Chapter 1
Designing a Future Europe

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Without Security There is No Liberty.
(Wilhelm von Humboldt, Statesman, Academic, and Founder Alma mater Berolinensis)

A Strategic Mindset for The Single Market

We're facing another tech race between two superpowers, right? Not exactly. The race for tech and military supremacy is more global and complex than it seems at first glance because the modern internet tends to be agnostic to geopolitical borders and at the same time we see more nationalistic reactions to those developments. The race is an indication of the high potential and power that new technologies give investors, the industry, non-state actors but also states using cyber-statecraft to expel others from their economic and political positions in the global world order of post-war global world order. However, this does not mean that the world is shaking. The world is always volatile, uncertain due to natural development. There has never been a time when the world stood still. It means an integration of machines with digital technologies and devices. The project *Industry 4.0* is a German invention deeply rooted in Germany's industry management culture for the process of man-made digitization (see Reinhold, Part IV, Chap. 20). It is very much focused on technical risks, technical issues and investments that had to be made. In the last five years, the discussion started to shift and increasingly in the last two or three years. It stopped being only about the technical issues but more about the people (see Hemker, Part IV, Chap. 24). At the dawn of the 2020's, European societies are still amid the transitional phase to Industry 4.0. The transition also means the transition of politics, societies

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and companies (see Huether, Forewords) into the hybrid age. The immense potential of this transition lies in increasing efficiency, reducing overall costs and starting new businesses. It is also helping with finding solutions to urgent crisis such as for health problems like cancer, fighting pollution and saving the planet's natural habitat, reducing resource consumptions or simply easing peoples work and health life. This transition for humans includes the opportunity to take a further step towards the advancement of the human condition (see Mey, Forewords) in the sense of the ideals of the Enlightenment (Pinker 2018). Those opportunities that result from technical disruptions make this moment the best point in time: to put humans in transition strategies and political concepts for the European single market first (see Huertas et al., Part V, Chap. 29). Strategic successes in business, politics, and society depend on the people. *It is the digital mindset, the culture of management and learning that has the power to take a society to the top, not global insecurity.*

New Alliances and Anti Alliances

This momentum of uncertainty is probably more difficult to change than a society's mental attitude to dealing with uncertainty and opportunities associated with technology (Acemoglu and Robinson 2017). An uncertain future can be met with the greatest possible freedom of thought and flexibility as things happen, but what societies can really control is the way that they respond to those things, including thinking beyond borders of the material world and considering the ambitions of third countries. This is an increasingly connected world. While the competition for tech leadership between the superpowers, United States (4.3% of the world's population) and China (18.5% of the world's population) has reached a new level, third countries that have close ties with them are forced to reposition themselves in the shifting world order. The Chinese government has set itself the goal of becoming the world's tech leader by 2030. The country is turning into something new, where billions of Renminbi are being continuously invested pushing the country to unimagined levels of growth. It is creating new markets and with them market defining rules. To achieve its goal, the Chinese government regards digital and AI tech as strategic for geopolitical, economic and security reasons (see Mayer, Part III, Chap. 13). These ambitions of the People's Republic of China come with a strong initiative, which can cause in western societies a future that will be more Asianized (Khanna 2019). This forecast reflects a crucial policy issue: *If western countries do not react in a focused manner and find their strategies and answers as democracies, they will be trapped between the two superpowers. This is their great challenge, which is to form new alliances and redesign old ones, such as the transatlantic partnership.*

Brain Drain

Turning heads toward Europe's 10% of the world's population today, there is the "old continent" suffering from a brain drain, especially in the significant field of AI tech, which in the past has lost tech talents mainly to the "Big Five" companies (Amazon, Facebook, Google, Microsoft, Apple) and research labs in the US. These "Big Five" seem to be the most powerful tech companies in the world, if not including their Chinese competitors' market power. Recent trends show that the brain drain is going in the direction where money is flowing. Where opportunities are promising, and tech ideas thrive. This includes opportunities arising from lower regulation, lower tech and lower ethical standards that allow unquestioning technological progress. This makes China interesting to potential participants and that doesn't mean one has to go to China to participate in its development. Companies like Huawei employ 80,000+ R&D employees (45% of the total workforce). To further increase their share of research personnel, they are building research labs in Europe, e.g. in Italy and France (Tao and Zhifeng 2018). This is a crucial point: *While European scientists are working for Chinese companies, Europe itself needs to adapt its policies and thought patterns to attract talented professionals, start-ups and venture capitalists to its own institutions.*

Europe's Death Valley and Global Tech Investments

Europe is still waiting for governmental initiatives to attract venture capital (VC) for high risk projects and to change its investment culture. Europe's *Death Valley* is the innovation gap in between a top-notch research sector, high potentials fleeing the continent, and patents that are transferred to products in foreign labs and companies. This gap can be closed with private money and initiatives, such as from the Public Group International Ltd. in London or J.E.D.I. in Paris. Public promotes European startups for creating GovTech for governments and administrations. J.E.D.I. tries to foster disruptive innovations and moonshot tech made in Europe. This kind of innovation, emerging from outside of public institutions, is urgently needed to support public institutions in maintaining democratic structures through tech made in Europe (see Butter et al., Part II, Chap. 3, Loesekrug-Pietri, Forewords). Europe as a political entity still lacks a major political push for a more innovative future. The present EU research framework, Horizon 2020, intends to foster cutting-edge research together with the industry, but that wasn't the success the European market requires. It is not enough to create major breakthroughs in science, these findings must make their way into products and real world workplaces. This must be a major goal for the €100 billion Horizon Europe, the next research and innovation framework. And although also Germany, a major research hub in Europe, feeds a unique innovation cluster that operates worldwide. It must achieve much more to fulfill the needs of a 21st century society. *A German contribution to a new European innovation strategy*

could be to integrate these institutions (e.g. German Academic Exchange Service, German Research Foundation, German Centers for Research and Innovation) into a strategically designed innovation value chain and European tech network together with private initiatives.

