

Going digital

Seven steps to the future

Germany's path to lead European digital transformation

Bold move: The seven key areas
in which Germany and other
European economies must act to
drive the digital transformation

1. Finance

50 billion to boost growth and
lead the world!

2. Infrastructure

The future needs gigabit networks!

3. Competition

An end to data monopolies!

4. Data protection

More sovereignty for Europe's citizens!

5. Governance

Down with digital parochialism!

6. Digital literacy

As important as reading and writing!

7. Business culture

Think big, act fast, be bold!

A forum for the digital economy

The Internet has been changing our economy, our politics, our way of life – as individuals and as a society – for the past 25 years. It has long been apparent that digitization will revolutionize virtually every industry, creating new ways for future generations to shape the world we live in. Global players have emerged. Others will follow, penetrating new markets, crafting new business models, tapping new opportunities. On the Net, the global economy is reinvented every day.

Most key players in major European corporations have grasped the importance of the changes taking place. What we still lack, however, are the common ground and resolute strategies we need to unleash the vast potential of a successful digital transformation for Europe. As things stand, others are writing the rules by which the digital game will be played out in the future. We need to assume an active role in this process.

What we aim to achieve

The *Internet Economy Foundation (IE.F)* was established with the goal of being an inquisitive think tank, an independent advisor and a competent dialogue partner in this dynamic environment. It aims to be an impartial organization and a pioneering voice for politics, the economy and society, providing information about the latest developments and defining the interests of the German and European Internet economy in a global context.

Commissioned by Roland Berger and realized in collaboration with the IE.F, this study identifies the most important sociopolitical areas where action is needed in the context of digitization. In these areas, it also makes specific – and necessary – recommendations for action to get Germany and Europe's Internet and digital economy in shape for the future.

Your involvement in this exciting and important project – the successful digital transformation of Germany and Europe – would be warmly welcomed. A broad alliance of the political and business communities, of the media and society at large is needed to get this project off the ground and keep it in the air. We look forward to hearing your ideas and suggestions, and to constructive and fruitful collaboration with everyone who wants to be a part of shaping the digital future!



Friedbert Pflüger
President
Internet Economy
Foundation



Clark Parsons
Managing Director
Internet Economy
Foundation

“If you don't tackle
digitization head on,
you will disappear from
the economic scene
and the working world
in five to ten years.”



Günther Oettinger

EU Commissioner for Digital Economy and Society

Contents

WORLD 4.0: A UNIVERSE OF DIGITAL OPPORTUNITIES	Page 06
-----------------------------------------------------------	----------------

NEED TO CATCH UP: DIGITIZATION IN GERMANY (AND EUROPE) HAS STALLED	Page 10
-----------------------------------------------------------------------------------	----------------

JUMP START: HOW TO MOVE INTO THE DIGITAL FUTURE	Page 18
------------------------------------------------------------	----------------

1. Finance: 50 billion to boost growth and lead the world!	Page 22
2. Infrastructure: The future needs gigabit networks!	Page 28
3. Competition: An end to data monopolies!	Page 37
4. Data protection: More sovereignty for Europe's citizens!	Page 42
5. Governance: Down with digital parochialism!	Page 47
6. Digital literacy: As important as reading and writing!	Page 51
7. Business culture: Think big, act fast, be bold!	Page 54

HUGE EFFORT: GET TO WORK!	Page 60
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WORLD 4.0: A UNIVERSE OF DIGITAL OPPORTUNITIES

Today, everything we do is connected. Digitization is changing every aspect of our life. It is creating potential for greater freedom, prosperity and participation.

Digitization is so much more than the fourth Industrial Revolution with which the concept of "Industry 4.0" often equates it. It connects every aspect of life and economic activity, thoroughly and comprehensively. It is our constant companion in everything we say and do in the social, intellectual and economic realms. The possibilities it opens up are changing the way we live, work and think. It broadens our horizons and makes us more creative by plugging us into a far more dense array of contacts, information and stimuli. More than merely Industry 4.0, it is a World 4.0 – shaped by communication, transaction and interaction and transcending every physical and conceptual border and barrier. A world that holds out the prospect of greater human freedoms and more efficient human activity.

