1 INTRODUCTION

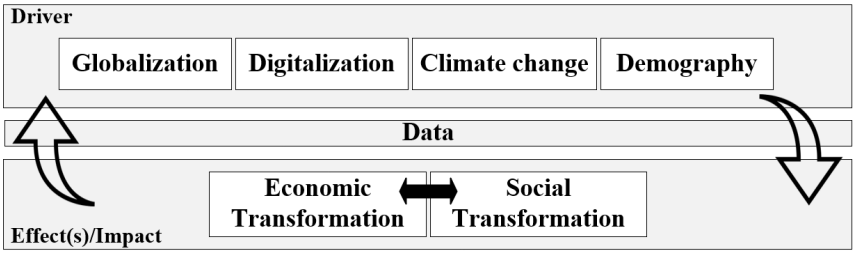
The introduction introduces the reader to the topic of data governance. The motivation for the research, the problem and the premises of the study are presented. Furthermore, the structure of the work and the conventions used are outlined.

1.1 RESEARCH MOTIVATION

The term "research motivation" covers all the things that motivate people to do research in the first place. Possible motives include the desire (a) to obtain a research degree and the associated benefits, (b) to face the challenge of solving an unsolved problem, (c) to derive intellectual pleasure from creative work, (d) to serve society, (e) to gain prestige and much more. This section presents the research motivation for this study.

Our world is in a state of upheaval: political upheavals, technological advances and social upheavals are shaping our times. Globalization, including geopolitical shifts, digitalization, climate change and demographic changes are challenging established structures, driving uncertainty but also opportunities and transforming society, the economy and social structures (Fig. 1). Traditional power relations are shifting, while new players are appearing on the world stage. At the same time, global crises such as pandemics and economic instability are leading to new forms of cooperation and solidarity. In the midst of these challenges, the need to develop sustainable solutions for a common future arises.

Fig. 1: Drivers of transformational processes and their effects



Source(s): Author's elaboration

Data in a constantly and rapidly changing world: Data plays a central role in a changing world, as it forms the basis for decisions and innovations in almost all areas. In the digital era, data has become one of the most valuable resources that companies, governments and organizations use to identify trends, optimize processes and predict future developments. It enables data-driven decisions that can lead to increased efficiency and better crisis management in business, public administration and politics. At the same time, the challenge of using data responsibly is growing. The protection of privacy and compliance with ethical standards are crucial to prevent misuse and surveillance. Data can both drive the

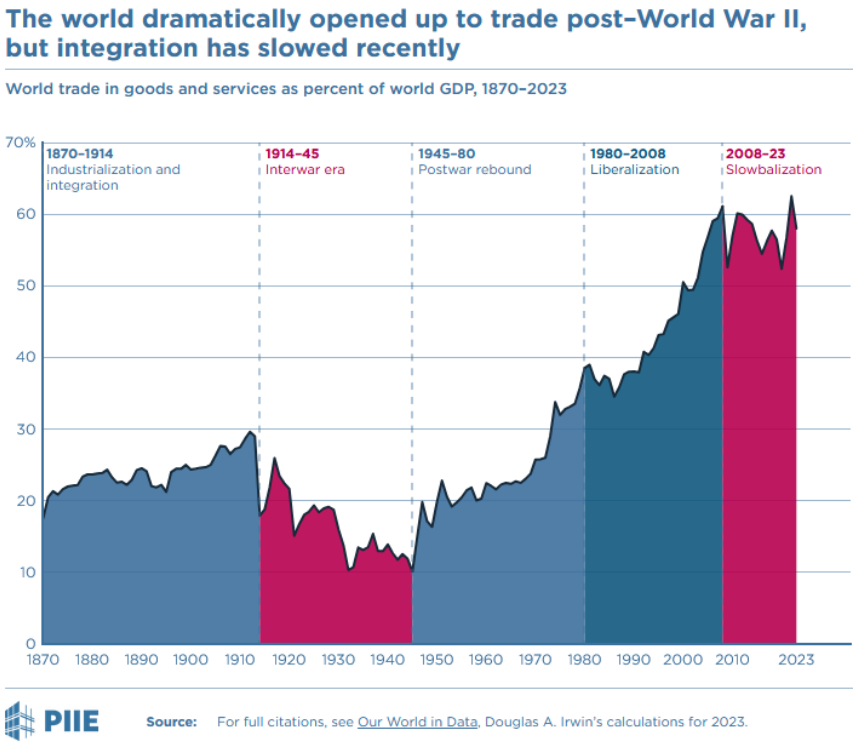
development of new technologies such as artificial intelligence and machine learning and contribute to surveillance and control. In a changing world, data is therefore not only a driver of innovation, but also an area of tension between progress, security and ethical issues. Governance plays a crucial role here in ensuring the responsible and effective handling of data in a changing world. It creates the necessary framework conditions to use data as a valuable resource while minimizing risks such as misuse, surveillance and loss of privacy. Through laws, regulations and ethical guidelines, governance can ensure that data is collected, processed and shared fairly and transparently. Let's take a closer look at the drivers and their transformational effects below.