Foreign players are investing in Europe. A prominent example is Softbank. The Japanese investment powerhouse is unrivaled in the global VC industry and reflects a recent trend. Many promising tech companies (unicorns) are owned by international investors, funds and banks. In times of zero interest rates the tech sector became a promising place to grow money stocks. As a result the sector is in a phase of overfunding. Europe's second disadvantage in this VC market is its "old money trap". The owners of old money, that can be found mainly in Europe, usually do not operate at the high-risk tech level. They are interested in receiving their money stocks. Much money flows into bricks and steel as many do not see an opportunity in technical disruptions. In other regions of the world, there is more "new money"—such as in China or San Francisco where people got rich in the last decades, which often means less money per owner than in families who own "old money". These new investors have set themselves the goal of increasing money holdings and are therefore more willing to invest in high-risk projects that promise higher and riskier profits. They support the growth of the tech sector in their regions and are feeding the overfunding.

The US tech pioneers—belonging to the group of investors with the new money, the "Big Five" in the USA, haven't invested their cash in new tech for a while (2016: Apple $215.7b, Microsoft $102.6b, Google $73.1b) because there was no opportunity to invest in new tech in Silicon Valley. They have even been questioned about their status as tech companies. They should have become *de facto banks* because their money didn't pour into innovations but into balance sheet reserves. There was an effect on the US tech market, fresh (new) money and startups shifted to other innovative regions and projects in the US, pushing new developments. The money and ideas have moved from the Silicon Valley region to the Boston Area, Pittsburgh, Washington D.C., Metro Area and Southern California's emerging technology ecosystems around Los Angeles, San Diego, Santa Barbara and San Bernadino. Later Google started creating new tech sectors, invested in e-cars, virtual reality glasses, and especially in quantum computing, Amazon invested massive amounts of money in cloud tech and in the meantime became leader in R&D funding. Facebook invested in algorithms of any type that triggers social media correspondence and in cryptocurrency. The "Big Five" companies helped to accelerate the recent global tech and AI hype in Europe. They built up research labs and attracted researchers. Those older companies are now losing their status as agile tech companies. A company that does not innovate ages and declines. In the 21st century that decline will presumably be as fast as the tech market accelerates. From this scenario derives the opinion of a few innovation experts that in a short time the platform economy will lose its market position and instead new business models based on new technologies will emerge (Charles-Edouard Bouée, former CEO of Roland Berger at the Axel Springer AI Summit 2018). Meanwhile Huawei a Chinese hightech company (Tao et al. 2017), is a controversial company. It is accused of being an active part of a Chinese borderless surveillance system. Its strategy of adapting to future challenges made the company as

successful as it is today, e.g. in the 5G technology sector. In 2018, Huawei employed almost 45% of its staff (80,000+) in the R&D sector. The company maintains 40 research labs around the globe, some in Europe. It follows a strategy to invest 10% of the income in research on a regular basis (information collected 2019 in a personal interview at Huawei Headquarters in Shenzhen/China). As a response to these research and investment cultures, *Europe needs a new industry strategy and more investment in R&D correlated with a strong research management attitude in companies, more high-tech-focused investment strategies and high-risk projects in the tech sector. This must be supported by a future-oriented, start-up focused and open minded research community.*

Long-Term Public Investment in Infrastructures

In the US, the five new tech regions are old acquaintances when it comes to the research funding initiatives of the Advanced Research Projects Agency (DARPA) of the Department of Defense. As early as in 1969, the first DARPA-financed ARPANET hubs were in Utah, in the UC Los Angeles and in UC Santa Barbara. In 1970, Stanford University joined the group that would later become the parents of the Internet. In the same year, Harvard University and the Massachusetts Institute for Technology (MIT) on the Pacific Coast joined. In 1971, Carnegie Mellon University in Pittsburgh became a member of the club (DARPA 1978). Today, these regions are the regions where the "Big Five" were founded, where fresh money is invested in new tech, where new companies are founded, and business models emerge. This result translates into two fundamental public policy challenges for Europe: ***Long-term strategic public investment in (a) talented professionals, innovation and (b) infrastructures is required!*** ARPANET, the mother of the Internet, began growing fifty years ago, at the heart of what has become the world's most important technology center in recent decades, Silicon Valley. It can be deduced, that long-term strategic innovation management and public infrastructure investments are key to technological progress and economic prosperity in a society (see Reiche, Part III, Chap. 12). This is the objective in today's Europe, but not yet achieved (see Loesekrug-Pietri, Forwords, see Butter et al., Part II, Chap. 3). *This is what the Chinese government aims to accelerate through a variety of funding initiatives and strategies for research institutions, universities, industry or through the Belt and Road Initiative (OBOR) and the Asian Infrastructure Investment Bank: long-term supremacy in global infrastructures and in governance of digital technology.*

Shifting Tech Hubs

In terms of basic and applied research in AI—the current top-notch technology for the accleration of the digital transformation, the EU research hub is still said to be the

world's most diverse and collaborative. The backbone of it is the European Research Area, which itself is underlined by political instruments that foster European innovation, e.g. the Horizon 2020, the EU Framework Programme for Research and Innovation. Europe's thriving research hubs are the UK, Switzerland, France, and Germany. Those regions are leaders in inventions, research and AI patent applications. Estonia is long known as the "European Silicon Valley" but offers a government and not privately driven model of digital transformation (see Hartleb, Part III, Chap. 16). A few others are catching up, such as Cluj-Napoca in Romania, that obtained the title "Silicon Valley of Eastern Europe" (De Man 2018). Europe's AI start-ups are clustered in London (see Exhibit. 1.1). Since the beginning of Brexit, new data shows a slight shift to Berlin, a city that has obtained international attention as start-up hub. Digital nomads from everywhere in Europe and Israel meet there. Even the US giant Amazon, that has heavily invested profits in new tech and talented professionals, moved its AI and Alexa research team to Berlin's vibrant city center. Paris has attracted more investment for start-ups in 2019 than Berlin.

