

Digitalizing *Deutschland*

by
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Dedication

Dedicated to

my fellow colleagues and friends

who studied abroad with me at Fachbereich 06 der Johannes Gutenberg-Universität

Mainz in Gernersheim, Germany,

as we all endured the struggle of receiving our German residency permit

and navigating a foreign land without much digital services and assistance available.

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Abstract

Germany is a thriving nation with the fourth largest economy in the world, but it has a significant issue—a lack of digitalization. Germany still prefers to do most of its tasks with pen and paper rather than utilizing digital tools. This is in part due to cultural perspectives based off Germany's history as well as their values and traditions. It is also in part due to the structure of their government. Germany has made attempts to digitalize the country, but none have yet to be successful. This project explains how Germany is behind digitally as a nation, investigates the reasons behind these digital delays, and why it poses a massive problem for Germany. This project also evaluates what plans Germany has made in the past to digitalize as well as future steps Germany should take in order to catch it up digitally with other developed nations.

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Chapter I

System Check: Detecting Problems in *Deutschland*

Germany is responsible for many technological inventions and has the fourth-strongest economy in the world. However, many Germans still tend to do tasks the old-fashioned way. This is true in daily life, businesses, and government processes. It may come as a shock to outsiders from other developed countries how little Germans digitalize, but Germany is very hesitant when it comes to doing things a new way. A thesis by scholar Corinna Funke compares digital public services in France, Denmark, and Germany: “German public administration has literally made zero, at times negative, progress in terms of digital public service implementation over the course of the last ten years” (Funke). A YouTuber with the channel name *Tinto Travel* posts about her experiences in Germany and explains in one of her videos how shocked she was when she first moved there. She comments on how the government, banks, job centers, foreign authorities, insurance companies, and other businesses all insisted on still using paper forms rather than being digital (“How does” 0:18).

The European Investment Bank conducted the Corporate Digitalization Index or CDI. EIB found that Germany ranked only 15th out of the 27 EU countries (Płóciennik). The CDI measures how often countries use digital technology, invest in software and digital business processes, accessibility to transmission infrastructure, utilization of digital monitoring systems, and potential for future digitalization. Germany had a score of 65 out of 100. Denmark and the Netherlands scored the highest, with a score of 87. The average score of the EU was 67, and Germany still falls below that line. These results do

not reflect Germany's GDP per capita compared to other EU countries. It is unexpected, considering a country thriving financially is heavily lacking in digitalization. These statistics also come as a shock when it is taken into account that Germany aims to be an international leader in digitalization. Because of Germany's economic power, it is clear that the lack of technology is not due to having insufficient funds but rather an aversion to change, among other factors (Płóciennik).

Many stores and restaurants are reluctant to accept credit cards or any forms of digital payment and still remain cash-only establishments (“How does” 0:37). This is especially bewildering since Germany actually invented the chip card. Nevertheless, chip cards and other forms of digital payment up until recently have rarely been used in Germany for transactions. Deutsche Bundesbank conducted a study in 2017 that revealed on average, Germans always carry about 107 Euros in their pockets. It was not until 2018 that more payments were made digitally with card than cash in Germany. In 2018, 48.6% of transactions were done with a card, while 48.3% were still made in cash (Schütz). Prior to 2018, about 80% of transactions were done with cash (Sullivan). This reliance on cash inconveniences tourists and creates a barrier for immigrants with non-Euro currencies.

Germany's schools are just now investing in tablets and interactive whiteboards since many still use chalkboards. However, many teachers and professors still do not make use of this technology because they have little to no training on how to use the technology provided (“Digital Transformation” 2:31). On top of this, many Germans are very skeptical about teaching in a way they find untraditional. They tend to have the mindset of the old way being sufficient and find it unnecessary to try learning a new way

of teaching (“Digital Transformation” 1:02). However, the COVID-19 pandemic did push Germany to digitalize their education systems more rapidly in the past few years. The lack of infrastructure and use of technology caused the German education system to be more unprepared than most other countries’ education systems when the pandemic struck (Hartong). Despite the advancements Germany has made in digital education since the pandemic, their digital progress is still lacking when compared to other developed countries.

Just as the schools are behind in modern technology, so are German businesses. Germany is infamous for 66% of its business still using fax machines, whereas, in most developed countries, fax machines are a thing of the past. Many German businesses also still use traditional mail instead of email (“Digital Transformation” 0:14-1:33). Relying on mail through post slows down processes and makes it more challenging to keep track of documents. This is also assuming parcels do not get lost in the mail, which only adds to inefficiency, frustration, and confusion. It is confounding why Germans still use physical mail and fax machines when they have a reputation for believing efficiency should be a priority (Burack). It is common for German local businesses not to have a website, especially in rural areas. This makes it extremely difficult for people visiting the country to know where to find locations, such as restaurants and stores. Oftentimes, the only place Germans can find information about local businesses is through fliers posted on the doors of the establishments. For example, if someone wanted to look up the opening hours for the local grocery store, rather than looking up the hours on their device at home, they would have to walk or drive to the store itself to look at the posted hours. This proves to be very inconvenient as it requires much more time out of a person's day.

Google Maps is not much help in Germany either when it comes to finding out information about the area. Because of Germans' strong belief in protecting their data, many locations in Germany are so infrequently updated that Google Map's location information is often inaccurate. Some locations are not mapped at all. Almost all of Europe has Street View available on Google Maps, with the exception of Austria and Germany, where their street views are either blurred or nonexistent (Jacobs). Google Map's Street View covers 98% of the places in the world where people live, yet Germany and Austria are among the 2% that are not mapped ("Why There's Almost No" 0:38). There are some instances in larger cities, like Munich, where some Street Views are mapped; however, in these larger cities, a majority of the buildings on Street View are now outdated (Vonau). Even being able to open Google Maps is not always a guarantee due to Germany's poor phone coverage in various areas.

It is not uncommon for Germans to be on the phone while walking, and suddenly, their call gets dropped, or they can no longer load websites. Germans would say they have entered a *Funkloch*, which literally translates to "radio hole." A *Funkloch* is defined as an area where phone service is poor or nonexistent ("Digital Transformation" 1:42). According to a news article by *The Local*, for most densely populated areas, Germany has sufficient phone coverage, while the rural areas tend to have patchy signals or at times a phone signal is nonexistent. But even Germany's most prominent cities, like Berlin, still have phone coverage issues. Berlin is Germany's most populated city, with roughly 3.8 million inhabitants, and yet there are still areas that only offer 3G and 2G coverage. Berlin has the second most 4G coverage out of all German cities. Cologne has the most 4G coverage and is Germany's fourth most populated city with 1.1 million people.

Hamburg, Germany's second most populated city with 1.9 million, has the third most 4G coverage (Wartenburg; "New Map"). Nowadays, many developed countries offer 5G in densely populated areas, while Germany can still barely provide 4G ("New Map"). Regarding the speed and availability of Germany's 4G network, it ranks close to the bottom among the other European countries despite Germans having to pay some of the highest prices in Europe for data (Bastien).

Not only is phone coverage an issue, but Wi-Fi coverage as well. Not all regions of Germany support high-speed broadband internet, and internet speeds generally tend to be sluggish. A survey in 2017 conducted by the Organization for Economic Cooperation and Development ranked Germany's internet speed 29th out of 34 countries. In 2018, only 2% of Germany was covered by fiber optic internet. Meanwhile, Sweden had 58% of its internet utilizing fiber optics, Latvia 62%, and Japan 76% (Carrel). Unreliable internet poses issues for schools, businesses, and individuals, especially during circumstances like COVID-19. Bastien, a blogger who answers questions and advises those moving to Germany, writes, "Whether it's at home or on mobile, it's hard for some to move to the first European economic power and experience internet like it's 2009." He also notes, Germany ranked 25th worldwide in 2017 for average internet speed, with a speed of 15.3 Mbp/s (megabytes per second). In terms of the average highest internet speed, Germany ranked 45th place, below 17 countries in the EU (Bastien). When it comes to fiber-optic internet, only four countries rank lower than Germany.

Regarding Germany and the internet, Germany has some of the world's most stringent laws and policies on internet security. Websites in Germany also always ask users if they are okay with cookies. In contrast, in other countries, such as the United

States, cookies are automatically active on a majority of websites. A recent law that was passed in Germany regarding cookies is known as the "Telecommunications Telemedia Data Protection Act" or TTDSG, December 1st, 2023 ("TTDSG"). This law states that websites must get the user's consent to set and regulate cookies, store any information on the user, or gather any personal information. In most cases this even includes the user's IP address which is usually required to view a website. ("TTDSG"). The TTDSG means very few websites in Germany do not require the user's consent to be fully operational. This law is one example of a *Datenschutz* law or data protection law. These are extensive and detailed laws since Germany is highly concerned with personal data. The TTDSG is one of three main legislations for data protection in Germany, and as the name suggests, it also covers privacy over Telecommunications and Telemedia ("Germany Federal Act").

