing companies worldwide to address the issue of preserving our planet. The question "Can I be sustainable?" is almost impossible to ask, but rather "Can I afford not to be sustainable?" These impacts are not only visible on an ecological level but also on an economic and social level. The demand for more sustainable trade extends from suppliers and manufacturers to the end customer. Along with this, more sustainable development

and a more sustainable corporate image is having an ever greater, more significant and decisive influence on the reputation and external impact of a company. But it is not only the company's own drive for a supposedly better image that shows the need for sustainable corporate development – legal requirements, guidelines and social expectations must be met and adhered to.

Which Areas/Factors of Digitalisation Play a Role for Sustainable Corporate Development?

As already confirmed by the expert interviews, new innovations and technologies play a significant role as an influencing factor of digitalisation on a more sustainable development (VR, AI, cloud computing, big data, blockchain, etc.). Along with the latest technologies, the topic of energy efficiency is seen as an essential factor, as are communication skills and transparency.

It is important to define a clear goal and requirement in the field of sustainability development. Existing KPIs can be adapted to make sustainability measurable.

Other key points can be considered as points of influence:

- Roles and mergers in the area of CSR and CDR
- Clear responsibility allocation within the company
- Considering the IT department as an enabler by promoting innovation; the IT department in particular has the technological know-how to promote visions and missions of the corporate strategy in the area of sustainability (Vogel & Thomas, 2020, p. 49). IT serves as a role model and pioneer. Especially technologies such as "digital twins" in connection with climate-related data and climate impact assessments can provide simulations and forecasts for companies, for example in investment or location decisions.
- Reducing vendor dependencies in order not to be too exposed to geopolitical influences
- Using the agility of the IT departments (in the area of change management)
- Providing internal and external education in the area of sustainability
- Using the communication skills and transparency of the digital transformation to establish working and discussion groups across departments in order to work out clear possibilities for sustainable development, to measure and to track them.

How to Motivate the Individual Business Units of a Company (Intrinsic and Extrinsic)

It is important for the long-term and existing sustainable development of a company to involve all stakeholder groups (Rat für nachhaltige Entwicklung, 2020, p. 30). In order to achieve an intrinsic motivation of the employees of a company, the value of the sustainability of the company must be demonstrated to the employees. It helps to establish a link between the sustainability strategy and the company's vision. Employees could then develop a sense of pride in working for the company. Extrinsically, this could be demonstrated through the sustainability objectives and the associated higher purpose (people/planet). In addition, the company can make concrete recommendations for action and expectations to attribute a stronger presence and seriousness to the topic of sustainability. Through a corporate incentive programme, the previously defined recommendations for action within a company could further serve as an extrinsic motivator. Through playful approaches, employees or entire departments could be part of sustainable development and be rewarded for it.

Managers should also act as role models. For example, in the area of e-mobility, it has a more positive effect on employees if "even the boss" pursues a sustainable mobility strategy. Furthermore, management should seek dialogue with employees in order to classify which measures employees would still like to see in order to enable more sustainable actions. Especially the exchange with the employees and a participation (in the field of digitalisation as well as in the field of sustainability) was one of the key points of the expert statements of this study. A permanent thematisation of sustainable development has an internal as well as external effect on the positive reputation of the company (Galpin et al., 2015).

What Further Developments Are Possible?

Digitalisation has the potential to promote energy efficiency (Rat für nachhaltige Entwicklung, 2020, p. 38). Intelligent interconnected industrial production, such as in the example of Industry 4.0, has great potential to provide more environmentally friendly products and also has the potential to modernise monotonous workflows. Through a targeted strategic orientation and the connection of the sustainability concept with the existing corporate strategy, further developments are possible. The attractiveness of the company for new talents increases, who in turn bring new knowledge and skills into the company. A charismatic influencer within the company also has the opportunity to promote and push new cultural movements within a company. Knowledge building within the company also of-

fers the possibility to promote co-creation approaches in the field of environmental sustainability. This allows global goals to be achieved more quickly through shared knowledge/data. Especially with regard to global climate goals. This sharing of information and data not only enhances the company's own reputation, but also addresses the need for a more sustainable life. Further development possibilities would be the creation of a sustainability map that further improves and sharpens the best practice path of sustainable development across companies. It would also be possible to create a digital product passport that provides information on the emission values released by considering and evaluating the entire supply chain from the creation of the product to its delivery to the end customer and the emission values that can be measured and evaluated as a result. Such an assessment could be included in the cost analysis of each product or service beforehand. This would create transparency that would enable every end customer to monitor and reflect on their own climate goals.