1.1.1 GLOBALISATION: A WORLD WITHOUT ECONOMIC BORDERS

Today, we live in a world where economic borders no longer exist. Industry is spreading its supply chain across the globe, seeking the best environment for each specific stage of production. Others concentrate their production in a single region to capitalise on increasing economies of scale. However, the choice of location is not influenced by the local availability of production factors and ultimately customers. Production factors can be imported from abroad. Goods can be transported across the world at negligible cost. Globalisation (also known as world market, global market) is the key word for this phenomenon and integrated industry is the driving force behind it (Ventura, 2005).

What are the characteristics of globalisation: Globalisation is networking across borders (Meinert and Stollt, 2010): Events in one part of the world increasingly affect societies and problem areas in other parts of the world, i.e. the effects are no longer only perceptible locally. Natural boundaries of time and space are dissolving. The cost of transporting information, people, goods and capital across the globe has fallen dramatically, and global communication options can be utilised ever more cheaply and quickly. The ability of nation states to act and their influence on action are less and less congruent. Globalisation has been driven by technology, transport and international cooperation over the last century (Fig. 2):

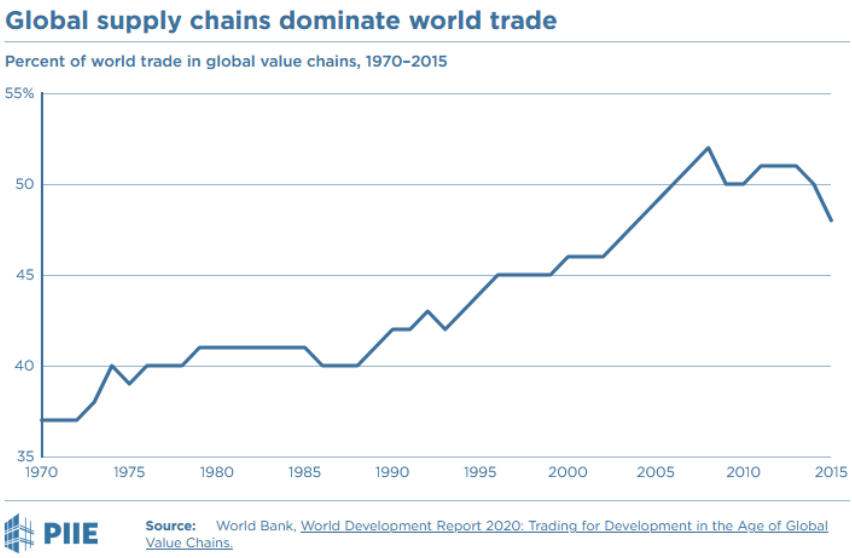
Fig. 2: Trade has grown by leaps and bounds in the last century



Source(s): PIIE (2024a)

Globalisation is the exchange (of goods, capital, knowledge and ideas, etc.): Key features of globalisation are liberalisation and the dramatic increase in international trade, the expansion of foreign direct investment and massive cross-border financial flows. Modular production processes are organised in transnational corporate structures and financed by international capital flows. Global supply chains are production networks in which products are assembled from parts from all over the world (so-called intermediate products). Today, 80 per cent of global trade is handled via supply chains operated by multinational corporations. Global supply chains dominate world trade (Fig. 3). Trade in intermediate products is now almost twice as large as trade in end products and plays a particularly important role in advanced manufacturing, e.g. cars. Competition is becoming global. Information, know-how and ideas are exchanged worldwide; the isolation of markets and societies is hardly possible under the conditions of globalisation.