Another piece of legislation for data protection is the GDPR or the General Data Protection Regulation. Its main objective is to give precise requirements concerning processes and data control, covering a broad digital topic span. Some of these topics include data collection consent, enforcing other requirements, and forgetting data collected. The other main piece of legislation is the *Bundesdatenschutzgesetz*, known as the BDSG-new, which replaced the old BDSG. BDSG-new translates to the New Federal Data Protection Act. This Act covers not only digital data processed by a computer but also personal data that is written on paper as well. The old BDSG was made law on January 1st, 1978. The new BDSG came into effect on May 25th, 2018. The BDSG-new Act differs from its predecessor in that it also protects all personal data intended to be a part of a filing system (Oladimeji).

Similarly, since Germans value their privacy, they are reluctant to digitalize any personal records. Germany's lack of digitalization when it comes to citizens' personal medical records and government forms is outdated to the point that it has become a joke. International comedian Daniel-Ryan Spaulding, who writes many comedic skits about Germany, mocks how difficult it was to get a digitalized vaccination record during the pandemic. He explains how he had to find a specific store in Germany to digitalize his paper vaccination records. He further explains how no Germans were able to point him in the right direction of the specific store. It was difficult trying to find the right place to go (Spaulding, "Germans" 0:00-3:09). Getting official forms in Germany digitalized can be difficult, which is due to Germany having little to no implementation of e-governance.

One study shows how Germany ranks only 21st out of the 27 EU countries in terms of progress in switching over from traditional governance to e-governance ("Election"). E-governance includes matters such as online forms, booking online appointments, using government websites, and utilizing email. Another study conducted by the OECD Organization for Economic Cooperation and Development, observed 29 countries and ranked them based on progress toward a digitalized government. Germany ranked 24th out of the 29 in their survey (Noyan). These statistics are most likely a result of Germans feeling the need to protect their privacy, and the thought of sharing personal government information over the internet is highly unsettling. However, despite Germans' anxiety concerning the security of government records, the government is arguably one of the most critical areas that needs to be digitalized. One of the most challenging processes to go through is that of obtaining a residency permit in Germany,

which is required if one is moving to Germany or staying in the country for more than 90 days.

Each region in Germany has a slightly different process when registering for a residency permit. However, in some ways, each regional process is hindered by a lack of digitization. Spaulding also speaks on the experience of getting an *Aufenthaltsgenehmigung* (residency permit) in Germany. He has a skit representing the struggles of getting an appointment to register for the residency permit. In the skit, he struggles to find a free time slot online to book an appointment since so few are available. Then he has to wait for a letter in the mail that has a confirmation number only afterward to wait for more letters that he then is required to bring to his residency permit appointment (Spaulding, “*Ausländerbehörde*” 0:00-2:50). The comedic skit encapsulates what immigrants have to deal with when moving to Germany but for many immigrants, making an appointment is a bit more challenging since the majority of the time, employees only speak German. Imagine being a foreigner with no knowledge of the German language and having to navigate through a complex government process where everything is printed on paper. It makes translating text and complex government terms more of an endeavor. Many other people who have immigrated to Germany share similar experiences.

An independent journalist with the channel name *yourtruebrit* interviewed foreigners he ran into on the streets of Germany and asked what it is like being a foreigner in Germany. A woman from England commented on how difficult it is to learn the German language and how it causes challenges with German bureaucracy. A man who immigrated to Germany from France also agreed that it was imperative to be able to

speaking German to understand things in daily life, such as public transport. He also mentioned that even though there is a lot less bureaucracy for people immigrating from within the European Union to Germany, he still found it to be excessive paperwork compared to what he was used to when he lived in France. He said Germans require significantly more forms to be filled out and multiple interviews at times, whereas the immigration process in France is much more straightforward. A woman from Poland and a man from Tunisia also mentioned the amount of bureaucracy and the large quantity of paperwork to fill out in Germany (“What’s Life” 0:00-11:03). For a country where bureaucracy is such an important part of life, it would make sense for it to modernize processes as much as possible to ensure efficiency, which is something Germans are often praised for. So, what are the reasons for the delay of digitalization in Germany?

It is clear that the digitalization challenges faced by Germany are not a result of insufficient economic resources. Chapter 1 shows some of the main areas where Germany is lacking in digital advancements including: internet infrastructure, cell phone coverage, government services, business services, and education. Chapter 2 investigates cultural attitudes that contribute to Germany’s hesitancy to invest in technology. Understanding a nation’s cultural view is the first step to uncovering why a society thinks and acts a certain way towards an issue or topic, in this case digitalization. Chapter 3 explains why this technological lag is a national issue that needs to be addressed. It evaluates how a deficit in technology affects the daily lives of Germany’s citizens, visitors, and immigrants. It also evaluates how it affects the nation on a global scale as well. Chapter 4 describes what Germany has done so far to fix the issue and why it has not been successful. It suggests potential solutions to Germany’s digitalization deficit and what

Germany's next courses of action should be to catch up digitally with other developed countries.

Chapter II

Running on Strict Security Settings and a Corrupted Past

According to the German broadcaster *Deutsche Welle*, Germany has all the right conditions for digital success but is held back from progressing digitally due to Germans' mindsets. Germans are extremely reluctant to invest in digitalization and culturally have an aversion to trying new things ("Digital Transformation" 1:00-4:29). Germans tend to trust traditional ways of completing tasks because they put a significant amount of value on order. Germans make sure everything runs a certain way and thus in an "orderly" fashion. A famous German saying is "Ordnung muss sein," meaning there must be order. This phrase is one of multiple that reflects German's innate need for order. Another is when one asks in Germany, "Are you okay?" or "Does everything make sense?" the Germans often say, "Alles in Ordnung?" which literally translates to "Is everything in order?" If a person is okay, then they are in *Ordnung* or order. Germans are not necessarily always consciously striving for order; it is more of a subconscious concept that exists in Germans' minds. It is how they have always lived their life. Changing the slightest process in a given task would disrupt order in the German mindset, so it takes a while for Germans as a society to get on board with changing how tasks are performed. Its citizens strictly follow the rules in Germany, and not following these rules is often seen as socially shameful. Germans have numerous rules. Some include quiet hours after 11 p.m., recycling each piece of waste into a proper bin, dogs only being allowed to bark a max of ten minutes at a time, and only crossing the road when given the walk signal (Baur). These laws may seem trivial, but Germans generally follow them very closely.

There is a special police force dedicated to dealing with these small misdemeanors known as the *Ordnungsamt*, which can roughly be translated to as regulations office. A ticket from the *Ordnungsamt* is called a *Ordnungswidrigkeit* or adversity to order. People can be ticketed for disobeying previously mentioned rules, such as jaywalking or making noise during quiet hours. Nic Houghton is the founder of the blog *40% German*, which is about his experience immigrating from the United Kingdom to Germany and reporting his observations on how German culture differs from British culture. He argues that while most nations would find all these rules restricting and confining, Germans actually find them more freeing. He thinks that Germans find comfort in the clarification that extensive detailed laws provide. It serves as a form of reassurance that as long as Germans stay within the limitations, they can feel confident that there is no room for disorder or chaos (Houghton). Even in instances where other nations may see Germans as carefree and wild, there are rules behind most activities. For example, some cultures see German nude culture or Berlin night parties as wild, taboo, and unregulated; however, there are many rules in place surrounding these activities. There are designated beaches and parks for people to walk around in the nude, and no staring rules exist at these locations. Nightclubs in Berlin have specific rooms for drugs and sex. So, what may appear like chaos to outsiders is all within orderly set rules to the Germans (Baur).

Germans are not timid when it comes to correcting others if they are not correctly following the rules. Christina Röttger, an expert on German culture, states, "Strangers will rebuke you because there is an expectation that everyone will follow the rules" (Baur). She gives an example of her neighbor sending out a *WhatsApp* message with a video informing everyone in the apartment how to break down a cardboard box properly.

Lukas Pietrek, a law student from Düsseldorf, tells the BBC, "There's order, and that is a good thing. But a lot of people are nevertheless too orderly and stuffy" (Baur).

Because Germans have an ingrained way of doing daily tasks, it is hard for them to change that routine when they have followed these rules and regulations strictly all their lives. This mindset could possibly be one explanation for the aversion and uncertainty regarding using technology as a tool in daily life since it is a new way of completing tasks. Röttger also comments that order is something Germans do not question or think about more than someone would think about grammar when speaking their first language. Therefore, Germans tend not to be as open to change as other cultures since they typically do not think twice about how they have done things for generations. Germans' tendency to adhere to ingrained patterns of behavior, especially in regard to order and regulations, makes them hesitant to use new technology and delays progress. They often do not question their ways of doing things since they are taught not to question orders from a young age (Baur). It should also be noted that Germany's population is experiencing a significant birth deficit. The majority of Germany's population as of 2020 was between fifty and seventy years old and only continues to get older (Goldenberg). With Germany's fewer births each year, they now offer *Kindergeld* or money given to parents by the government to help them provide for their children. Germany hopes this will help increase the national birth rate ("Child"). As Płóciennik notes, older generations tend to struggle more with changing their mindsets on how to do things and generally have an aversion to technology. The average German being over middle-aged could make German societies less tech-savvy.