Manufacturing can add gross value of up to 1.25 trillion euros in Europe

The economic opportunities opened up by a successful digital transformation are mind-boggling. They give new, data-driven business models and innovative, customer-centric companies the chance to create this World 4.0 that we are talking about.

According to a study conducted by *Roland Berger* on behalf of the *Federation of German Industries (BDI)*, Europe could see its manufacturing industry alone add gross value worth 1.25 trillion euros by 2025 – or suffer the loss of 605 billion euros in foregone value added if the digital transformation fails to materialize in the eight sectors studied. And these figures are comparatively conservative: Other studies point to similar or even greater potential. Here are a few examples:

A study by *Fraunhofer IAO* and *Bitkom* concludes that, in Germany alone, Industry 4.0 can deliver cumulative value-added potential of as much as 78 billion euros between now and 2025. That is equivalent to a 1.7% annual increase in gross value added for each of the six industries the study investigates.

An analysis performed by the *McKinsey Global Institute (MGI)* indicates that international data streams already contribute more than the conventional trading of goods to global economic growth. Worldwide, the MGI puts the potential macroeconomic benefits of the Internet of Things at between 3.9 and 11.1 trillion US dollars by 2025.

The *European Commission* calculates that rigorous digital reforms in four areas would fuel an extra 2.1% of annual growth. It also believes that full consummation of the Digital Single Market (DSM) within five years would boost growth by a further 250 billion euros. Finally, the European Commission estimates that e-government could slash administrative costs by as much as 20%.

Growing dynamism and innovative strength

Right now, large corporations are the principal driving force behind digitization. They are the ones who see it as an opportunity to discover new areas of growth and reinvent themselves. Yet new possibilities also present themselves – perhaps even more so – to small and medium-sized enterprises (SMEs). These firms stand to reap particularly handsome rewards from lower transaction costs, high scalability and networked collaboration. As an exercise in creative destruction in the best Schumpeterian tradition, digital disruption can

boost an economy's overall dynamism and innovative strength.

Society as a whole is poised to be another beneficiary of successful digital transformation. Consumers shopping online enjoy three specific advantages: a new level of convenience, transparent prices and a wider choice. The potential gains for each individual include greater freedom (through the use of social networks to build bridges and engage in dialogue worldwide, for example), more education (through alternative learning forms), better healthcare (through the real-time analysis of vital parameters, for instance), enhanced safety in both public and private spaces, and greater civic participation thanks to the online offerings of public administrations.

Finally, connectivity and digital technologies are useful tools to master three challenges of core importance to humanity: The combination of intelligently processed data with autonomous and highly efficient machines can help arrest climate change, combat the scarcity of resources and cope with demographic change.

Digitization does much more than create the potential to speed up economic activity and thus drive more growth and prosperity. It also underpins and enables individual freedoms and social participation. Europe in general and Germany in particular cannot afford to waste these opportunities.

Digitization is so much more than merely the fourth Industrial Revolution with which it is often equated.



NEED TO CATCH UP: DIGITIZATION IN GERMANY (AND EUROPE) HAS STALLED

Digitization is more than just a tool to optimize processes and realize efficiency gains. By focusing too narrowly on "Industry 4.0", Germany in particular is limiting the potential of across-the-board digitization.

“We have what
it takes to experience
a digital economic
miracle. The question
is whether it will
take place in Germany.”



Angela Merkel
German Chancellor

Need to catch up: Digitization in Germany (and Europe) has stalled

The full scope of the digital revolution is still underestimated, especially in Germany. According to a study conducted by Münchner Kreis, an independent platform that seeks to give orientation to digital decision-makers, quality (79%) and suitable education (78%) are currently regarded as the most important success factors in industrial production. By comparison, a focus on customer benefits (75%), a pronounced entrepreneurial mentality (60%) and high value added internally (43%) are regarded as less significant. As far as the success factors for digitization are concerned, guaranteeing privacy and data protection (65%) figures much more highly on the list of priorities than, say, pursuing a platform strategy (39%).

Many companies still see the digital transformation primarily as a way to harness information and communication technologies to optimize existing processes in specific industries. The very concept conjures up images of connected robots replacing humans on assembly lines, smart sensors optimizing material and logistics flows, and recombined supply chains shortening delivery, production and sales processes. This focus on process optimization and efficiency gains is a by-product of the specifically German fixation with Industry 4.0 (though this bias can also be found in China). By contrast, the English-speaking world perceives the Internet of Things as something much bigger and more wide-ranging.