What Opportunities and Threats Arise from the Implementation/How Can It Be Implemented?

Due to the scope and complexity of the two topics of sustainability and digitalisation, opportunities and threats are often not entirely clear. The findings in chapter 4 showed, for example, that increasing digitalisation will further increase energy consumption, but also that digitalisation creates the opportunity to implement processes in a more energy- and resource-saving way. One threat that could arise from this is the growth of rebound effects. This refers to an effect that leads to consumers using the products more intensively or more intensively due to savings potentials and efficiency increases, additional products of the same type are purchased more frequently, or the saved resources are consumed in other ways. For a more sustainable corporate strategy, it is important to define concrete goals in the area of emission consumption, savings and avoidance potential.

By measuring and reporting (for example the GHGP Scope Data) these emissions data more seamlessly, there is an opportunity for companies to get closer to global climate goals by sharing this information and providing models and plans on an open-source platform through co-creation with other companies and sectors. This is another example of how digitalisation has the potential to be a tool for a greener world. The experts described further opportunities several times through the use of the latest technologies. For example, the technology of the digital twin makes it possible to digitally test products in advance, to improve them and also to optimise them with regard to sustainable production. The recycling process could also be improved in advance using such technologies and it may be of use in the area of the CE and the return of natural resources to the cycle.

For the experts, the issue of greenwashing is a risk that should not be underestimated. For the end consumer, it is currently very intransparent to see whether a company is really acting in a “green” fashion or only pretending to do so. CO_2 certificate trading enables companies to achieve a green image and thus to conceal whether sustainability is really a central theme of the corporate strategy. The experts also currently see a risk in the area of digital participation. It is important to accustom employees to new technologies step by step and to take fears about possible job losses seriously. The experts also see a risk in the correct and ethical handling of data. Especially in the social environment, social media platforms continue to develop at an uncontrollable speed. There is often a lack of rules and boundaries that provide a platform for bullying, discrimination, and digital violence. However, digitalisation with all its facets and possibilities offers the basis to act as a tool that can promote entrepreneurial partnerships (internal as well as external), enable more sustainable development, make research and education more transparent and drive a more sustainable culture and social change. The latest technologies offer the opportunity to achieve significant success in the field of climate protection and decarbonisation. Digitalisation also offers potential in the area of more sustainable consumption and in feeding humanity.

For the implementation of a management blueprint, it is therefore important to identify opportunities and risks and either use them or combat them. The findings of this study have identified the areas of potential energy savings through digitalisation, enabling digital participation and the use of the latest innovations as the most important opportunities. Clear communication with both internal stakeholders and external stakeholder groups is also seen as important for sharing experiences and knowledge. This allows both sustainability and digitalisation to be considered together and allows for the possibility of synergies.

Addressing and implementing a CDR strategy at an early stage can therefore mean a competitive advantage over other companies. In addition, there is already a certain expectation in society for companies to face up to their digital responsibilities, especially in the fields of data protection, digital participation, cyber security and environmental protection (E4, 2022, line 149-163).

Table 2: Key Points of the Blueprint

Ref	Question	Implementations
1	Why is sustainable corporate development important?	• Combating climate change • Demand for more sustainability on all levels • Influence on reputation • Complying with legal requirements • Complying with social expectations
2	Which areas/which factors play a role?	• New innovations/technologies • Energy efficiency • KPIs to make sustainability measurable • Using IT department as “Trigger and Enabler” for corporate sustainable management • Communication as the key to knowledge transfer and education
3	How is it possible to motivate the individual business units of a company (intrinsic and extrinsic)?	• Involving all stakeholder groups • Developing a sense of pride to work for the company • Rewarding sustainable behaviour
4	What further developments are possible?	• Promoting co-creation approaches in the field of environmental sustainability • Promoting energy efficiency • Providing transparency on emissions data
5	What opportunities and threats arise from the implementation/ how can it be implemented?	• Sharing sustainability KPI • Avoiding rebound effects • Using digitalisation to save energy • Enabling digital participation • Synergies between digitalisation and sustainability