Germany, the world's 4th biggest economy and Europe's industrial powerhouse, will most likely become the leader in manufacturing, robotics, and quantum computing. Almost half of the patents for autonomous driving have been successfully filed by German automotive companies. In 2018, the country was named the second most innovative country in the world (BCG 2019). *Despite this early lead in*

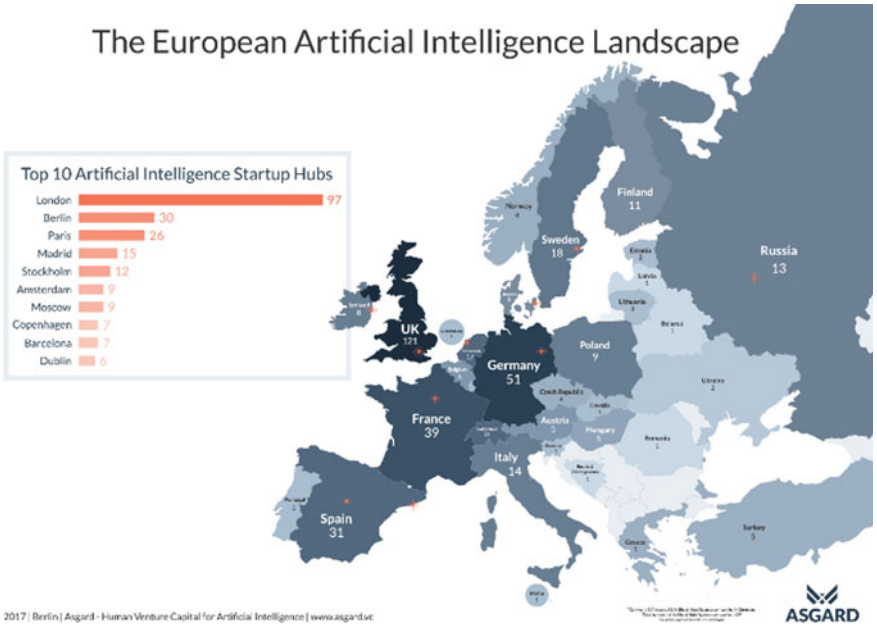

Exhibit. 1.1 The European artificial intelligence landscape, © Asgard 2017 (http://asgard.vc/wp-content/uploads/2017/07/European-Artificial-Intelligence-Hubs-and-Landscape-2017-by-Asgard-VC.png)

science and with patents, the country has not invested in products and in other fields that thrive and appears to be losing in sectors that comprise the new business world. This is a phenomenon we have seen in the West before, its leaders failed miserably on defining how important new technologies will become in the future, e.g. 5G. This scenario needs to be prevented. Europe must apply a long-term strategy focusing on European innovation infrastructures.

The Connectivity of a Leapfrogging Country

China's research has overtaken its key competitor, the United States, and is fast closing in on Europe's lead. China, the West's major tech rival is—still operating in relative isolation from the wider research and business community and is ready to become the global leader in tech and internet governance by 2030. China is seizing all possible opportunities to develop technology. Its large population (18.5% of the world's population) gives the country a unique advantage through sheer size. The Chinese government and industry leaders know how important strategic education and a high-quality learning culture are for the future prosperity of their society. Chinese politicians are considering the importance of the innovation value chain. This also means that Chinese companies and citizens by law must focus on tech investments when investing globally. An example was Ping An Insurance's investment in the Berlin-based FinTech company builder FinLeap in 2018. Even the internal administration of Chinese people (Social Scoring System) has been declared a testing ground for new tech for social stability reasons (see Leibkuechler, Part IV, Chap. 21, see Mayer, Part III, Chap. 13). The Chinese consider this governance systems as geared to stability and prosperity, not to control.

The Chinese digital market itself is protected on many levels; protected by the Golden Shield in cyberspace, and legally regulated for international corporations, especially for American companies. Chinese tech companies can have an impact at the same level as US companies through the third pillar of the One Belt and One Road Initiative (OBOR), the digital silk road. With the OBOR China promotes infrastructural projects, e.g., submerged cables in the Australian region, ICT infrastructures in neighboring countries such as Afghanistan and a smart city project in Duisburg, Germany (see Reiche, Part III, Chap. 12). The Chinese population is digitally connected worldwide. Companies expand globally through increasingly voracious customers of goods and digital services using Chinese devices and the Chinese platform economy. They are spreading tech developed in environments with less regulation and data inaccessible in Europe. *This marks the best point in time for European politicians to put tech, ethics and security on the political agenda with the highest priority in order to find a democratic response to changes in their economic partnership with China.*