Germany's rather one-sided understanding immediately imposes limits on the possibilities and opportunities afforded by comprehensive digitization, many of which derive precisely from the disruption of conventional business models and the creation of highly scalable plat-

forms to allow firms to occupy the customer interface and carve out market positions that are hard to attack.

A much more fundamental understanding of digitization is therefore needed. What matters most is:

- The systematic use of technology to solve customer problems. This can only be done if superior knowledge – generated by the capture, structuring and analysis of personal data – enables companies to know their customers inside-out.
- The strict alignment of the entire organization with customers' key needs and "use cases" – alongside the elimination of all processes that do not genuinely add value for the customer.
- A culture change in our companies. Most European countries and in particular Germany must broaden their engineering mindset and their inherent focus on incremental improvements and functional USPs. They need to see a bigger picture and explore the realms of agility, experimentation and self-organization.
- Moving early to occupy key positions in the value chain. Why? Because the apex predator at the top of the digital food chain can utilize such a superior resource base (data) that it does not need to fear any rivals.
- A competitive data transfer infrastructure. Without sufficient physical bandwidth, it will never be possible to attain a leading position in digital competition.

If the world is to become what we Europeans would like it to be, if we want to participate in the greater potential freedoms and prosperity promised by digitization, we must play an active part in shaping the digital transfor-

mation. Our companies must adopt key positions in the digital ecosystem. This is especially true of Germany, a country that depends heavily on exports.

How European firms can successfully occupy such positions becomes clear if we see things from the perspective of the key determinant of success or failure in the digital world: the customer. →A Customers experience the digital world like this:

Step 1: Switch on the device.

By pressing the "On" button, customers choose the operating system – and hence the bubble-like environment – within which they will move around in the digital world (e.g. Android/Google or iOS/Apple).

Step 2: Do routine tasks.

To organize recurrent tasks and personal affairs, customers use integrated interfaces – to find what they are looking for, for example, or to send messages and mails. The operators of these basic services generate the most extensive knowledge of customers and thus realize the highest advertising revenues.

Step 3: Meet specific needs.

Customers use a variety of vertical applications to retrieve information, make purchases and consume entertainment. These specific applications generate individual but less comprehensive user profiles than more fundamental services.

Step 4 (in the future): Interact with business partners.

Most B2B applications in existence today – and most of those that will exist tomorrow – do not have direct access to customers. Instead, they are addressed from within the B2C environment (sometimes referred as "prosumerization"), with platform operators acting as the gatekeepers. Even for B2B players who appear to be well positioned at the present time, this will lead to a competitive disadvantage in the medium term: Since they are merely on the receiving end, they will sooner or later find themselves degraded to a behind-the-scenes role.