5.3 Limitations

As with any research, there are limitations to this study. These limits can be derived from the necessary restrictions and offer starting points for further research and investigations, which are explained in more detail in section 6.2. The limitations of this work result, for instance, from the fundamental orientation of the chosen method of analysis. When identifying the experts for the interview surveys, they were all subject to a regional restriction. Due to this focus, the insights gained are limited to German IT companies. Accordingly, the transfer offers both country and cross-sector potential for further opportunities and risks as well as factors influencing digitalisation on sustainability and sustainable development. All findings presented in this paper and its evaluation are based on a qualitative analysis based on expert interviews in the IT industry. However, to the great diversity in the content of the two core topics (digitalisation and sustainability), all relevant elements could be considered in the qualitative analysis.

The experts' assessments are also based in part on the subjective assessment of the respective participants. All experts demonstrated in-depth knowledge in both core areas of this work. Three Potential participants were not selected for a final interview due to insufficient competences in one of the areas. In order to intensify the research in the areas of this study, the development of concrete measurement criteria could help to obtain a more objective assessment. Another limitation is the speed of digital change. Statements and implications should be considered as a snapshot of current digital opportunities. Evolving legal frameworks should be taken into account in further research. Furthermore, digital transformation needs to be considered more from a societal perspective and considering the interaction between companies and society. Another limitation is the time frame in which the qualitative research took place. The time frame was influenced in some areas by the COVID-19 pandemic. The pandemic can be seen as a driver and accelerator in many areas of digital transformation. Despite the continuing need for research in these areas, this paper was able to make an important contribution to the research field. The recommendations for action derived from the empirical data offer the actors necessary support for future implementation and strategic positioning.

6 Conclusion

In this final chapter, an overview is given of why the chosen research method was appropriate for this study and the research questions are answered in summary overview. The limitations of this work have already been discussed in section 5.3. Finally, an outlook is offered on how this study, and the research upon which it is based, can provide insight and a better understanding of the topics of digitalisation and sustainability.

Summary of Sustainability Opportunities & Threats of Digitalisation

In this section, the previously established research questions are revisited and answered based on the information reflected in the literature together with the statements of the experts in the interviews.

Main Question:

Which sustainability opportunities or threats arise for German IT companies in the areas of environment, economy and social affairs resulting from the increasing digitalisation?

The results of the qualitative research showed that, on the one hand, the experts have extensive knowledge on the topic of digitalisation and digital transformation and sustainable corporate development. All experts see digitisation as an opportunity to increase the profitability of a company as well as to use digitisation as an instrument for more sustainable development. This development can be viewed from an ecological-economic as well as an ecological and social perspective. The necessity of digital transformation is seen by all experts. In the economic sphere, a possible competitive advantage and economic growth is seen as a clear opportunity. As a danger, not being able to successfully implement digital participation. From an ecological point of view, the massively increasing demand for new technologies, consumer goods and data volumes, caused by the rising population of mankind, is contrasted by an exorbitant consumption of energy and resources. Despite the high energy consumption associated with the digital transformation, these technologies have the potential to make processes, productions and developments more resource-conserving and energy-efficient. The danger that still needs to be considered here is a possible rebound effect that could be reflected in society. Nevertheless, new technologies and innovations in particular have infinite potential to improve the world in terms of the SDGs mentioned in this paper, which serve as a benchmark and guideline for many companies. On a societal level, the opportunity of digitalisation is seen as a way to promote a more

sustainable awareness among employees. The complexity and speed of digitalisation, which is not equally easy for all employees to cope with, was mentioned as a threat. Digital participation is seen by the experts as one of the most important responsibilities, especially in the social sector.

Sub Questions:

1. What are the main influencing factors of digitalisation on sustainability from the perspective of German IT companies?