Other Tech Hot Spots and Their Policy Language

Countries and governments in the EU that already treat digital tech as strategic are Denmark, Sweden, Italy, Estonia, and Finland (see Hartleb for Estonia, Part III, Chap. 16). Asia's other tech hot spots are Singapore, Taiwan, and Malaysia. Australia and Canada are working hard on their tech leadership, and in the Middle East the United Arab Emirates (UAE) invests heavily in digital tech. The UAE was the first country with a minister for AI. Israel has top-notch knowledge in security tech and a vibrant start-up scene not only in Tel Aviv but also in Jerusalem. These countries have strategic strengths such as in finance (Singapore), in their learning culture (Taiwan) or in technical and security terms (Israel). Their advantage is that politicians see digital tech and AI as a relevant technology for their society's future. They focus on it. That is what makes them leaders in digital tech and internet governance as they allocate money and political measures in those fields. They are about to establish a new policy language that fits with the world of the cyberspace, e.g., in Singapore, and Estonia (see Maniam, Part III, Chap. 14). *For Europe there is still a lot of work to do in the policy language field.*

New Colleagues and Other Surprises

As the status and speed of digitization varies from country to country and the western world still thinks in categories such as the developed and the underdeveloped world, leaps are not always reflected in official data and rankings. What is also not reflected are developments that contradict expectations (to understand why expectations can be wrong, see Rosling et al. 2018; Pinker 2018). What might be surprising is the status of digitization in Hong Kong, despite being one of the Asian Tigers and a global leader in FinTech, the city does not appear to be very open to transforming all sectors (see Thomson, Part III, Chap. 17). This also applies to research in digital and AI tech on Hong Kong Island. The AI and robotics scene in the Greater Bay Area Region of the Pearl River Delta spanning northbound from Hong Kong Island, Shenzhen to Guangzhou is much more vibrant. A development that should be closely observed by Europeans. The pace of digitization is taking surprising paths. Basic and applied research in the West became a job of private institutions that spent more money than public institutions. As a result, artificial general intelligence (AGI) and quantum computers may not be developed in a public but in a private lab.

In a "developing" country without any stable structural and economic legacies, it may be easy to adopt recent tech developments and new technologies (see Exhibit. 1.2). This gives less developed countries the opportunity to leapfrog. The internet in Africa is, for example, limited by a lower penetration rate than compared to the rest of the world. The low penetration rate is attributed to weak connectivity, lack of infrastructure and innovation. There is ample evidence that this is changing, and this

State and Pace	of Digitization
Countries Without strong organizational legacies with high innovation capacities *Leapfrogging opportunity high*	Countries With strong organizational legacies and without high innovation capacities *Leapfrogging opportunity low*
Countries striving for institutions *Leapfrogging opportunity depends on infrastructure and innovation capacities of the country/society*	Countries with developing institutions *Leapfrogging opportunity depends on infrastructure and innovation capacities of the country/society*

Exhibit. 1.2 State and pace of digitization. *Own Source* Feldner (2018)

gap is closing fast as more resources are being deployed in Africa to expand Africa's digital economy. This causes great opportunities for the continent.

The fabric of growing African connectivity are submerged cables that are deployed around Africa. The continent has been connected for a long time only by satellite or by fiber. Until 2009, the capacity was very low, and the costs have been high for connectivity. This changed in the last decade. Exhibit. 1.3 shows the state of connectivity within Africa and the Mediterranean in 2018. As a result of the increase in connectivity, an increase in mobile payments in Kenya and its neighboring Uganda took place. In 2007, with the launch of Vodafone's *M-Pesa,* a platform for mobile phone-based money transfer, financing, and micro-financing services, triggered an increase in FinTech. Today M-Pesa is the largest system in Kenya and Tanzania. It expanded to South Africa, Afghanistan and India, but also to Albania and Romania in the European Union.

Since 2009 the internet subscription in Africa grew from 4.5 million in 2000 to about 700 million in 2017. The average age of the African population is 19.5 years and will further push developments. Another driver for digital integration and connectivity is the e-healthcare sector. Actors are focusing on rural areas working on cutting-edge solutions to deliver healthcare in regions that are difficult to approach due to security, infrastructure, military or political reasons.

Key drivers are more than 300 African tech hubs that gather talented professionals. South Africa tops this list with 54 tech hubs followed by Egypt with 28. Tech nodes are in Kenya, Morocco, Nigeria (with 2.6% of the world's population and the world's fastest growing megacity), Ghana, Tunisia, and Uganda (Kamanthe 2018). These societies' future developments are affected positively by digital education products and Massive Open Online Courses delivered by educational companies such as Coursera, edX, Khan University, and Stanford OpenEdx that provide access to US and European education that wasn't available to Africans some years ago (Feldner 2018).

Another example of a rapidly developing digital market power is the Indian market with 17.9% of the world's population. The country will soon outperform China in terms of penetration rates and the sheer number of users that become future customers. What makes it easier for India to keep pace with developments is that it has neither