In addition to an aging population, Germany is falling behind digitally due to companies shying away from innovation as they are slow to incorporate new methods. As mentioned, Germans feel secure when following set rules and orders, so trying something new is daunting. Daniel Wiegand, an aerospace graduate entrepreneur, created his own business, Lilium. Lilium is a company that is developing vertical take-off and landing vehicles or "flying Taxis." He states that entrepreneurship and taking career risks is not something Germans are known for or is as supported in countries like the United States. He feels that Germany is very unfriendly towards entrepreneurs. He was trying to find a fourth partner for his company in Germany that had flight control software experience. He recalls interviewing German Ph.D. students for the position, "I think after one or two minutes, 50 percent of the people left the room and said, 'This guy is crazy'" (Carrel). He compares it to California, saying that the culture and people's thoughts are completely different. He believes that people and cultural mindsets bring about change and new ideas, as is the case in California with Silicon Valley (Carrel). Although many Germans admire the entrepreneurial innovation of Silicon Valley they do not think that way as a society. Journalist Anna Sauerbrey with the New York Times claims it is what Berlin would like to be. She believes it also lies in the culture of following regulations and not taking risks, which is Germany's downfall when it comes to innovation. Sauerbrey writes, "To create and grow an enterprise like Amazon or Uber takes a certain libertarian cowboy mindset that ignores obstacles and rules." Blogger Nic Houghton also agrees with this sentiment, saying that bending the rules can be seen as smart and a mark of genius in countries such as the United Kingdom or the United States. These countries

sometimes use the mantra "Rules were made to be broken," whereas in Germany, that anarchical thinking is looked down upon (Houghton).

According to CEO Christian Stengel of the German company Germanedge, it is also partly due to Germany being so used to being regarded as the most powerful economy in Europe. He states that Germans fail to see they are beginning to fall behind and still believe Germany is a tech-leading nation. A Bitcom Industry report shows that 54% of German companies with over 500 employees believe they are still a tech-leading nation. This opinion is likely a result of Germany still being the strongest economy in Europe; however, that will no longer be the case if Germany continues down this path. As for now, though, many Germans do not see a problem since their economy is still powerful, so entrepreneurship is just an unnecessary risk in their eyes. It is easy to find work in Germany since businesses are always looking for new employees, therefore there is little motivation to start new businesses (Stengel). Because Germans do not often support ideas of entrepreneurship or change, many are reluctant to try new methods, including branching out into the digital world. Culturally, Germany does not possess an entrepreneurial spirit; perhaps if it did, more innovation would come about and, as a result, more digitalization (Carrel).

Another value Germans prize in addition to order is that of privacy. According to an article by the publisher Dot Magazine, the European Union has the strictest rules in the world regarding data protection, and out of the European Union, no country has stricter rules on data protection and privacy than Germany ("Germany: Land"). These rules can explain a bit why Germany is so against Google mapping their terrain. In 2010, Google attempted to map Germany's 20 biggest cities only to be faced with numerous protesting

Germans. Many of Google's camera cars used for mapping street views were vandalized (Jacobs). At one point, Google was caught collecting Street View photos of Germany using unencrypted Wi-Fi connections. Ilse Aigner, Germany's minister for consumer protection, called a Google Street View Photo “a million-fold violation of the private sphere” and said, “there is not a secret service in existence that would collect photos so unabashedly” (“Why There's Almost No” 5:26). Google was fined \$189,225. This is almost the maximum amount of \$195,000 that the German authorities are allowed to fine a corporation. That was the only time Google was faced with such resistance to mapping terrain. Since then, it has been reluctant to map any more of Germany after those failed attempts (“Why There's Almost No” 5:26-7:14). Germany sometimes refers to Google with a negative connotation. It has nicknamed it the “Octopus.” Mathias Döpfner, the chief executive of the global publishing company Springer, states he is “afraid of Google” (Sauerbrey). A digital use survey conducted by Kepios in Germany showed that only 9.5% of Germans have a smart home device such as a Google Home or Amazon Dot (Kemp). Another digital survey carried out by Acatech found that only 8.1% of Germans had smart home devices. 67.9% worried cybercriminals could take over their house with smart home devices (Künsting).

Google is not the only company Germans are distrustful of. Dana Regev wrote an article for *Deutsche Welle* on her observations of Germans and social media. She is originally from Israel, and the cultural norms surrounding social media are very different there. She was shocked that most of her German friends on *Facebook*, *Instagram*, and *Twitter* use pseudonyms. They do this so that they cannot be stalked or have advertisements targeted toward them trying to collect their data. She was even more

surprised to discover that people often will not provide their actual number on apps, even dating apps. She recalls an antidote of when she first began dating her German boyfriend and tried to call him on the phone with the number he had on his dating profile since she had no cellular data or Wi-Fi. She then realized it was a fake number. They had been dating for a month, and he still had not felt comfortable enough to provide her with his actual number since he used to have a stalker. She was less offended when she realized it was not personal. He informed her that he does not even give out his actual number to job companies where he has had promising interviews (Regev). While not all Germans behave to this extent, this behavior of protecting information is a lot more common in their society.

Joe Cannataci, a UN reporter on privacy, states, "Respect for the rule of law and the importance of privacy is deeply entrenched in German culture" ("Germany: UN"). The value of privacy is closely linked to data protection. The word *Sicherheit* in German translates to both safety and security. To Germans, safety and security are one and the same ("Germany: Land"). Rachel Stewart, a reporter for *Deutsche Welle*, interviewed Germans on the street on how important data protection is to them on a scale of one to ten, with ten being extremely important. Out of the nine she asked, one responded with "seven," four responded with "nine," and four responded with "ten" ("Digital Transformation" 3:00-3:13). Acatech's survey asked if Germans were afraid of losing control over their digital data, and 60.6% responded that it was a concern (Künsting). Because of this concern regarding the lack of control over their digital data, Germans often use cash to pay rather than digitally (Płóciennik). Doris Neuberger, who is head of the Money and Credit Department of Germany's University of Rostock, explains, "The

most important reasons for the intimate relationship of Germans to cash are their needs for protection of personal data, security and confidentiality of payments and simple, universal usability” (Schütz).

Germany's desire for extreme privacy has much to do with its history. Two of Germany's past political powers used surveillance of its people to manipulate and punish them. These political powers made the Germans feel unsafe and oppressed by their own government. Anything could be used against them. One of these political powers was the Third Reich (Bulkeley). The Nazis were notorious for their strict monitoring and collection of an individual's personal demographics. The Nazis conducted two main censuses. The first one was taken in June 1933, in which they collected data to discover how many young men were capable of fighting in the war and to discover people's ethnicity. The second census was carried out in 1939. Citizens were instructed to write down their ethnicity on a card and report if one of their four grandparents were Jewish. Citizens were falsely informed that their data was anonymous and only being used for statistical reasons. However, all cards were carefully analyzed and traced back to those who had filled them out. A citizen answering they had a Jewish background resulted in them usually being sent off to a concentration camp. It was a tragic and terrifying time period to live in. Most citizens always felt they were being watched, and most of the time, they were constantly under strict surveillance. Citizens without a Jewish background had to exercise extreme caution at all times in case they made any actions or comments that could be seen as undesirable by the Nazis (Black, “BESA”).

During this period, there was technology available to the Nazis that aided them in identifying Jews and other minorities. A well-known American technology corporation,

the International Business Machines Corporation IBM was involved in helping the Nazis tally and keep track of citizens' personal data. Edwin Black's parents were Holocaust survivors from Poland, and he felt the need to expose IBM's dark past through years of research and investigations. The result was a 426-page book named *IBM and the Holocaust*, recounting in detail how IBM was involved in collecting and processing data efficiently for a horrific cause. Black explains how data could be read quickly and efficiently by punch cards invented by the German American Herman Hollerith, who worked for IBM. The card was roughly the size of a dollar bill and had columns and rows where different holes could be punched. Depending on where the holes were punched, it would convey data about each person to a high-speed reader machine known as a Dehomag Hollerith machine. The data on the cards included information such as age, ethnicity, religion, profession, criminal records, gender, and other demographics (Black, "BESA"). Black described it as "nothing less than a nineteenth-century barcode for human beings" (Black, *IBM* 25). Prototypes of these punch cards were sent to the Third Reich officers multiple times until they were satisfied with the results to officially order them for their purposes. IBM ensured the card readers were up to maintenance and upgraded occasionally (Black, *IBM* 9).