When asked what the most important factors of influence of digitalisation on sustainability are, a distinction was made between positive and negative factors. On the one hand, the latest technological developments and innovations associated with digitalisation, the possibility to work more energy-efficiently and a significant optimisation in the area of communication and collaboration were named as positive factors. Digitalisation offers us, for example through cloud computing technologies, simple solutions to consume more efficiently and to make processes simpler without having to make large and costly investments. Holding meetings, customer appointments and even entire trade fairs digitally saves a lot of travel time and thus reduces CO_2 emissions. This optimisation in the way work is done today also plays an increasingly important role in employee satisfaction. Work-life balance benefits from increasing digitalisation and its possibilities. Negative factors were the immense energy requirements and a too slow approach to the implementation of digitalisation and sustainability projects.

2. What are the main opportunities and threats of digitalisation with regard to sustainability for German IT companies?

As already mentioned in the answer to the main question, digitalisation offers many opportunities and possibilities for companies to optimise their processes, to develop strategically and to use emerging competitive advantages for themselves. Networking on a global level creates a transparency that opens up completely new possibilities for communication, both in the private and in the business environment. Flexibility in terms of time and space in professional life and the associated improvement of the work-life balance is another opportunity of increasing digitalisation. On the other hand, the risks are often the upheavals within society caused by digitalisation. Many of the current business areas, especially in the area of online trade, have only emerged in the last few decades. Digitalisation also promotes a certain fast pace and makes our world more and more transparent. The risks of digitalisation for companies are to guide their employees through this fast pace, to meet data protection requirements and to understand

and implement the opportunities of digitalisation. In this context, it is of great importance to enable other functions of the organisation in the area of sustainability across stakeholders.

3. What are the implications of the findings for theory and practice?

On the one hand, it is necessary for companies to examine in a self-analysis how far the company is positioned in the areas of sustainability and digitalisation. Based on the results of this analysis, it can be determined which factors and drivers have a positive or negative influence on the sustainable development of the company. Possible competitive advantages can also be identified. From this analysis, a vision can be derived of what future development is possible in the areas of CDR and CSR. The resulting gaps provide the opportunity to implement measures and strategies to close the current gaps. The sustainability goals to be derived from the strategy and the materiality analysis should be set and timed realistically and formulated specifically in order to avoid misunderstandings. It is also important to measure and subsequently evaluate the success in achieving the goals. Frameworks such as the SDGs offer an indicator for a possible target expectation. In addition to quantitative targets such as CO_2 neutrality by year X, which can be measured using key figures, qualitative targets (electric vehicles for employees, subsidies for public transport, etc.) are also useful. The need for open communication between different stakeholder groups became particularly clear. Areas such as the IT department of a company should be involved when it comes to strategic decisions in the field of sustainability management. The employees of a company should also be heard and be able to contribute their ideas and suggestions. This promotes solidarity with one's own company and consolidates a sustainable awareness across the board.

Proposal for Further Research

Through its qualitative research, this paper has provided a sound overview of the key areas of digitalisation and its impact on sustainable development. In addition, implications for strategic implementation at management level could be elaborated. Nevertheless, the findings of this study have not been able to consider all facets of digitalisation or sustainability. Further research in this area should be conducted. The qualitative results of this work could be supplemented with quantitative results and thus supported.

In further research, the areas that are strongly affected by increasing digitalisation should be considered at the company level and the areas which can be rethought and redesigned in this course with regard to a more sustainable view. Especially

with regard to the development and transformation driven by the COVID-19 pandemic in recent years, a completely new dynamic has emerged that needs to be investigated. This dynamic has forced companies, for example, to upgrade their technology and give their employees the option to work from home. Through this change, new ideas and concepts have emerged whose benefits could be dispensable or even doubtful or harmful for sustainable development.

It is not possible to stop the digitalisation of our world – but this is not presented as a problem by the experts. Rather, the problem lies in the implementation of sustainable technologies and the continued constant consumption of fossil raw materials and rare earths. Further research is possible in this area. For example, at the technical level through the improvement of more sustainable products and product designs, energy-saving and more environmentally friendly manufacturing processes and in the extension of useful life (counteracting planned obsolescence in consumer goods).