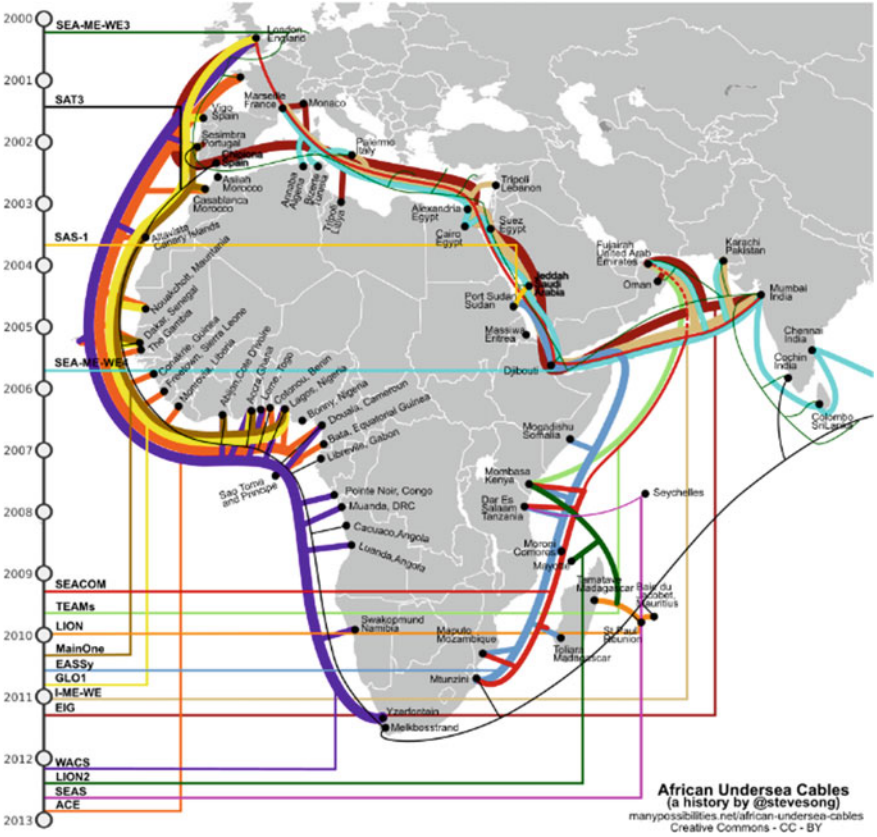

Exhibit. 1.3 African undersea cables (2018) Manypossibilities.net, © Creative Commons-CC-BY, https://manypossibilities.net/african-undersea-cables/

strong infrastructures nor binding institutional and organizational legacies in fields that are affected by digital technologies. Where everything is changing at the same time, this can assist a society to adopt new tech. Those countries aren't usually home to Luddites. It was an advantage for China as the country started at an agricultural level and jumped almost directly into the tech phase. It is likely that India will follow this path. *As a result, Europe will soon see another fast-growing economic power in Asia.*

From a Myth to Future Scenarios

These developments will provide access to basic legal and structural instruments in regions those populations today live without access to the (western-led) rule of

Digital Utopians in the second half of the 20t h century	*Digital Reality* of the early 21st century
Cyber Law = Law of the Horse	Cyber Law necessary for different reasons and in areas such as criminal law, international law, IP law, patent law, data ownership(?)… labor law, certification systems

Exhibit. 1.4 Digital utopias and reality graph. *Own Source* Feldner (2018)

law (mainly in Africa and Asia). Digital infrastructures and devices can fundamentally change cyberspace as an arena of human activity, but also the real-world needs for legal infrastructures necessary to support and sort the complexity of a modern world economy (Hadfield 2018). The new buying power in Asia (60% of the world's population) will pose challenges for policymakers in their own country but also in the West to adapt traditional legal and economic systems. In contrast, the early years of cyberspace were characterized by the attitude of American scientists (having been involved in the creation of the ARPANET and the internet technologies) and Silicon Valley entrepreneurs who mainly spoke about powerful myths, stories, digital utopias and the great potential that digital technologies have for human progress, for democratization of communication as well as for their business ideas. Accordingly, it was common for early thinkers to assume that the internet and related tech did not need new regulation, as the internet was supposed to be a freely accessible and secure space for each user (see Schulz, Part II, Chap. 8). They declared any new regulation redundant (see Barber, Part II, Chap. 5). Even the former president of one of the major start-up cradles in the US, Stanford University, Professor Dr. Gerhard Casper, once said that a new law of cyberspace would be as effective as a law of the horse (Easterbrook 1996) see Exhibit. 1.4.

The Transfer of Scientific Culture into Business

This way of thinking in science concluded that there was no need for a realignment of the legal systems, for intellectual property rights, cyber security or data ownership (see current discussions Mayer-Schönberger and Ramge 2017). That led to the current state of laws regarding the data economy (see Bullinger and Terker, Part II, Chap. 6), privacy rights (see Miller, Part II, Chap. 4), and data protection (see Richter, Part II, Chap. 7). It also led to the current state of the economy and job sectors (see Huertas et al., Part V, Chap. 29). This kind of thinking changed in the last four to five years, in the connected world of the "Internet of Things (IoT)". The new world is where geography is an increasingly irrelevant factor and where job

profiles appeared such as influencers, content moderators, where people are working for a "like" and a follow-up request on Twitter, and where the net incomes of most millennials are declining. Real world management has adopted the cyberspace culture: The first ARPANET project team at the University of California (including Vint Cerf, Steve Crocker) created the basic decision-making backbone for today's global cyberspace. It is operated by Internet Corporation for Assigned Names and Numbers an independent public private partnership in California. By that the net was built upon the decision making logic of scientists and has not changed in its role as the Internet's basic governance system. From there, the US scientific culture and mindset has evolved in the start-up company culture of Silicon Valley. Since most companies have been spin-offs from research and science, scientists went along with them. Thinking and cooperation cultures from science could expand (Isaacson 2014). This working culture in the sciences includes flat hierarchies. Corporations worldwide are now working in an agile management system and thus in loose project teams with flat hierarchies. The middle management has largely been abolished and stable jobs are becoming dynamic (see Huertas at al., Part V, Chap. 29). It presents serious policy challenges for labor markets that have been focused on hierarchical structures.