Based on the censuses conducted in 1939, location data was then used to systematically transport Jews and other ethnic groups onto trains that took them to camps. Trains relied on the punch cards made by IBM since these cards were also responsible for keeping track of the train schedules and passenger count. The trains' schedules were determined by application programs created by IBM so that the card readers could read and interpret the data regulating the train schedules. All data on the prisoners and workers

in the camps were tracked on machines in the T-Building in Oranienburg, which was the central SS managerial and administrative authority for the concentration camps located in a section known as D-II. Data was sent to the T-Building from each individual concentration camp that had its own site called *Hollerith Abteilung*. Depending on the camp, the *Hollerith Abteilung* was sometimes equipped with card organizers and others with tabulating machines (Black, “BESA”). If a prisoner was transferred to another camp, their identification code on their card was always sent with them. Prisoners were split into sixteen categories, which were punched into their cards. Some of these categories were Jew, Gypsy, and Homosexual. (Black, *IBM 363*). Even after a person was killed, their identifier card was updated with a code for how they died. Code C-3 was death by natural causes, D-4 was execution, E-5 was suicide, and F6 was special treatment, which really meant extermination by gas chamber, bullet, or other means. Black also notes that most deaths were coded as natural causes even when people were openly murdered (Black, *IBM 365*). IBM was in a partnership with the Nazis for twelve years. Black states that the Holocaust would still have killed hundreds of thousands. However, because of the technology provided by IBM to the Nazis, the Holocaust became the genocide of six million that we know of today (Black, “BESA”). It is horrifying to think how many more citizens would have been accused and captured by the Nazis if they had access to the current modern technology, such as online databases of personal information and personal devices that can be tracked (Tangens).

Another time in history when Germans had a negative experience with technology was during the period of the German Democratic Republic, which controlled Eastern Germany from 1949 to 1990. The German Democratic Republic (GDR) was a

authoritarian government that always held its citizens under tight surveillance. Charlotte Bailey, a journalist for the *Atlantic*, writes about how citizens were expected to dress, act, and speak a certain way. Anything out of line would be considered an offense. The GDR police arrested some people for dressing too "edgy" or applying to leave the country. For example, one man was arrested because he refused to cut his hair and was against wearing a government-approved scarf to school exams. East Germany strictly monitored their citizens, and privacy was often invaded. The Ministry for State Security in the East, commonly referred to as the Stasi, would go to great lengths to see what individuals were up to. They opened people's letters and spied on citizens by bugging and tracking them. The Stasi would also wiretap, drill holes in the walls, and encourage neighbors to spy on one another. Many East Germans never felt at ease within their own homes. Despite thirty years since the GDR existed, its effects still live on. Germans were allowed to request their Stasi file with all the information ever gathered on them after the GDR collapsed. Bailey explains how many Germans' trust was broken as they discovered that close friends and family had been reporting to the Stasi all along. One woman discovered that the man she loved and her closest friend had been reporting back to the Stasi without her knowledge. A man was shocked that he was thrown in jail because his girlfriend had informed the Stasi that he planned to leave the country. The GDR destroyed trust among many citizens in former East Germany, especially their trust in the government. David Wood, who is a sociologist associate professor at Queen's University, explains how, in modern days, communist states have significantly more power over their citizens than the Stasi did. They can spy on their citizens by viewing their communications online, tracking their movements, and viewing their transaction history. Scott Thompson, a

surveillance historian at the University of Saskatchewan, says, "Certainly it is no coincidence that Germany has some of the strongest privacy laws in the world and a palpable cultural aversion to surveillance, and appears as a rare blank spot in Google Street View's coverage of Europe" (Bailey).

Given Germany's dark past concerning the government abusing technology to invade privacy and Germany's reluctance to try new ways of doing tasks, it is no surprise that many Germans are skeptical of new technology. Acatech's survey on technology in Germany discovered that only 24.6% of Germans think technology solves more issues than it causes. That means that over a third of Germans think that technology actually causes more problems than it is beneficial. This is how Germans view technology in general; however, German views on technology tend to vary depending on what the technology is pertaining to specifically. Germany is a huge advocate for environmental friendliness; therefore, it is are very supportive of technology regarding renewable energy or any technology that combats global warming. Regarding smart home devices, data digitalization, or robots replacing human jobs, Germans tend to be more reluctant towards these ideas. Acatech also found that only 54.4% of Germans believe technology is capable of making their lives more convenient. Many do feel that they will lose control over their personal data. 60.6% fear this will be the case. This study also concluded that even though older German generations having more reasons to fear their data being exposed due to Germany's past, the younger generations feel more threatened by the loss of personal data. However, despite the younger generation being more concerned about data leakage, they generally support the need for digitalization. The survey also found that men are more pro-digitization than women in Germany. Surprisingly, it was also

found that East Germans are more pro-technology than Western Germans despite East Germans' history with the GDR (Künsting). Given Germany's cultural values and history regarding data protection and its consequences, it will take effort, trust, and open-mindedness from the German people to catch up with the rest of the world digitally.

Chapter III

Performance Affected: Lagging Behind in the Global Digital Race

Given its cultural standpoints and history regarding personal data and technology, Germany's reluctance to go digital is understandable. Janosch Delcker, a journalist for *Deutsche Welle*, writes about how Germany is in need of a “digital awakening” in order to be more self-reliant (Delcker, “How Germany”). Germany is heavily reliant on software and hardware from other countries because it has fallen so far behind. According to the European Union's Digital Economy and Society Index, Germany ranks only 13th out of the 27 European Union country members when it comes to digitalization efforts. These statistics can be seen as humbling on Germany's behalf, considering Germany has the most powerful economy in all of Europe but needs outside assistance when it comes to technology (Płóciennik).

The McKinsey Global Institute, a global management consulting firm, argues that Germany could have an even more powerful economy if it digitalized more but it is hindering its economic growth by not going digital. A report by McKinsey Global Institution states that Germany needs to adapt to the quickly growing changes in the digital world if it wishes to preserve their status as the most powerful economy in Europe. This is especially a concern given Germany's aging population, which will lead to less employment in the future. A lower employment rate and a national technological delay will negatively affect Germany's GDP. Predictions show that if Germany started using more automation technology it could result in an overall increase of 2.4% to its GDP. Automaton technology is simply any piece of technology that performs a task

automatically that a human may have initially performed. Automation technology is created through digitalization since it is essentially programming a machine to behave a certain way or to perform a task using software. Increase in automations lead to digital transformations all around. Some examples of implementing automation technology are self-checkout aisles or motion-activated light switches. According to the report, Germany currently only uses only 10% of its digital potential. Europe generally utilizes 12%, while the United States utilizes 18%. Germany capturing so little of their digital potential is also partly due to its lack of online platforms for business transactions and not having many large-scale technology companies (Windhagen, Eckart, et al.). It partly goes back to the German mindset of doing tasks the traditional way and not branching out and trying new methods when the old ones still work, regardless of how inefficient they may be. This societal view of doing business without utilizing much technology makes digital tools hard for German businesses to access. Therefore, it is considered normal for organizations to be paper based, but it is also a challenge to have digital tools implemented with so few resources available.

This lack of automation and utilization of technology is partly due to Germany not having many large-scale tech companies and most German large-scale tech companies Germany does have are understaffed. There are those who think Germany's lack of large-scale tech companies is of little concern when it comes to making technological progress. However, several instances have proven that owning technology companies is a huge factor in a country's digital advancements. For example, the European and Japanese electronic industries overtook the American electronic industry in the 1970s. At the time, the only popular electronic goods America produced were

television sets, while all other new electronics had to be imported mainly from Japan. Because America was importing these products, all technological developments ceased for some time in The U.S. It also made America utterly reliant on other countries for any progress in technology. Another notable case would be Scotland and its involvement in "Silicon Glen." Scotland had high hopes for "Silicon Glen" and thought it would become as big of a success as Silicon Valley. However, it was later called "Silicon Colony" after the Scottish Development Authority invested in Japanese and American high-tech companies. Instead of owning a global high-tech company, Scotland and other parts of Europe contained branch factories that now worked for the global American-Japanese companies. The jobs performed in these branches were low-paying factory jobs. It helped with unemployment rates in Scotland by providing many jobs, but no technology was actually being developed there. Advancements in technology continued to be made overseas, still making Scotland a consumer of new technologies rather than an innovator. The factories in Scotland were merely cogs in the machine to Japan and America (Seitz 181).