Especially in the area of energy consumption, further research for more sustainable energy production is of central importance. This may include further development of the current possibilities of solar energy and wind power, but also through the latest innovations in energy production using hydrogen fuels and the further development and expansion of smart grid networks. The area of e-waste was also only dealt with superficially in this paper. Especially with regard to the often-planned obsolescence of consumer goods, this topic is developing into a strong source of problems. Here, too, further research on the extent of the problem and on how to combat it is needed. On a social level, further research would be possible regarding the changing culture through increasing digitalisation. The dangers of the “transparent human being” and the impact of constant transparency in the field of social media and its effects on a psychological level also allow for further research possibilities.

Outlook

Climate change, the loss of biodiversity, increasing pollution and the constant consumption of natural resources are just a few of the many challenges currently facing our world. Digitalisation has entered almost every area of our lives. It supports us every day and simplifies our lives. At the same time, the digitalisation of our world also harbours massive dangers that we must face. It is important to take responsibility for one’s own actions for a more sustainable world. Also, there should be no denial of responsibility by those who hold the biggest levers and have the greatest influence. How much ego culture can the world take before it

collapses? The time to work collectively for and not against the world, to act together and not alone, is inevitable. What does prosperity mean for us? How can prosperity be measured and when does personal prosperity exceed the prosperity of the world? Increasing money and maximising profits does not automatically mean promoting prosperity. Topics such as the sharing economy and the CE belong together, but they need people who can implement and realise them and who can rethink and change structures in order to be able to co-exist better within them.

If we look at one of the most expressive works of the Greek philosopher Plato – Plato's Allegory of the Cave – and mentally build a bridge to our fast-paced and consumer-oriented world shaped by digitalisation, we can draw a frightening comparison. Plato's Allegory of the Cave, in its simplest form, is representative of how our reality is shaped and defined by the information available to us. Compared to our world, it shows how limited we often are with our views. The latest technologies and the internet are becoming more and more a part of our daily lives, we use the internet constantly and everywhere and the use of these technologies could be described as Plato's Digital Cave Allegory. Humanity is becoming more and more immersed in these advanced technologies. The normal world is becoming more and more an illusion as we are trapped in our digital worlds. We become addicted to it because using the internet gives us satisfying experiences and we think we are connected to something. But we are just sitting in front of a computer, or a smartphone and the experiences of real life are passing by.

7 Appendix

Appendix 1: Interview Guide

	English	German
Welcome and introduction/Begrüßung und Einleitung	Good day, thank you for taking the time to be available to me as an expert for an interview.	Schönen Guten Tag, vielen Dank, dass Sie sich die Zeit nehmen, mir als Experte für ein Interview zur Verfügung zu stehen.
Explanation of the research project/Erläuterung des Forschungsprojekts	I would like to give you a brief overview of my topic and a rough outline of the current state of research on the subject.	Gerne möchte ich Ihnen einen kurzen Überblick über mein Thema und einen groben Überblick über den aktuellen Forstungsstand des Themas geben.
No questions – only explanatory questions/ Keine Fragen – nur Erklärungsfragen	The purpose of the interview is to find out what challenges are posed by increasing digitalisation, but also what responsibilities companies face with regard to sustainable development and what need for action can be derived from this.	Ziel des Interviews ist es herauszufinden, vor welche Herausforderungen durch die zunehmende Digitalisierung aber auch vor welchen Verantwortlichkeiten Unternehmen stehen im Hinblick auf nachhaltige Entwicklung und welcher Handlungsbedarf sich daraus ableiten lässt.
	What are the influencing factors of digitalisation in relation to sustainability and where do opportunities and threats arise?	Was sind die Einflussfaktoren der Digitalisierung in Bezug auf Nachhaltigkeit und wo ergeben sich Chancen und Risiken?
Consent request/ Einverständnisabfrage	What is your current position?	Was ist Ihre aktuelle Position?
	How long have you been working in this position?	Seit wann arbeiten Sie in dieser Position?