Fig. 3: Global supply chains dominate the world trade



Source(s): PIIE (2024)

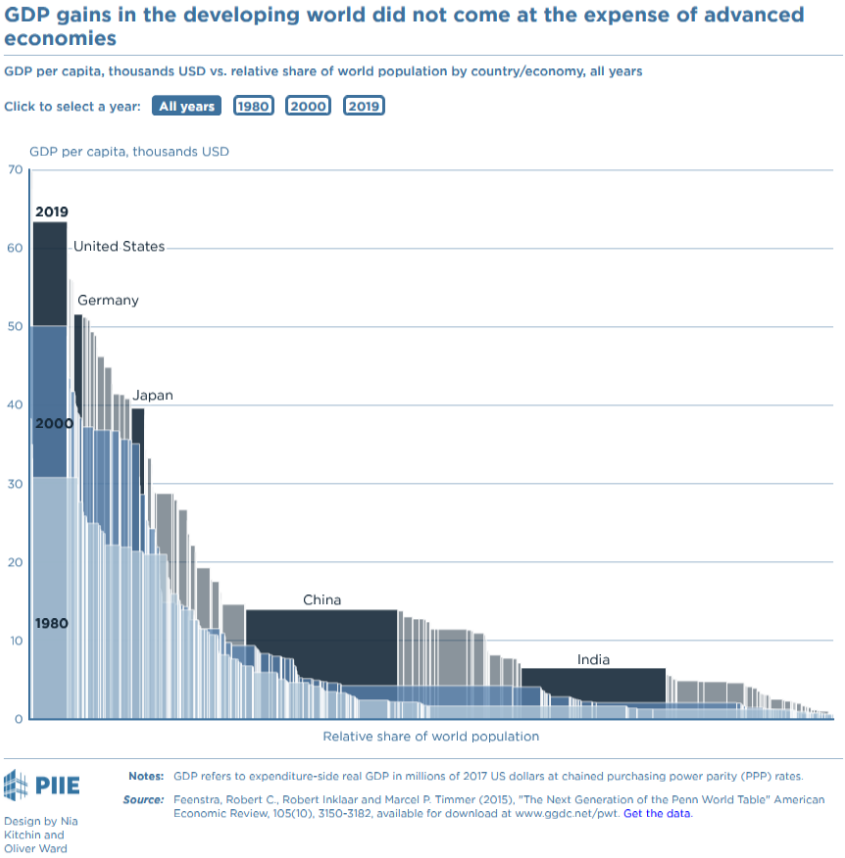
Globalisation is conflict and cooperation at once: an expression of this is global governance, i.e. the way in which decisions are made and implemented at a global level. Problems must be tackled in an international context. As the current process of cross-border interactions and interdependencies accelerates, the discussion about inequalities between countries, but also about inequalities within countries and their impact on people, families and communities, is intensifying. The discussion about globalisation is fast becoming a discussion about democracy and social justice in a global economy.

Globalisation is a change of perspective: a decisive dimension of globalisation is that we humans observe, perceive, recognise and understand everything as global (emergence of a global perception). Our knowledge of events and problems around the world has expanded dramatically. This goes hand in hand with a much greater awareness of global inequalities in terms of living standards and opportunities. Improved access to global information has created better informed and more critical interest and stakeholder groups (e.g. the increasing density and reach of international norms).

Globalisation is an open process: humanity can derive little from the past, because the interweaving and interaction of economic flows, cultures and knowledge across (former) borders is unprecedented. The search for ideas, new lifestyles and social orders within and between states that can enable sustainable and equitable development is at the heart of this open process.

Globalisation is driving poverty reduction worldwide: almost every country is richer today than it was four decades ago (Irwin, 2022), before globalisation took off (Fig. 4).

Fig. 4: Globalisation leads to higher incomes



Source(s): Irwin (2022)

More open (and increasingly digital) economies have helped previously extremely poor countries to grow faster and reduce poverty worldwide.