While Germany does not have many hardware technology companies, it does possess various software companies. This is another argument that although Germany does not have many large-scale hardware companies, all that matters for digital progression is the software companies that are responsible for developing applications. However, the software can only be as advanced as the hardware it runs on. So, while Germany has one-half of the resources required to be a digital leader, it lacks the other half for which it is entirely dependent on other countries. Germany imports materials such as microprocessors, computer chips, semiconductor lasers, liquid crystal displays,

etc. (Seitz 183). In fact, electrical and electronic equipment were the second most imported goods to Germany in 2022, followed by machinery, according to the United Nations Comtrade database (“Germany Imports”). In addition to needing to purchase resources from other countries, there is only so much software programmers can innovate without intense collaboration with the hardware companies responsible for producing the products running on said software. Hardware and software developers often need constant communication to understand how a machine's physical-mechanical workings and the internal algorithmic workings of a program operate. It is crucial that both the hardware engineers and software programmers are on the same page so that the best software can be created for that specific machine. Otherwise, issues such as unforeseen errors and lack of optimization or efficiency in coded programs occur. When hardware is developed overseas, and Germany imports it, German software companies are using hardware that already has software previously designed for it which puts German software companies in a position of more competition since they are tasked to revise what has already been made. Not only this, but they are also working on a product that in other countries may already be becoming obsolete as the hardware companies are most likely already making a new model. This puts any software that German programmers are coding on a time crunch because they are trying to improve software for hardware that may soon be replaced and require entirely different code. If Germany were the country responsible for producing the hardware, this would not be a problem since they would be the first to be able to produce the software and have access to the hardware firsthand. If German software companies are not in communication with their hardware counterparts, they are left in the dark about what the next product's capabilities and functionality will

be. It could lead to new software created by the Germans being completely incompatible with the latest hardware version. There is also a potential issue of Germany's trade partners deciding to no longer export hardware to Germany, which would lead German software developers to either have to sell their ideas to other countries or shut down their companies. This can happen if Germany becomes a one-sided dependent trade partner, meaning that Germany depends on one country for imports such as hardware, but that country does not rely on Germany for any exports. If the country Germany is currently getting its hardware from wants to increase competition, they may stop supplying to Germany. This is to avoid German software companies from cutting into their profits by designing German software for their hardware when the supplier country would want consumers to only buy software from them rather than Germany (Seitz 182-183).

Zemmler Siebanlagen, a family engineering firm in eastern Germany, had all deliveries of arriving goods checked without any digital assistance until March 2018. There were stacks of paperwork and manual crosschecks that took hours. Now, they utilize an inventory application to get the job done, which cuts the time it takes to receive shipments down to a fraction of what it was prior to. They are able to instantly update other departments electronically. Zemmler's company still hopes to implement more digital resources to aid with efficiency. He plans the inventory app for shipments to just be the beginning of utilizing more technology. The company quickly encountered a few hurdles when creating more digital tools. One of these is a shared database between his welders and assembly line workers to keep track of parts in inventories and to share project plans. He discovered that his region of Germany, Brandenburg, does not support high-speed broadband internet, which is necessary to transfer large amounts of data to the

database. Without high-speed internet available, companies have even less incentive to try and work out digital solutions when the technology itself is challenging to navigate. The Mittelstand is a group of small and medium business firms dedicated to finding new working methods. One member, Alexandra Horn, states regarding poor internet speeds that "digital business models cannot be implemented, plain and simple" (Carrel). This is one of many reasons why German companies are so hesitant to go digital. Two other main reasons, in addition to slow internet speeds, are government inefficiency and the reluctance of smaller companies to work with them if they were to go digital due to data privacy (Carrel).

All of Germany's data protection laws are not only an obstacle for German businesses going digital but also for international businesses that simply want to conduct business with Germans. International businesses are often overwhelmed by the laws and regulations on digital media in Germany, and it can be challenging for them to work around these rules. Much research is required when businesses launch a product or service online in Germany to ensure they abide by all the regulations. Companies have to spend a great deal of extra time and money to work around Germany's extensive laws and regulations regarding digital security that it is sometimes considered too much trouble and not worth the effort. After all one misstep could cost a company thousands of Euros for something found acceptable in all other EU countries. In 2016, the General Data Protection Regulation came into effect. Companies had until 2018 to read over the new regulations and make their business contracts and processes compliant. Companies that were found not to comply could be charged up to 20 million Euros ("Germany: Land").

Marketing products in Germany require extra research and often non-digital approaches, since many Germans do not use digital advertisements but rather traditional billboards or paper advertisements. This is due to Germans being skeptical of online advertising since they feel it invades privacy and are worried these companies could be collecting their data without consent. Germans are especially cautious when it comes to data that involves their health. When questioned how much a German would be willing to pay to ensure their health data was not leaked, the average amount was around \$184. In contrast, the average United States and Chinese citizen said they would only be willing to pay to protect their health data if it cost under \$10 (“Germany: Land”). Because of this any marketers of health products or businesses have to put in extra effort and caution to get German consumers to trust them. German IT worker Phillip Hermann states he tries his best not to reveal any of his data online. He knows how ads try to get consumers to engage in impulsive shopping and thinks that it is best to keep things to yourself as much as possible. When questioned “Why hide?” he simply responded with “Why not?” He then mentions that it is best to be cautious given what “certain governments” can do with information (Regev). Needless to say, these mindsets result in companies having a tough time when marketing to Germany since there is often a lot of revision required in order to adjust their advertisements to reach a German audience. They have all the regulations to review to avoid fines, make sure their websites comply with German laws, have marketing strategies that are not purely digital, and ensure their company is perceived as trustworthy so Germans will be willing to release their personal data to them. Data regarding banking information is especially something that Germans are hesitant to give away since some are not fond of the idea of their purchase history being tracked (Schütz).

All of the obstacles companies face when marketing or working with Germany have made Germany a less attractive business partner and market. It is no wonder that as a nation, Germany has dropped significantly on the charts for business location attractiveness, according to the Economic Research Institute. Once considered the leading country to do business with, Germany as of 2022, now ranks 18th out of the 21 leading industrial countries. No country in history on the Economic Research Institute's rankings has ever dropped down as fast as Germany. Germany went from first to 18th place over the course of just 15 years. Christian Stengel, the CEO of the German company Germanedge, thinks one of the main causes for Germany's "de-industrialization," as he calls it, is due to digital blindness. Germany is severely unprepared in terms of digital readiness, and many companies do not acknowledge this fact (Stengel). He comments that German industrial firms are extremely far behind their international counterparts in terms of digitalization, and that digital strategies are essential for surviving in the modern market. Germany continues to drop down below other nations technology-wise due to their digital progress being stagnant and will only continue to fall behind the less they innovate (Stengel).

The previously mentioned Digital Economy and Society Index shows that Germany ranks 18th out of the 27 countries in the European Union in the category of integrating technology in business and e-commerce (Płóciennik). It reflects a significant gap between Germany and other countries in the EU when it comes to digital public service. Digital public service is even more scarce in rural areas of Germany. According to the index, only 18% of small and medium-sized German businesses use e-voicing. The index also found that less than a third of small and medium businesses share information

electronically, which includes having websites and emails. As mentioned, this can be linked to Germany's fear of posting information online, resulting in a lack of privacy and security. Because of this cultural anxiety, resources such as business emails and websites are not commonly set up and, therefore, are not seen as a priority to businesses despite being inconvenient for customers when businesses lack these tools.

Germany's lack of technology in businesses, education, and many other areas was not brought to light until the Coronavirus pandemic of 2019 struck. Children had to attend school online to comply with quarantine measures, and in the beginning, most schools did not possess the technology necessary for remote learning. The Digital Pact for Schools was a plan to increase technology in schools. It was primarily launched in 2019 to allow schools to set up their own Wi-Fi networks and purchase smartboards with a budget of five billion euros. However, once the pandemic occurred, the budget for the Digital Pact was increased to three times the original amount to allow schools to purchase tablets ("Ministry"). Implementing technology during COVID-19 was challenging because each state oversaw implementing digital education tools. This division of power meant that each of the sixteen states had a different approach to e-learning. Each state used a different e-learning software, which led to the quality of remote learning varying in each state. Additionally, during the COVID-19 pandemic the importance of strong and fast internet connections became apparent since many homes did not have stable connections to the internet, which was essential for remote teaching and remote meetings. Even after several months of the pandemic, Germany's health departments were still reporting case numbers through the use of fax machines (Delcker, "Why Can't Europe's).