The Early Visionary and the Legal Systems

Lawrence "Larry" Lessig, an Internet pioneer and Harvard professor of law, wrote twenty years ago in a visionary article (Lessig 2000) that one day there will be regulation of the internet. What he called the "law of the code". He foresaw for the time when the internet would become an increasingly complex technology, and a military operation space (see Alatalu, Part II, Chap. 2). This where we have now arrived. Digital tech and AI give human life the potential to flourish like never before, or to destroy itself. If they are not managed with (a) ethical rules (see Spielkamp, Forewords; see Walorska, Part II, Chap. 11; see Mey, Forewords) or are not (b) be aligned with business needs (see Huether, Forewords) and (c) do not cover as much ground as they should, they do not match human goals. Digital tools are constrained by their coding. They are not free from biases and governance systems as products have been in the industrial revolutions. Digital tech is man-made and is interwoven with biases, thoughts, bugs and impressions of the humans that made it. Decision makers focus on one tech tool that is trustworthy and may assists with regaining trust in politicial decisions and institutions: the blockchain technology (see Braun, Part III, Chap. 18). Blockchain's basic technology beside the distributed ledger tech is smart contracts. The person that described them at first place was Nick Szabo (1994). He wrote an article that explained smart contracts as digital transaction protocol that execute terms. If those rules will govern our daily lives in the trustworthy blockchain world, the biggest question for the acceptance of this tech in democratic systems is "*Who will be the mastermind of these conditions?*". Graduated lawyers are drafting in the analog world, controlling and executing contracts. In the digital world blockchain companies are here to circumvent notaries, lawyers and bankers, to dramatically

reduce the overall costs and risks associated with those businesses. This reflects a fundamental challenge for the existing legal system, for trust in institutions and for governance systems (De Filippi and Wright 2018) and the basic demands of legal infrastructures will change fundamentally due to blockchain technologies (Baecker 2018) and the law of the code. This overall change began when the wall came down in the year 1989 and the World Wide Web. That was the moment when nearly forty percent of the world population accessed the western world's economic system (Hadfield 2017) and the emerging cyberspace. Now this young world faces an ever-growing IoT and is about to take another almost four billion people living in China, Russia, India, the Middle East or Africa (possibly another 60% of today's world's population) into the same legal and economic system and in cyberspace as an arena of human activity. The expectations of legal infrastructures are changing. Politics must not only deal with code law and smart contracts, but also with transnational legal challenges such as cyber security, tax systems and the cross-border flow of data, products and surveillance activities as well as with the people and their connectivity. *After several years of failed negotiations on an international cyber security treaty in the United Nations, one thing is clear so far: each country and nation will see this differently from its cultural background and will focus on its own political goals and power-building opportunities. The world is likely to be divided into several tech regions, driven by different policy guidelines. Europe must address its technological status and forge strategic tech and policy alliances.*

The Media's Love of Growing Insecurity

As a response to those developments, e.g. a growing perception and feeling of becoming more and more disconnected in Europe, the media coverage of tech applications such as AI, cyber security, election meddling (see Lohmann, Part IV, Chap. 19) or hacking activities has taken on a new form. The media is concerend about effects of the insecurity in cyberspace, from increasing connectivity and an overall growing insecurity. These developments were described as a negative advancement that went all the way to representations of a dystopian future for humanity. There were reasons for this new way of reporting. These reasons were incidents such as the NSA affair and Snowden disclosure in 2013, which caused a furore in Germany but not in the US (see Miller, Part I, Chap. 4). It was a spying activity from the US, backed by the "Five Eyes" alliance's intelligence services, against German politicians (see Herpig et al., Part II, Chap. 9).

Another incident that caused anger and insecurity among people, but this time across the transatlantic community, was the Cambridge Analytica scandal in 2015–2016. Scientists from the Psychometrics Centre at Cambridge University had signed a research cooperation agreement with Facebook. The data made accessible by the project were later misused for economic and political purposes. The project ended as an unethical and criminal project of a third party. Cambridge Analytica Ltd., a

data analytics company, was alledged to have been misusing private data of millions of Facebook users for economic reasons and for the political benefit of the then US presidential candidate Trump.

Election meddling, deep fakes, hate speech, disinformation through social media platforms such as Facebook and YouTube instigated by Iran, North Korea, Russia and China or related groups, causes feelings of insecurity on a regular basis (see Lohmann, Part IV, Chap. 19). The only answer to those challenges is a political vision for internet governance including a culture of high-quality education that answers new questions that haven't existed before Cyberspace grew at such a fast pace. One key expression that comes to mind when experts speak about those developments and events in cyberspace is "Media Literacy". Although it is contested what "Media Literacy" might mean, democratic societies need an excellent education in media literacy to be able to maintain their democracy in the digital world. *The people must be empowered to understand and enabled to handle information flows in cyberspace, to build up capacities and cutting-edge knowledge in this field.*

A New Research Power in Cyberspace

Events such as the Cambridge Analytica scandal reflect the major struggles companies like Facebook are facing. In the years of its existence Facebook has had a clear focus on business development and on the development of new products. But after 14 years of existence, the revolutionary start-up became a sluggish company that struggles every day to reinvent and reposition itself. It was at this stage that Facebook and peers began a new phase in which they invested heavily in research and people to enable inventions and new products (see A.III, B.III). They also signed research cooperation contracts with well reputed research and technology organizations as they promised an increase of the company's reputation. The brightest minds from science moved to Facebook and developed research ideas for the company. At Professor John Martini's research lab in Santa Barbara Google maintains one of the most successful quantum computer teams in the world (Dönges 2014). *As stated earlier, important research and knowledge about critical technology is in private hands and no longer in the hands of governments or public research institutions. This needs to be rebalanced if democratic governments in Europe want to maintain political authority.*

Failures in Innovation Management

Although the platform companies triggered innovations and the current AI hype, Facebook, for example, has failed to adapt its economic advances in an ever growing IoT to its growing corporate responsibilities, to the expectations of society, its

customers and to traditional compliance rules. After serious data scandals, Facebook and other American platform companies must answer questions about user and data privacy. The working conditions at Facebook, e.g. for content moderators, have already been criticized. There is a lack of powerful lobbyists for the rights of workers as they existed in the last industrial revolution (see Schulz, Part II, Chap. 7). A very smart solution to these problems that can help those companies to manage their innovation processes has come up from the business consulting world. The concept of "Corporate Digital Responsibility (CDR)" was invented and has emerged from traditional corporate social responsibility (see Andersen, Part II, Chap. 10).