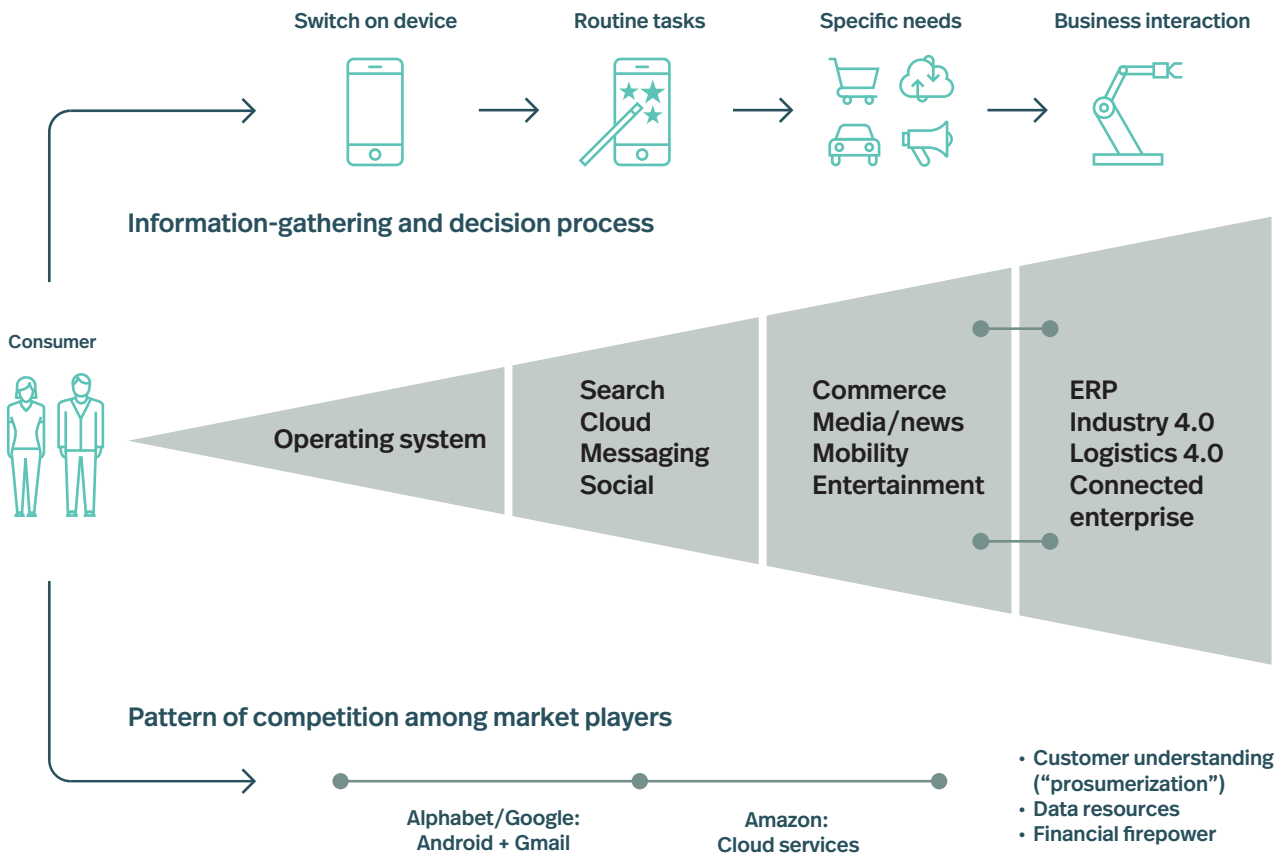
Ultimately, a company's position in the consumers' decision process will determine its market power in the digital world. The position of European companies is already precarious, as comparison of market shares in Germany clearly shows. →B Assuming the role of gatekeepers, leading platform operators such as Apple, Alphabet/Google, Facebook and Amazon now threaten to marginalize them even further – or edge them out of the market altogether. The same thing happened a long time ago in network technology and devices: Witness the fate of former global players such as Alcatel, Nokia and Siemens. The prevailing pattern of competition today, where vertical integration is causing individual value chain links to become increasingly interlocked, will only exacerbate this trend.

The above analysis leads to two alarming conclusions for European companies:

- Most value is already added in the top two tiers of consumers' decision process, and more will follow. If the Europeans fail to establish their own players on these tiers, their share of value added will erode.

Need to catch up:
Digitization in Germany
(and Europe) has stalled

A Platform operators hold all the aces: Companies' position in consumers' decision process determines who wields market power in digitized industries