E-governance is another area that Germany heavily needs to invest in. There are several benefits to having e-governance services available. The main benefits are e-governance's efficiency and convenience. A simple implementation could be German bureaucracy's switching from traditional mail to email. This saves a considerable amount of time since emails take seconds to send while paper mail can take up to a week ("What is E-Government"). In general, Germany runs off of a paper-based system, so there is much room for e-governance to increase efficiency and organization effectively. In a government dealing with numerous citizens and each citizen having physical records of information regarding government services, it can be a challenge to keep everything sorted in the correct location. It can be easy to misplace one of many physical documents, which not only slows down services but also is a security concern. In such a case, the citizen may be required to repeat a government process, which is inconvenient and often frustrating. The same can be said for sending documents through the post. Parcels can go missing, and then the recipient may wait weeks just to discover that a government form was lost in the mail. Even when paper-based systems are closely monitored and orderly, there is still the issue of storing all the files. They require drawers, filing cabinets, or other containers to be kept in, which takes up a considerable amount of space. If these records are digital, they are all stored remotely in a digital cloud or on a hard drive where they neither take up physical space nor have a high risk of being misplaced ("The Top Challenges"). Additionally, records being stored online have the advantage of being accessible from a database. This allows multiple people to access the records at once without needing a physical copy to be sent via post and allows the record to be accessed in various locations simultaneously (Bhandarkar). Furthermore, paper-based systems are

costly and environmentally unfriendly which is ironic as Germans generally strive to be an eco-friendly nation. A survey done by *Süddeutsche Zeitung Magazin* asked Germans their concerns about the future, and 75% of residents answered that environmental protection is the priority (Stern 160). This is ironic considering how Germany uses significantly more paper than other developed countries. Doing away with paper-based documentation would undoubtedly be an eco-friendly step (“What is E-Government”).

In the Peter Zudeick’s article on *Deutsche Welle* he explains that it is no secret that Germans are very fond of bureaucracy. He believes this is rooted in Germans’ love of order and regulations. Moreover, with all of this bureaucracy comes a lot of paperwork to ensure that every step and process is carried out correctly (Zudeick). German government processes often entail multiple forms that must be filled out, sorted, reviewed, and approved. Often, these forms are not all filled out in one sitting. A more efficient government means that people are able to receive government services faster, and the government is capable of helping more citizens at once. This will, in turn, allow citizens to have a more positive view of their government and its competence. Currently many citizens do not look forward to going through government processes as they are very long and typically take multiple in-person visits which can be frustrating and inconvenient. As mentioned in Chapter One, immigration processes are one example of where Germany could greatly benefit from an e-governance system. It would decrease the time it takes for each person to apply for a residency permit and allow for better organization of everyone's files. During a time when many refugees are fleeing to Germany, this would prove especially vital to processing and sorting the inflow of refugees in a timely and orderly fashion. Not only this, but having government websites

available that allow people to schedule their appointments online and read over all the necessary documentation for applying for residency will save time for both immigrants and government workers. Currently, e-governance would be helpful since Germany is experiencing a large number of refugees coming in from Ukraine due to the war. In 2022, roughly 1.05 million Ukrainians and 883,000 Syrians immigrated to Germany (“Ukrainian Refugees”). This caused severe delays in German government processes as it struggled to keep up with the ever-rising number of refugees. One can imagine the stress and chaos the government workers must have been under to sort through and analyze approximately 1.1 million immigrants in one year without modern digital tools. Stacks of paper had to be sorted by hand rather than being stored away in a digital filing system. The majority of documents are mailed through post and sent back and forth rather than being emailed or stored in a database. Additionally, language barriers could also have caused confusion. If government websites allowed immigrants to schedule online, they would not have to call a government worker and attempt to communicate in a foreign language since websites can easily be translated automatically. It would also be prudent for government websites to post more information on what immigrants can expect in the interview to apply for a residency permit, thus allowing for better preparation for the interview, and causing less confusion and stress on both ends. Germany needs e-governance more than ever at a time like this.

One woman who immigrated to Germany talks about her experience with the *Ausländerbehörde* (immigration office) in Stuttgart, Germany. She says they do not have a website to schedule appointments. Instead, people have to wake up early to wait in line before the government building opens and hope they can get in. It is very unorganized,

and some people stand in line from as early as five in the morning hoping to be able to get an appointment. The video of her experience with getting a residency permit in Stuttgart was posted May 12, 2023 (“Hours” 0:00-1:44). This demonstrates that disorganization in government offices in Germany is still a significant concern, and Stuttgart’s circumstances could easily be fixed if they had a way to schedule appointments online.

Jenna, an immigrant from Canada shares her experiences immigrating to Germany. She made an entire YouTube series and a helpful website she created for immigrants called *LifeinGermany.com*. Her website has the intention of making it easier for people to move to Germany as there are many details in the immigration process that are not explained to immigrants. One of her videos covers her experience with the *Ausländerbehörde* and how she waited one and a half years for her appointment to register for her residency permit in Dusseldorf. She states when speaking about the *Ausländerbehörde* that it is “the worst place you could go to in Germany.” She has to renew her residency in Germany every so often meaning she must periodically make a trip to the *Ausländerbehörde*. She explains how Germany requires a substantial volume of documentation and usually immigrants are required to bring physical copies. None of the processes are done online. Despite having gone to a German government offices multiple times and being able to speak perfect German, she was still stressed to go on her tenth visit. Since she had booked the appointment, which was 18 months ago, they changed their requirements to needing a photocopy of all her documents. They were unwilling to photocopy her documents at the office since there were 160,000 people queuing for residency permits. In the end, she was forced to schedule another

appointment after already having waited a year and a half and having all the correct documentation. Jenna was so distraught with her experience that she posted a video on Instagram of her in tears after leaving the *Ausländerbehörde*. She says that within 15 minutes of posting the video she was already receiving tons of supporting comments sympathizing with her situation saying they all had similar experiences receiving residency permits in Germany. She states in the German city of Freiburg it was slightly less stressful but still stressful, nonetheless (“Worst Part” 0:00-10:22).

Often times the employees at the *Ausländerbehörde* can come off as rude and frustrated towards foreigners. Part of this is because foreigners do not always speak good German or may not be able to communicate in German at all; however, this process is also stressful for the employees likely due to the amount of unnecessary paperwork they have to shuffle through and sort. It is also unnecessarily stressful in cases such as in Stuttgart where appointments cannot be scheduled in advance and are based daily on people showing up and hoping to get a spot. The *Ausländerbehörde* in Dusseldorf typically will not answer their phones and instead sends callers to voicemail where it states their employees are too busy to answer phone calls. All of this makes the process of residency for immigrants in Germany not only exhausting for the employees but extremely exhausting and overwhelming for the immigrants trying to obtain it. It is notable that Germany’s lack of digitalization causes such confusion of what their registration process requires that citizens like Jenna felt inspired to make her own website just to help other foreigners. Jenna created a downloadable checklist of items that immigrants should bring to the *Ausländerbehörde* that is applicable in most regions of Germany. She also has a welcome program immigrants can enroll in to help them figure

out the best places to look for apartments, register for a German banking account, sign up for phone and electricity plans, and more. Her paid welcome program is so successful because it is so difficult to access information that foreigners need in Germany (“Worst Part” 0:00-10:22). This shows how difficult it is to research all this essential information when moving to Germany that people are willing to pay for such a program. This is extremely problematic especially for a country that is trying to be as open as possible to foreigners.

Germany's reluctance to embrace digitalization is causing the country to lag behind other developed countries significantly, despite having the most powerful economy in Europe. Some consequences of this are a negative impact on its GDP, becoming a less attractive business partner, overly lengthy government processes, insufficient remote learning, inefficient industries, and unnecessary paper use. Catching Germany up digitally is more than just about securing its economic status. It is necessary to enhance efficiency, accessibility, and convenience for each and every citizen. In a world growing increasingly dependent on digital technologies, Germany's hesitation to embrace the virtual world has far-reaching effects. Germany needs to address this deficit in digitalization as soon as possible.

Chapter IV

Updating and Rebooting *Deutschland*

One main roadblock, it seems, for Germany when trying to go digital is an overall lack of prioritizing the implementation of digitalization on the federal government level. It has proved challenging for Germany to follow through with digitalization plans. One example of this was in 2016 when the German government set a goal to implement fiber-glass internet in an attempt to upgrade internet speeds since German internet is not up to par with other countries. The original goal was to have fiber-glass internet available nationwide by 2025; since 2022, that goal has been postponed to 2030 (Delcker, “How Germany Plans”). The first digital agenda planned by the German government was in 2014, and several other digital plans for Germany have been planned since then. However, each digital plan either did not get very far or was postponed. This is in part due to the previously mentioned cultural views of Germans and their skeptical perception of technology and also due to technology not being seen as a pressing concern.

Another issue when it comes to implementing digital plans is how Germany’s government is set up, especially in regard to digitalization. Former chancellor Angela Merkel's digital assistant stated that the division of power that is protected in Germany's Constitution is responsible for hampering digital progress (Carrel). Germans are stereotypically detail-oriented and as a result, the way their government distributes power heavily reflects that fact. However, one of the main problems with this is that Germany's distribution of power was created before the virtual world existed. For most nations this is not an issue but because of how intricately Germany splits its government processes,

the procedure for implementing digital legislation is spread out among various ministries. The Economy Ministry for example is in charge of promoting new technologies, the Justice Ministry is in charge of digital consumer protection, the Ministry of Digital Infrastructure and Transportation is in charge of internet broadband distribution, and the Interior Ministry is in charge of data security. To make matters more complex, Germany's regional authorities are each in charge of planning and implementing legislation in terms of education, taxation, policing and spending. Germany is split up into sixteen different states, and each one has its own regional government with the responsibility of planning new legislation. This setup proved to be a hurdle when the German federal government tried to improve digital education in schools across the nation using federal funding. In order to do this, there had to be a constitutional amendment since policy regarding education and its funding is entirely up to the jurisdiction of each individual German state (Carrel). Only after this amendment was passed Germany able to provide each state with the federal funding necessary for digital education.