In summary, the term globalisation stands for the increasing emergence of worldwide markets for goods, capital and services as well as the associated international integration of national economies.

1.1.2 DIGITALISATION: CONVERSION TO DIGITAL ECONOMY

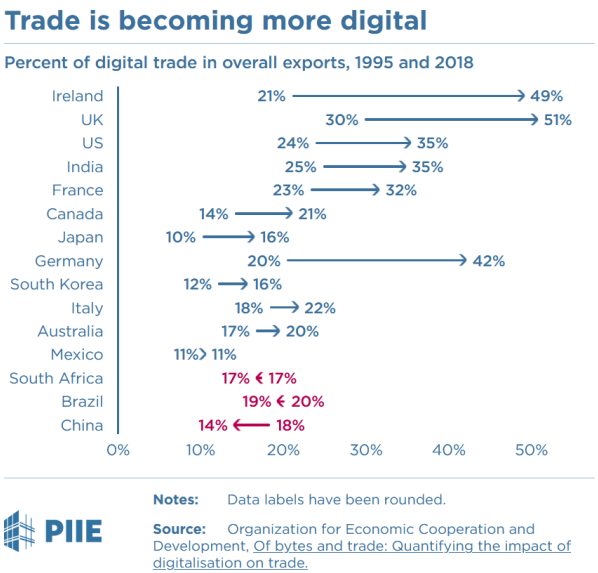
Technological developments in recent years have revolutionised entire industries. In addition to the exponential increase in processor performance at constant production costs (Moore's Law), this also includes the development of the bandwidth that can be used for data transmission (Gilder's Law) and

the falling cost of digital storage media (Rashedi, 2022). As a result, the technologies required for digitisation have become both more powerful and less expensive, making them more affordable. On the other hand, this also opens up extensive opportunities to collect, store and analyse enormous amounts of different internal and external data.

The globalisation process of the markets is being driven primarily by new technologies in the areas of communication, information and transport as well as by newly developed organisational forms of operational production processes (digitalisation). Worldwide data networks, satellite communication, computer-aided logistics and highly developed means of transport decouple work and production, products and services from national locations and enable companies to select the most favourable production or delivery locations and coordinate their activities worldwide. This is increasingly bringing together supply and demand from all over the world and standardising pricing. As a result, trade is becoming more and more digitalised (Fig. 5).

Digital commerce can be defined as the trade in goods and services that are ordered or delivered digitally. The World Wide Web and modern means of communication (e.g. mobile phones, internet telephony) make it easier to buy, sell and deliver goods and services worldwide. Digital trade accounted for an estimated 24 per cent of global trade in 2018, up from 19 per cent in 1995. Examples of digital trade include hiring an offshore contractor to answer phone calls or using a mobile app developed in the US to order a taxi when travelling abroad. Digitalisation is the growing process alongside globalisation.

Fig. 5: Trade is becoming increasingly digital



Source(s): PIIE (2024)

What is digitisation? In English-language literature (German only uses the term ‘digitalisation’), a distinction is made between two terms: Digitisation and Digitalisation. Although the two terms sound similar, there is a clear difference – and this ambiguity is causing uncertainty even among IT experts.

According to Gartner (2022a), digitisation is "*[...] the process of changing from analog to digital form, also known as digital enablement. Said another way,* digitisation *takes an analog process and changes it to a digital form without any different-in-kind changes to the process itself.*" The investment required to digitise properties and assets is enabling companies and industries to embrace digital transformation. Data from across the organisation and its assets is being processed using advanced digital technologies, leading to fundamental changes in business processes that can result in new business models and societal change. In contrast to this definition, according to Gartner (2022b) digitalization is "*[...] the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business.*" The goal of digitalization is “*[...] to enable automation, increase data quality, and collect and structure all that data so we can apply advanced technology, such as better and smarter software.*" (Grundsell, 2019).