Functional Sovereignty

Law scholars have investigated the US platform economy from a law and economics point of view. Some say that it has achieved "functional sovereignty". This term derives from a fundamental principle of international law (Schmitt 2017), which was developed in 1648 in the Treaty of Westphalia: state sovereignty. It describes the power of the political authority to act on behalf of citizens in relation to a specific (national) territory. Airbnb, for example, has developed market power to shape urban planning in smaller cities in the United States. Amazon has received offers from democratically elected mayors to assume political power when the company moves its headquarters to these cities. These companies gather more customers than countries like Estonia or Sweden have citizens (2.41 billion Facebook users worldwide in the second quarter of 2019). The result is a de-facto political influence that was reserved for elected representatives and represents a similar sovereignty in the hands of private companies. This power reflects a fundamental shift in the political power systems of western democracies.

The developments are turning companies into competitors for political authorities, which were traditionally responsible for organizing life in constituencies (see Reiche, Part III, Chap. 12). Amazon announced in early 2019 that it had encountered fierce opposition from local authorities and politicians from Long Island City in Queens. That kind of resistance was reason enough for Amazon not to establish the No. 2 headquarters in New York City. The incident is interesting for several reasons: New York is considered one of the world's most important centers for new technologies, and the city has always been the concrete jungle where dreams come true. The city's authorities have begun to take a critical look towards the tech world with its platform economy, as they did in Europe.

The Race to Dominate the Internet

Over the past decade we have seen a loss of political power in the elected authorities and their bodies (see Braun, Part III, Chap. 18) as a result of what happened within

the platform economy. It was only recently that the authorities have begun to assume their role as regulators in cyberspace (see Barber, Part II, Chap. 5; Zurkinden, Part IV, Chap. 22). In the digital domain, confidence in political institutions is correspondingly at a record low—which is also reflected in the rise of influencers that can easily grab the prerogative of interpretation over political and social issues. This applies not only to Western authorities, but also to countries like China. The Chinese government reacted earlier and harsher to this deficit by introducing the questionable "Social Credit System" (see Leibkuechler, Part IV, Chap. 21). Other governments have hastily developed internet governance guidelines, created new ministries and developed AI guidelines to prove their ability to tackle these issues. After years of hesitation and what lawyers called the "wait and see approach", they are trying "sandboxing" models and are beginning to regulate, e.g. the EU General Data Protection Regulation (GDPR).

Today China seems to be the tech policy leader since its implementation of the digital strategies as part of the OBOR initiative, its Cybersecurity Law and with its holistic AI strategy from summer 2017. This poses a great challenge for its allies but especially for its traditional counterparts like the US. The US barely has an AI strategy. The Federal Government of Germany did not announce its AI strategy until November 2018. The Minister of State for Digitization in the Federal Chancellery, who took office in March 2018, acts as the "face" for internet governance in Germany. Responsibility for shaping policy lies with the head of the Federal Chancellery and his internet governance team. This fragmented authority is an expression of the fragmentation of authority in internet governance throughout the Federal Republic of Germany (Gauss, Part III, Chap. 15; Duenn and Schaefer, Part IV, Chap. 23).

In times of fundamental change, it is important to adapt adequate politics, policies, policy language and organizations to secure future prosperity and democracy. Regulatory and governance approaches in the West are currently primarily seen as risk minimization and security maximization. It led us to fail miserably on defining new critical technologies and this makes society ill-equipped for future tech and its effects on society and democracy. Europe needs to overcome existing prejudices and uncreative thought patterns that are not supportive. It needs a regulatory and governance mindset that will maximize knowledge for as many as possible; inventions and innovations to create European start-ups and opportunity. *This is a crucial point and the best point in time to redesign organizations that back democratic societies. For the connected and the post-digital society, suitable concepts are needed now, not traditional concepts.*

Spreading Tech Knowledge and Finding Opportunity in Disruption

Apart from political forces, AI tech is said to be the strongest driver of digital transformation, so it is important to understand the techniques and to develop them with

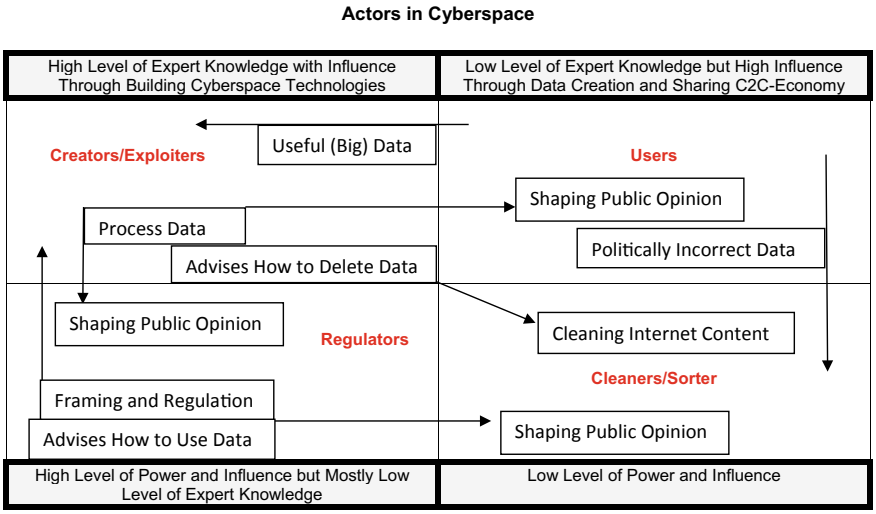

Exhibit. 1.5 Actors in cyberspace. *Own Source* Feldner (2018)