On August 31, 2022, Germany announced a 3-year plan that was designed to catch Germany up with the rest of the world digitally. This plan was developed by Germany's ruling coalition of the Social Democrats (SPD), the Environmentalist Party (The Green Party) and the Free Democrats (FDP). They created 18 initiatives to attempt to make Germany prepared for the digital age. Many were skeptical of this plan's success when it was first announced. Volker Wissing, the minister of Transport and Digital Infrastructure, had his doubts and said the goal is just for Germany to make it into the top ten of the EU's Digital Economy and Society Index, in which Germany currently ranks 13th. Wissing said that the government is ambitious to see this plan through but also

needs to be realistic in its expectations. Government officials are hoping these goals being laid out in more detail than in the past will lead to them actually seeing completion without any delay (Delcker, “How Germany Plans”).

Wissing was not the only one with doubts. One lobbying group known as the Association of the Internet Industry says there is not enough ambition for this plan to succeed. Even if Germany were to meet the goal of being in the top ten in the Digital Economy and Society Index, that would still only be a midfield position compared to the rest of the EU. Being Europe's most powerful economy would not be sufficient in the long run (Westendarp). Another criticism of the 3-year plan is that even though it aims to cover much ground, many areas of it still remain too vague. Without a well-designed and detailed plan, achieving the goals it hopes to achieve will be more challenging. How long certain projects will take and what methods will be used to implement the new technologies are still not clearly thought out, likely resulting in unforeseen delays and complications. It also does not help that not all of the projects have an assigned ministry responsible for seeing them through and therefore are not currently receiving proper attention to make much progress. However, some main areas of the plan have been delegated to specific ministries in which have been assigned main digital policy projects. Some areas, such as data institute, which consists of standardizing data and driving data availability, still have yet to be assigned a specific ministry (Kabelka).

One possible solution that has been discussed is adding an additional ministry, which would be known as the Ministry of Digital Affairs. Katrin Suder, Chair of the Digital Council Government Advisory Board, explains how a Digital Affairs Ministry would help speed up digital progress in Germany. With the addition of a Digital Affairs

Ministry there would be a ministry with its own budget and staff specifically for working on digital projects rather than splitting them across multiple ministries. It would allow legislation regarding digitalization to be passed more efficiently and organized. However, Suder did caution that the new Ministry would have to be implemented carefully; otherwise, more problems could arise that conflict with the current ministries. Moreover, she explained how adding a Digital Affairs Ministry would not completely solve Germany's delay in digital progress but would undoubtedly be a step in the right direction (Delcker, "Why Can't Europe's"). The Association of the Internet Industry also advocates for a Digital Affairs Ministry. They believe this Ministry would significantly increase digital progress. They argue that the way the 3-year plan is currently set up, with responsibility split up between ministries, is no way to make substantial progress ("A Year").

Another issue with the 3-year plan is that it does not specify where the money will come from and how all these projects will be funded. Being the wealthiest country in Europe, it is clear Germany has the money but has not yet decided which federal departments will fund these projects (Kabelka). In response to these concerns regarding the lack of a budget, Wissing replied, he was not too worried about the financing aspect and would do whatever it took to accumulate the money needed for the plan to succeed (Westendarp). Due to current events, one of them being the war in Ukraine, Germany has been more focused on budgeting their defenses. Additionally, green energy projects are also receiving more attention and budgeting at the moment (Kabelka). As of today, there is still yet to be a detailed budget created for the 3-year plan. The German budget for 2024 vaguely states that 54.2 billion Euros will be used to invest in digitalization,

education, mobility, and research, but not how much specifically will be contributed to digitalization or the 3-year plan (Carrel). The budget is supposed to be being worked on as a collaboration between the Federal Ministry of Finance (BMF), Federal Ministry of Economics and Climate Protection (BMWK), Federal Ministry of Digital Affairs and Transport (BMDV), and the Federal Chancellery (BKAmT). Because a coalition of three political parties currently governs Germany, each Ministry is overseen by a different party. Two of these ministries, the Finance Ministry and the Ministry of Digital Affairs and Transport, are ruled by the FDP (Free Democrats). The Green Party rules the Ministry of Economics and Climate Protection, and the Federal Chancellery is overseen by the SPD (Social Democrats) (Noyan). Because of this division of power, all these political parties must negotiate their plans for digitization and ensure it is supported by the three of them.

It has now been over year into Germany's three-year plan, announced initially on August 31, 2022, and 70% of German citizens say they have yet to observe any progress in digital transformation, according to a survey conducted by the Association of the Internet Industry. Additionally, when citizens were asked what areas they felt were in the most need of digitalization, 63% responded with digitalizing administration and public authority, 53% said digital infrastructure, and 33% replied with cybersecurity. 82% feel that Germany is below average compared to its international competitors in the domain of technology. All in all, 86.2% of Germans think that the current ruling coalition of the FDP, SPD, and Greens will not meet their original goals to transform Germany digitally ("A Year"). Germany's most recent report on the upcoming 2024 budget would support this doubt. Germany plans to cut spending, especially in areas pertaining to digitalization

(“Eco”). Only a fraction of the budget for digitalizing Germany's public sector has been earmarked so far. Germany also had a plan to digitalize education known as the Digital Pact for Schools 2.0, which has now been postponed. Digital Pact for Schools 2.0 is a follow-up program of the original Digital Pact for Schools that aims to replace and upgrade outdated technology in schools. According to the online German news source *Nordbayern*, there will be no more funding for the Digital Pact for Schools 2.0 until at least 2025. There are no concrete plans for this budget, giving many doubts about the likelihood of this project moving forward.

The first step in order for Germany to digitalize more as a nation is to realize and accept that its lack of technology is a significant problem. One reason why Germany keeps putting technological progress on the back burner is that it does not seem urgent. Even though a more digitalized government could greatly assist in current situations, such as registering incoming refugees from Ukraine and Syria, Germany does not have much exposure to e-government and its effectiveness. The same is true for implementing technology in businesses. German businesses view technology as a means to optimize processes and reduce costs but fail to see how technology is capable of completely transforming processes and production as a whole. On top of Germans not realizing the potential of implementing more technology, their economy has yet to feel the effects of not being as digital as the rest of the EU. Because Germany still remains the most powerful economy, many businesses fail to see the need for digitalization. The CEO of Germanedge called German businesses “narrow-minded” in terms of technology and “arrogant” in terms of economic success overall (Stengel). More than half of German businesses feel that Germany is still a tech-leading country (Stengel). While many

German citizens are starting to realize the effects of little digitalization in Germany, businesses and government offices still have not yet come to terms with how dependent the future will be on technology. Until Germans realize that this is a significant problem, it will not receive the attention required for action to be taken.

The second step, as suggested by the lobbying group, the Association of the Internet, and Katrin Suder, Chair of the Digital Council; Germany would most likely make considerably more progress towards digitalization if they founded a Digital Affairs Ministry. As stated above, Germany currently has fifteen separate ministries, and adding a sixteenth Digital Affairs Ministry would be a way for digitization policies to be implemented without having to get multiple ministries to agree on how it should be carried out (Delcker, “Why Can’t Europe’s”). This would be especially helpful given that Germany's ministries are equally divided among the three ruling parties, so not only are separate ministries currently having to agree on digital policy, but separate political parties as well, each with different views and agendas. If there were to be a Ministry of Digital Affairs, this Ministry would be ruled by one political party rather than each piece of legislation regarding digitalization being written by a different party depending on which Ministry oversees it. This way, the policy will be written more efficiently and ensure consistency across areas, given that one political party will oversee digital legislation. In some cases, collaboration between political parties and other ministries will still be necessary but not nearly as much as is currently required.