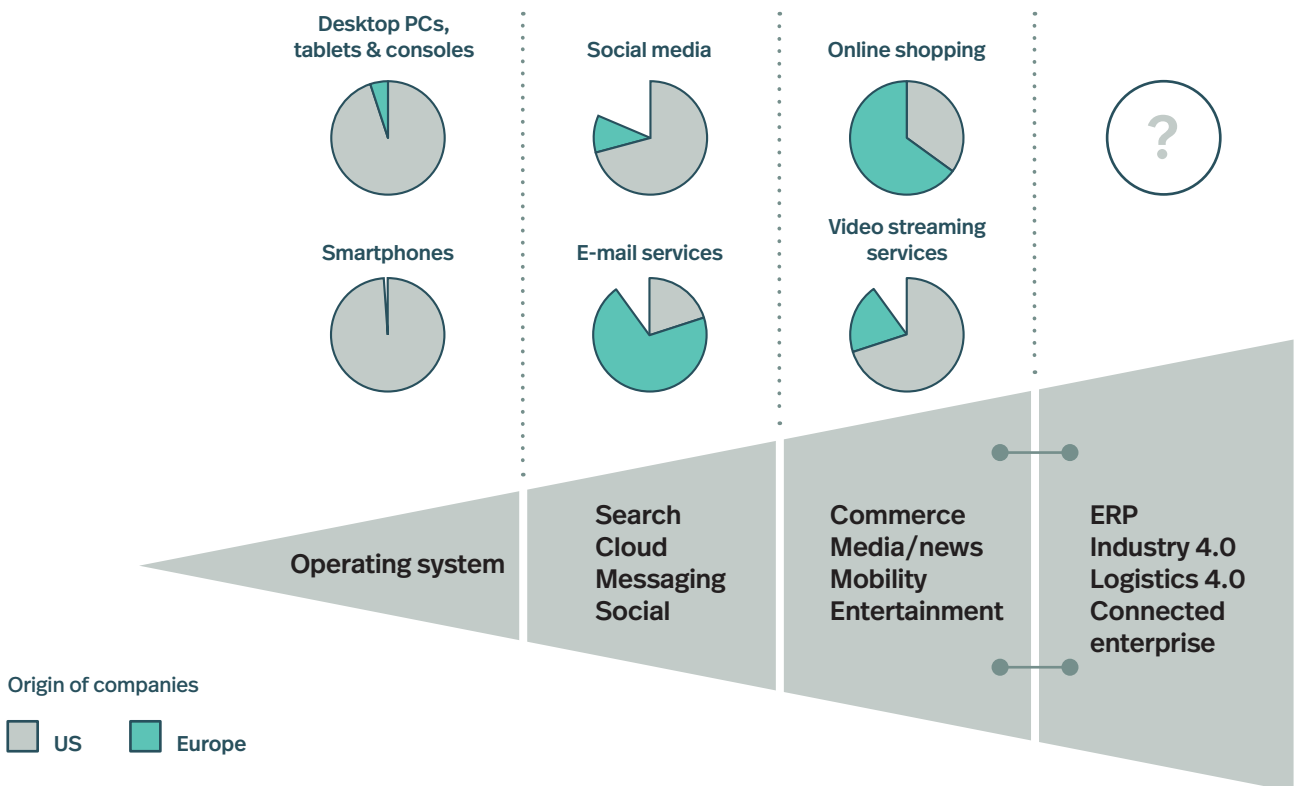
Source: Roland Berger

- There apparently is little prospect of attaining a sustainable, independent competitive position in the B2B segment without a significant footprint in the B2C market. Success or failure in the digital world is ultimately determined at the interface to the custom-

er, and that is firmly in the hands of the mostly US platform operators.

As a result, Europe in general and Germany in particular have an awful lot of ground to make up if the digital

B US providers' dominance: Leading Internet companies' market shares in Germany at each step in consumers' decision process