a vision of a prosperous future in a democracy. But the dramatic success in the AI research area "machine learning" have led in recent years to a flood of AI applications and devices that are not reflected in the European education system. An emerging status of ignorance and unawareness in society towards this development will lead to even more resistance to tech and create a long-lasting sense of insecurity or fear. This development has the potential to divide European societies (see Hartleb for Estonia, Part III, Chap. 16). If a society is digitally divided, there are a few who have access to knowledge and power and those who cannot catch up (see Exhibit 1.5). This level of insecurity and division has the potential to further weaken democracy and political decision makers.

There is a way to circumvent this scenario: the dissemination of knowledge through high-quality education for as many as possible. A prosperous future demands a high-quality learning culture. It is important to provide education for self-confident citizens. Not only IT literates have to find their way in Cyberspace, but the others as well.

The Remote Control of Our Life

A reason for this widespread feeling of uncertainty is that the 3rd generation mechanical AI learning models, applied in today's AI world, are obscure, unintuitive and even difficult for experts to understand. The fields of machine and deep learning are particularly cryptic for humans. While deep learning techniques are incredibly good at finding patterns in data, their complexity can make it impossible for people

to understand how they come to their conclusions. The more that people depend on digital and AI applications, and the more tech affects human life, the more important it becomes that the technology is robust against the design process (see Walorska, Part II, Chap. 11) and becomes understandable. AI systems must be monitored on a permanent basis. For their safe use it is important that code is aligned to human goals and values. *It comes with the following questions:*

I. *Should the research and development phase be subject to legal regulation, or to the monitoring of legal and certification professionals?*
II. *What does implementing cyber security and ethics in the coding process mean and will this serve human goals?*
III. *Who will be the one that decides what goals should be implemented in AI?*
IV. *Will the next "Big Five" global tech corporations be located in China, Singapore, Pakistan, India, in a post-Brexit UK or be in the hands of Russian investors?*

Enabling Democratic Goals

Since the 1990s, experts have been working to understand how technologies behind deep learning—neural networks—make decisions. The idea behind this work is that its results could facilitate the handling of the technology and minimize risks. A concept for this, the concept of explainable AI (XAI/ex AI), was introduced in 2004. Ex AI are AI systems whose actions are easy for people to understand and thus enjoy trust. In 2015, AI security research became mainstream in the US. **Until this year, critical discussions about AI risks were often misunderstood as the goal of hindering the AI process** (Tegmark 2018)**!** The year 2015 thus marks a very important date for the future of humanity, considering what AI can trigger for society, be it good or bad. In August 2016, the U.S. Defense Advanced Research Project Agency (DARPA) initiated the Explainable Artificial Intelligence Program (XAI) for military reasons. DARPA's political intent behind this research is to prevent agents and military personnel from blindly trusting an algorithm when using autonomous instruments like weapons or robots. The result of the program will be a toolkit library that can be used for the development of future systems. Upon completion of the program, these toolkits would also be available for further enhancement and migration to defense or business use in the US. In Europe, the High-Level Expert Group on Artificial Intelligence (HLEG on AI) presented its draft of an ethical guideline for trustworthy AI at the end of 2018. For the HLEG on AI, trustworthy AI means that general and abstract principles arising from human rights are underpinned by technical specifications in the design process for an algorithm. It is not yet clear

what *trustworthy AI* means, since the meaning of the word has not been clarified (see Zurkinden, Part IV, Chap. 22). *A first step in Europe would be to clarify what is meant by trustworthy and how Europeans can put their ethics into practice by translating ethical principles into a code of conduct for technologies and companies. This leaves EU politicians with one question: How to handle actors, that are not subject to EU regulation?*

Don't Let People Be Outsmarted

The consequences of malfunctioning AI and digital tech for law enforcement, medicine, politics, critical infrastructures, in the media and for peace on earth can be serious, especially in democracies. The main risk might not be conscious intervention by people, but the lack of education in the population and a continuing loss of talents in Europe. This situation will lead us to new security concepts focusing on the individual and devices making up the IoT. It is foreseeable, that we will move to holistic security concepts and insurance policies for institutions and their individuals. As long as we do not see knowledge spreading in society, technology and tech companies are responsible for ensuring stability. An important step to counteract this technology-driven development is not regulation but education for all citizens (Getto, Part V, Chap. 28; Deimann, Part V, Chap. 27). This training must integrate findings from ex-AI- and cyber security research, media literacy and practical experiences of the physical world (see Ilgen, Part V, Chap. 26). It is necessary to teach this to children (see Ferracane, Part V, Chap. 25). If not, it will become more difficult for the younger generations to take on a critical position in the discussion about being human in the hybrid age. It will also become difficult for them to build a successful career as they are facing new actors and colleagues from around the globe (Feldner 2018). *Today is the best moment for liberal democracies to fight attacks by authoritarian regimes, non-state actors, and from their own ignorance, challenging developments with self-esteem, open-mindedness, an excellent education culture, and strong cyber defense skills.*

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