Having a Digital Affairs Ministry also allows for projects and policies outlined by the 3-year plan that do not currently have a ministry assigned since they do not seem to fit any ministry’s responsibilities. For example, the issue of data strategy currently does

not have a ministry assigned to that task. Having a ministry with the sole purpose of tending to digital affairs would give digital projects a ministry that has the time to deal with them and ensure they have funding. As of now, scattering these digital projects across ministries that have little to no connection to the digital projects they are assigned is not going to guarantee that these projects are seen as a priority. Especially when these ministries have other projects that need time and funding, the Digital Affairs Ministry could also potentially be in charge of matters that affect each state individually, such as e-governance and digital education. The inconsistency of remote learning during the pandemic was problematic since each state made remote learning work. Each state used different software and techniques, resulting in varying qualities of learning. If there had been a Digital Affairs Ministry, they could have developed a nationwide e-learning platform to ensure consistency of education between states. Each state would still be ultimately in charge of its own education, but now there would be a ministry that had the time to collaborate with each of the states to shape the software to fit their requirements and preferences (Delcker, “Why Can’t Europe’s”). The same goes for helping states in matters such as e-governance, public infrastructure, and other projects. It would allow the country to have digital tools that may be unique in each state but still similar enough so that citizens are not unfamiliar with how they function.

Lastly, some of Germany’s cultural attitudes must change to promote digital progress. Germany should be more open to new ideas and supportive of entrepreneurs. Daniel Wiegand's story in Chapter 3 explains some of the general attitudes Germans have towards new concepts and ideas that seem far-fetched. Wiegand interviewed German Ph.D. students trying to find partners for his business, and recounts how about half of

them walked away thinking his ideas were crazy. In 2016, Germany saw a 10% drop in the number of small businesses founded by entrepreneurs. In 2017, there was a 2% drop in small businesses founded by entrepreneurs (Stengel). According to the Global Entrepreneurial Monitor, a research project that measures the national entrepreneurial activity in 51 countries, Germany scored at barely or below sufficient for enabling entrepreneurship in the categories of Entrepreneurial Finance and Government Policy: Taxes and Bureaucracy. If the government began to encourage and support entrepreneurship, as is the case in countries like the United States, more citizens would be open to starting their own businesses with their individual unique ideas. Without the government's support citizens feel that it is unlikely they will have a strong enough foundation to start a business. New businesses are important in all nations as they are what inspire and result in new ideas and progress which largely includes technological advances.

Germany received an Entrepreneurial Finance score of 5.3 in 2021, ranking it 11th out of highly developed economies. A score of 1 indicates a country is highly insufficient, and a score of 5 indicates a country is highly sufficient in that area. However, a 5.3 is still considered a low score for a country with such an advanced economy. For comparison, the United States scored a 6.2 in Entrepreneurial Finance which is about where it should be for a higher functioning economy. The Global Entrepreneurial Monitor, (GEM) defines Entrepreneurial Finance as, "The availability of financial resources—equity and debt—for small and medium enterprises (including grants and subsidies)" ("The World's"). This score suggests that Germany's government could do a better job in funding entrepreneurs. Germany scores higher in this category

than other European countries-this is expected because Germany is the fourth most robust economy globally-with the second most powerful European economy being the United Kingdom, which ranks 6th globally. The other category GEM considered low for a country in Germany's position was Germany's score on Government Policy: Taxes and Bureaucracy. It is defined as "The extent to which public policies support entrepreneurship - taxes or regulations are either size-neutral or encourage new and SMEs." SME is an abbreviation for small and medium sized enterprises. Germany's score of 4.69 suggests that Germany's government could use more government policies that support its citizens starting their own businesses ("The World's").

Germany scored the lowest in Entrepreneurial Education at the School Stage, which GEM defined as "The extent to which training in creating or managing SMEs is incorporated within the education and training system at primary and secondary levels." Germany received a score in this category of 2.83 in 2021 and 2.73 in 2022. This low score could correlate with the German cultural perspective of sticking to what is working rather than taking risks. GEM states that, overall, Germany has a very strong education system in place and is just lacking in its curriculum regarding entrepreneurship. In addition to Germany's government creating a more robust entrepreneur curriculum, the government could also implement more Physical Infrastructure that supports small businesses. As of now, Germany scored a 6.03 in Physical Infrastructure. This seems like a high score, but it is actually the third-lowest score among other highly developed nations. Entrepreneurs in Germany would benefit if the government gave new businesses better access to physical resources, transportation, land, utilities, and communication which includes making more communication available digitally ("The World's").

Referring back to entrepreneur Daniel Wiegand's perspective in Germany not being as open to entrepreneurs and new ideas as California, GEM's data supports this perspective. One of GEM's categories is Cultural and Social Norms, which is defined as, "The extent to which social and cultural norms encourage or allow actions leading to new business methods or activities that can potentially increase personal wealth and income." The United States scored 7.04 in this category, while Germany only scored 4.65. GEM gathered these scores based mostly on their adult population survey, which asks questions regarding motivation to start businesses. GEM reports that, in general, Germany has always shown lower interest in being entrepreneurs than other nations with similar economic status. In 2021, 5.8% of Germans said that they plan to launch a business within the next three years. Germany had the lowest percentages among highly developed economies in response to the following questions: "There are good opportunities to start a business where I live" (48.2%), "It is easy to start a business in my country" (38.2%) and "I personally have the skills, experience and knowledge to start a business" (37.1%) ("The World's"). The report states that these responses are partly due to Germany's current stable and strong economy. This results in a high demand for new employees, so starting a new business is not preferable when there are currently many job opportunities offering high wages. However, it is crucial that the German government still encourages entrepreneurship so new businesses and ideas can enter society. Not all of these ideas and products will strictly be related to digitalization, but many will be given that digital technology is the future. The more progress people make, the more digital technologies are utilized and integrated into society, but the government has to support progress in order for it to take off. Konard Seitz, a former head of the Policy Planning Staff in the

German Foreign Office, states, "...Entrepreneurs and managers in Europe need the encouragement and support of society and government, who must create the conditions and the physiological climate in which high technology industries can flourish. We must redefine the role of government in the economy. It is vital that it should orient society and industry towards the future" (Stern 183).

The other societal attitude that Germany as a nation needs to work on changing is their distrust and skepticism towards technology. Many of these anxieties revolving around privacy and the potential harm of technology are rooted in Germany's dark history of these tools being abused and used in unsettling ways. Germany has more reason than most nations to distrust new technology. Between the involvement of IBM technology in the Holocaust and previous political powers invading citizens' personal lives for control, it will take time for Germany as a nation to trust in the good technology has to offer. Despite Germany's aiming to be a leader in digital technology, it is already lagging far behind. Angel Merkel, former chancellor of Germany, said, "To think that we can be at the forefront of artificial intelligence and be as restrictive as possible with data is just like wanting to rear cows without feeding them" (Carrel). Germany cannot hope to pave the way for other nations in the technological sphere while its people still fear the effects and consequences of going digital. This attitude will take time to change but also effort on the government's behalf to reassure its citizens that despite technology having a potential to be used in harmful ways it has potential for good as well.

Germany's journey towards digitalization is riddled with challenges, many of which are deeply rooted in cultural attitudes and government setup. Digital progress in Germany is obstructed by a lack of prioritization by the government which is a result of

cultural skepticism and complex power distribution. While Germany has set ambitious digitalization goals, these plans have often been delayed or have failed to gain significant traction. The current division of power within the government being designed without consideration for the virtual world is an additional hurdle for implementing digital legislation effectively. The recent 3-year plan introduced by Germany's ruling coalition offers hope for digital advancement and is a step in the right direction. However, it is already behind schedule and there is skepticism among experts and the public due to no plans as to where the funding will come from, vague project descriptions, and digital projects still not having an assigned ministry. The addition of a Ministry of Digital Affairs is a possible solution to catalyze digital progress in Germany. A Digital Affairs ministry could centralize digital policy and allocate resources and funding efficiently. By reducing the need for agreement between multiple ministries and political parties, the process of implementing digitalization would become more coherent and consistent. Additionally, a change in cultural attitudes is necessary. It is crucial that Germans recognize the urgency of their digital shortcomings and be open to technology transforming various aspects of their life. German citizens must be more open to change and willing to take risks. The government should consider encouraging entrepreneurship by improving entrepreneurial education and investing in physical infrastructure to support start-up businesses. These steps are crucial towards creating a more innovative environment and as a result newer ideas. Furthermore, overcoming deeply ingrained distrust and fear regarding technology and data privacy is essential for Germany to catch up with the rest of the world digitally. Germany should consider being more open with their data in certain areas in order for digitalization to be an effective tool. Germany can

still ensure privacy by utilizing secure encryption methods and firewalls, but just has to trust in their secureness. There are always risks involved with technology but some risks are necessary for the progression of society. Successfully putting Germany's digitalization technology on par with other developed countries will be a multistep endeavor that includes governmental reorganization, policy adjustments, and cultural shifts. Acknowledging these issues and prioritizing digital plans is essential if Germany wishes to digitally catch up with the rest of the world and maintain their economic status. Not only this, but it will improve German citizens' lives by making them more efficient and convenient. It will also allow for government processes to be more straightforward and organized so that Germany can be better prepared for times of crisis such as the current inflow of thousands of refugees. Germany has a long way to go if it aims to be a digital leader in the future. Only when the nation fully embraces digital transformation can it overcome the obstacles that have hindered its progress adapting to the digital age.

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