	How many employees does your team comprise?	Wie viele Mitarbeiterinnen oder Mitarbeiter umfasst Ihr Team?
	Do you agree that the interview will be recorded using Microsoft Teams audio recording?	Sind Sie damit einverstanden, dass das Interview mittels Microsoft Teams Audioaufzeichnung aufgezeichnet wird?
Entry Question/ Eingangsfrage	What does digitalisation mean to you?	Was bedeutet für Sie Digitalisierung?
	What does sustainability mean to you?	Was bedeutet für Sie Nachhaltigkeit?
Main Questions/ Hauptfragen	What challenges do companies currently face in implementing the sustainability goals?	Vor welchen Herausforderungen stehen Unternehmen aktuell bei der Umsetzung der Nachhaltigkeitsziele?
	In which area does digital transformation have a positive influence on the areas of sustainability? (Environment/Economy/ Society) Can you think of any other examples? (Three?)	In welchen Bereich hat die Digitale Transformation einen positiven Einfluss auf die Bereiche der Nachhaltigkeit? (Umwelt/Wirtschaft/Gesellschaft) *Fallen Ihnen dazu noch weitere Beispiele ein?* *(Drei Stück?)*
	In which areas does digital transformation have a negative influence on the areas of sustainability? (Environment/Economy/ Society)	In welchen Bereich hat die Digitale Transformation einen negativen Einfluss auf die Bereiche der Nachhaltigkeit? (Umwelt/Wirtschaft/Gesellschaft)

	Can you think of any other examples? (Three?)	*Fallen Ihnen dazu noch weitere Beispiele ein?* *(Drei Stück?)*
	From your point of view, what responsibilities have arisen in terms of corporate development as a result of increasing digitalisation?	Welche Verantwortlichkeiten sind aufgrund der zunehmenden Digitalisierung aus Ihrer Sicht in Bezug auf die Unternehmensentwicklung entstanden?
	What opportunities or risks does the digital transformation create with regard to increasingly sustainable development? And in terms of corporate development?	Welche Chancen oder Risiken entstehen durch die Digitale Transformation im Hinblick auf eine zunehmend nachhaltige Entwicklung? Und im Bezug auf Unternehmensentwicklung?
	How important is sustainability in your corporate culture? (Influences internal/ external)	Welchen Stellenwert hat Nachhaltigkeit in Ihrer Unternehmenskultur? (Einflüsse intern/extern)
	Do you have a specific strategy to reduce your carbon footprint in the coming years and at the same time increase your competitive advantage through a more sustainable image? If yes, how?	*Haben Sie eine konkrete Strategie in Ihrem Unternehmen in den kommenden Jahren sowohl Ihren Carbon Footprint zu reduzieren und im gleichen Zuge den Wettbewerbsvorteil durch ein nachhaltigeres Image zu erweitern? Wenn ja, Wie?*
	Which topics or projects in the area of sustainability	*Welche Themenbereiche oder Projekte im Bereich*

	have already been implemented internally or are currently being planned?	*der Nachhaltigkeit sind intern bereits umgesetzt worden oder sind aktuell in Planung?*
Additional Questions after the main interview/ Zusatzfragen nach Abschluss des Hauptinterviews	What ethical concerns or undesirable side effects do you see arising from the increasing digitalisation of our world?	Welche ethischen Bedenken oder unerwünschten Nebenwirkungen entstehen aus Ihrer Sich durch die zunehmende Digitalisierung unserer Welt?
	"The digital transformation – a climate killer" What do you think about this statement?	„Die Digitale Transformation – ein Klima-Killer" Wie stehen Sie zu dieser Aussage?
	Do you think that digitalisation and new technologies will help us to meet the challenges of sustainability?	Denken Sie, dass wir mithilfe der Digitalisierung und neuen Technologien die Herausforderungen in Bezug auf nachhaltiges Handeln meistern können?
	Finally, do you have any additions on the topics of sustainability and digitisation?	Haben Sie abschließend noch Ergänzungen zu den Themen Nachhaltigkeit und Digitalisierung?
	Goodbye. Thank you very much for taking the time.	Auf Wiedersehen. Vielen Dank, dass Du Dir die Zeit genommen haben.
Ending/Verabschiedung	If you have any comments or questions afterwards, please feel free to contact me.	Solltest Du im Nachgang noch Anmerkungen oder Fragen haben, kannst Du Dich gerne an mich wenden.

Appendices 2–7 (transcriptions of the expert interviews) are not included in this publication for reasons of length and data protection.

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