The digital economy is the most important driver of innovation, competitiveness and economic growth in the world (Kravchenko *et al.*, 2019):

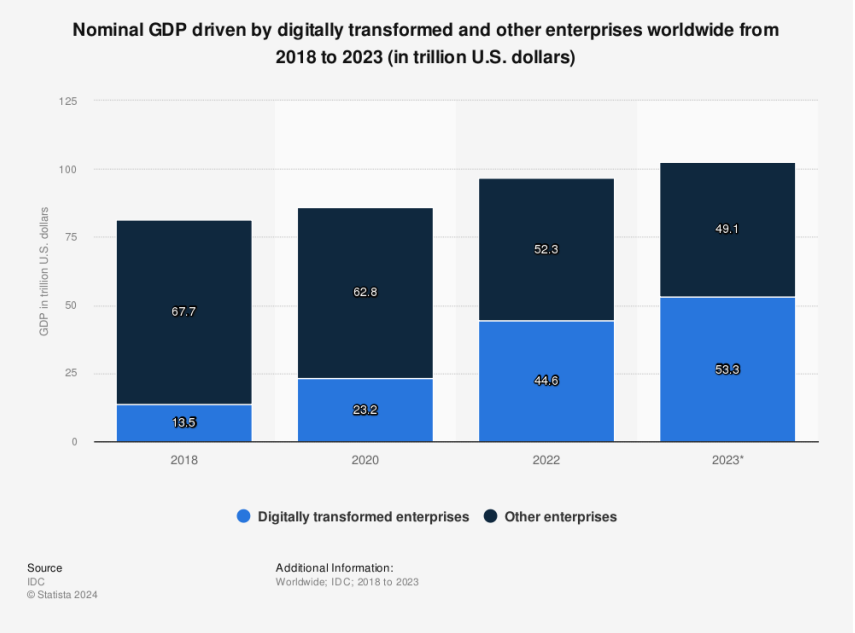
- Digital technologies have radically reshaped the economy. Machines are intelligently interlinked, they are becoming smarter.

The amount of data and information available from intelligent machines, sensors, financial transactions, social media and many other sources is growing exponentially and unabatedly. According to analyses, the amount of data worldwide will grow from 33 to 175 zettabytes (1021 bytes) between 2018 and 2025, i.e. by a factor of 5.3 (Reinsel *et al.*, 2018).

- The way in which data is processed and stored will change. Data will increasingly be processed and analysed in intelligently networked objects (currently 20% compared to 80% in stationary data centres and facilities). This will be reversed by 2025.

While digitally transformed companies accounted for USD 13.5 trillion of global nominal gross domestic product (nominal GDP) in 2018 (in current prices, without adjusting for inflation), they are expected to account for USD 53.3 trillion in 2023, more than half of total nominal GDP (Fig. 6). This indicates that digital dominance of the global economy is imminent (Statista, 2024a).

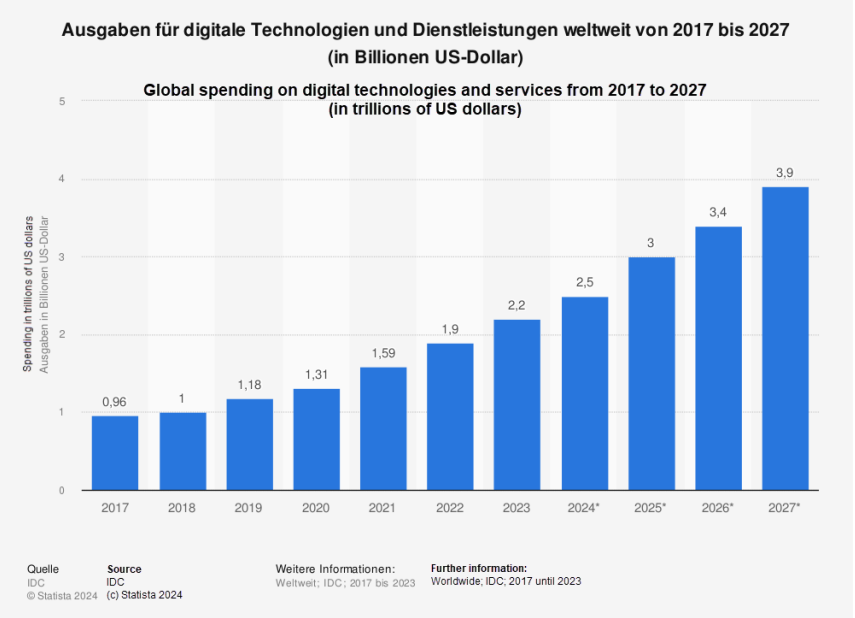
Fig. 6: Nominal GDP increasingly driven by digitally transformed companies



Source(s): Statista (2024a)

According to Statista (2024b), global spending on digital transformation technologies and services will increase from USD 0.6 trillion in 2017 to USD 2.39 trillion in 2024 (Fig. 7).

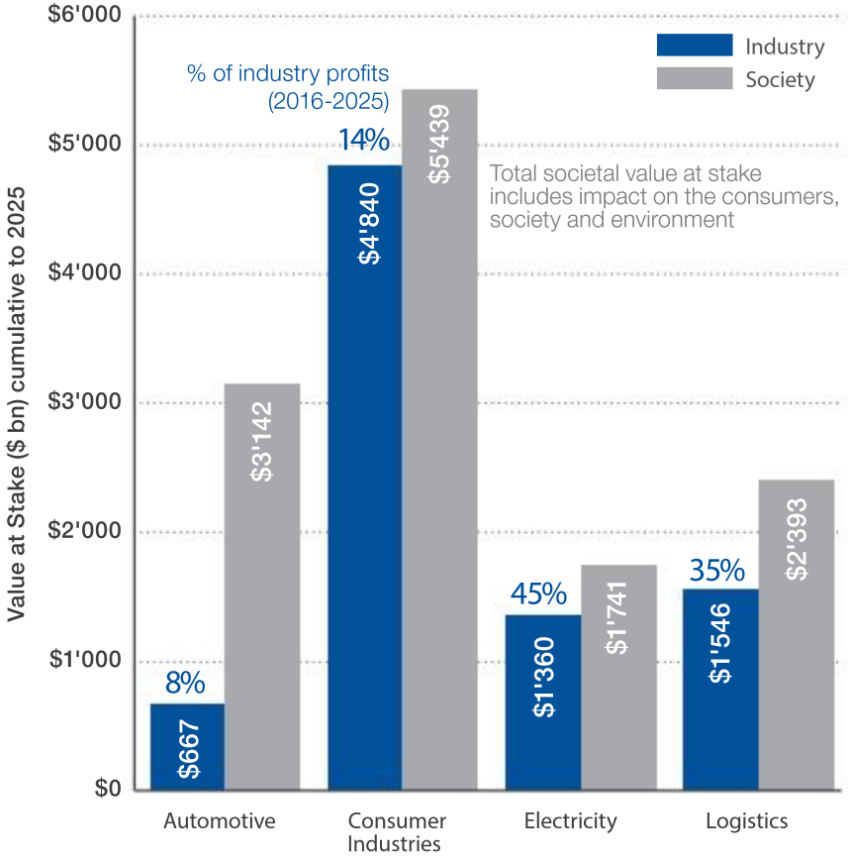
Fig. 7: Spending on digital technology and services is increasing worldwide



Source(s): Statista (2024b) – The graphic was (additionally) labeled in English to make it easier for an international audience to understand.

According to the World Economic Forum (2016), the digital transformation has the potential to create more value for society than for industry (Fig. 8). This is due to the falling cost of advanced technologies (a top-of-the-range smartphone cost $499 in 2007, a model with similar specifications cost $10 in 2015) and the 'combinatorial' effects of these technologies. This is also reflected in market capitalisation: it used to take Fortune 500 companies an average of 20 years to reach a value of one billion dollars; today's digital start-ups can do this in four years.

Fig. 8: The potential of digital transformation



Source(s): World Economic Forum (2016)

1.1.3 DIGITAL ECONOMY: DATA-DRIVEN TRANSFORMATION OF CORPORATES

1.1.3.1 AT LARGE: THE LEVEL OF ALL COMPANIES

An economy is described as digital if it is based – exclusively or primarily – on digital products and services. More precisely, the digital economy in a functional sense is the totality of actions and institutions of systematic and targeted action to meet human needs under conditions of scarcity, which are based on the use of digital information and communication technologies (Lengsfeld, 2019). These are those parts of the economy whose value creation, transactions, allocation, distribution and creation of benefits are based on the use of digital information and communication technologies. The terms digital economy, digital economy, digital economy or cyber economy are used synonymously.