Source: Convios; Statista; Roland Berger

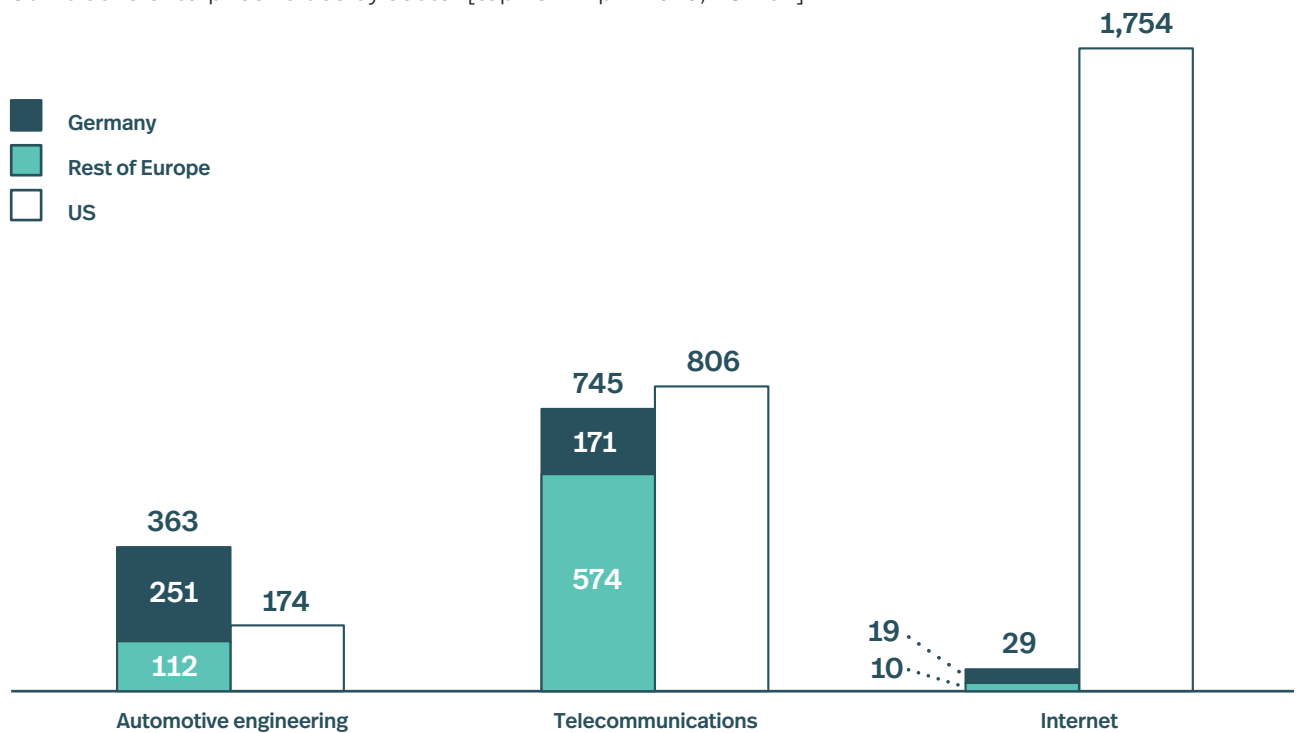
Need to catch up:
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transformation is to succeed. A glance at the enterprise value of the ten biggest companies in three selected industries is sufficient to illustrate how wide the gulf has become: →C Whereas Germany's automotive engineering sector is actually out in front of its US

counterpart and valuations in telecommunications are a fair reflection of the size of the two countries' economies, the US Internet giants are in a league of their own. Enterprise valuations make the point with alarming clarity.

C Digital asymmetry: The enterprise value* of the ten largest US Internet companies is far greater than that of global players in traditional industries

Cumulative enterprise values by sector [top 10 in April 2016; EUR bn]



*Market capitalization plus preferred equity, minority interests and debt less cash in hand and other liquid assets

Source: Bloomberg; Roland Berger



JUMP START: HOW TO MOVE INTO THE DIGITAL FUTURE

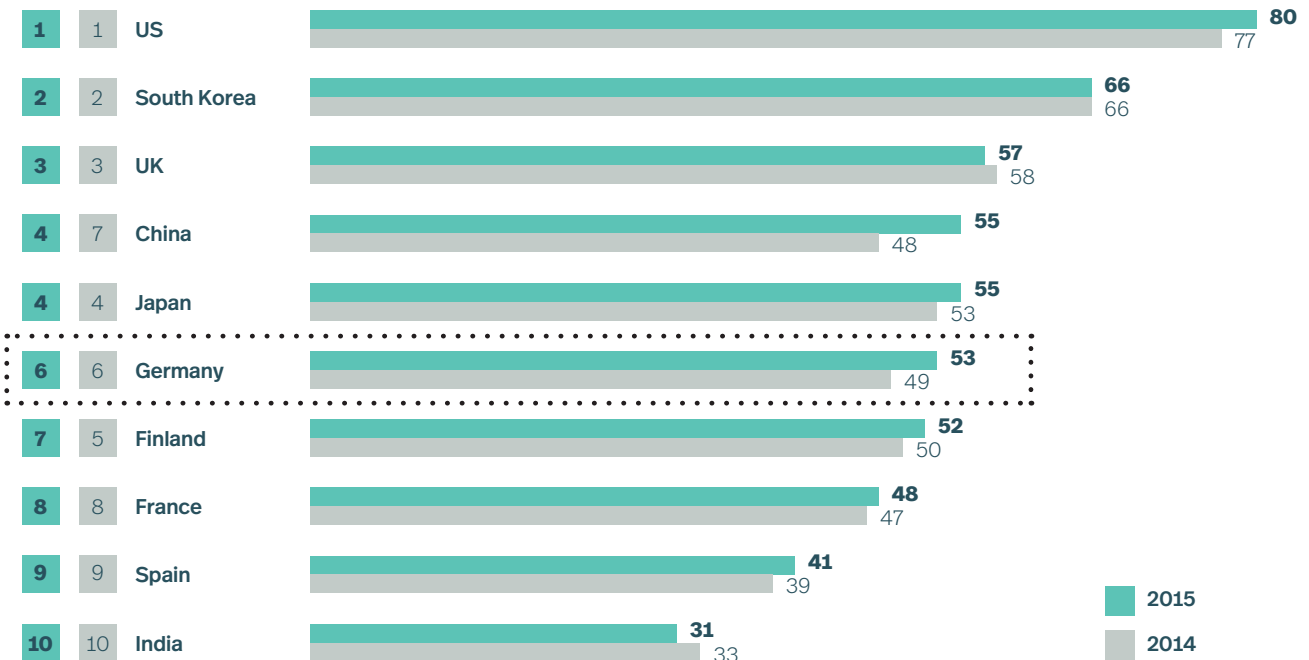
Europe – and Germany in particular – must create the conditions for an independent Internet economy. That requires substantial improvements in the following areas:

finance, infrastructure, competition, data protection, governance, digital literacy and business culture

Germany and Europe are on the defensive. Neither political entities nor the business community are making sufficiently active use of the creative options afforded by digitization. The digital transformation will be the most prominent challenge to the whole of society in the years ahead. It is therefore vital to leverage its potential and

put it to good use for future generations. The digital economy of Germany – the economic powerhouse of Europe – and other European countries must set themselves the goal of bringing forth major Internet players who, by 2025, can compete with their US rivals, and of building a working and sustainable digital ecosystem.

D Digital Location Index*: In terms of global capabilities, Germany lags way behind the leading countries – China has edged past it in the digital race



*Calculated based on the degree to which business and company-internal processes are digitized and the intensity with which new digital technologies and services are used

Source: TNS Infratest/Federal Ministry for Economic Affairs and Energy (BMWi)

Germany now overtaken by China too

A rigorously orchestrated, politically managed digital transformation would at least allow Germany to narrow the gap on the most advanced countries in the world. Two comparisons illustrate just how much ground has to be made up: According to the European Commission, around 55% of US growth between 2001 and 2011 was driven by digitization, compared to a figure of just 30% for the EU member states. Also, in the international Digital Location Index commissioned by Germany's Federal Ministry for Economic Affairs and Energy, which measures the degree to which business and company-internal processes are digitized and the intensity with which new digital technologies and services are used, Germany currently ranks sixth – way short of the US, the leading nation, but also behind South Korea, the UK, China and Japan. →D

If the digital transformation succeeds, Europe – and Germany in particular – will once again be able to bring forth innovative and highly competitive companies of global rank. If not, other countries will carve up large portions of digital value added between them.

Europe can and must gain ground

It is not too late. Think of the far-reaching changes that FinTechs, mobile payment and blockchain technologies are bringing to the financial sector. Think of the way automated driving, shared mobility and intermodal transport are revolutionizing how we get around. There are still unoccupied white spots in which Europe, and above all Germany, can call the tune and drive the European economy toward a position as "terra numerata". If that is to happen, though, courageous action is needed in seven areas.

KEY AREAS Going digital

1. Finance

50 billion to boost growth and lead the world!

European start-ups call for growth capital to close the gap on the front-running nations. In Germany alone, stimulus of 50 billion euros is needed.

2. Infrastructure

The future needs gigabit networks!

Only fiber to the basement/home delivers enough capacity to handle future real-time applications.

3. Competition

An end to data monopolies!

Dominant platforms must be regulated appropriately to ensure fair competition.

4. Data protection

More sovereignty for Europe's citizens!

Responsible consumers should be able to decide for themselves how their personal data is used.

5. Governance

Down with digital parochialism!

Digital agendas will remain nothing more than empty promises if responsibilities are not clearly assigned.

6. Digital literacy

As important as reading and writing!

Personal and corporate digital skills are essential to safeguard our prosperity.

7. Business culture

Think big, act fast, be bold!

We must change our attitude to risk and entrepreneurship in order to unleash a new "Gründerzeit".

1. Finance: 50 billion to boost growth and lead the world!

Start-ups are of critical importance to an economy's ability to compete. They are usually the early adopters of new technologies and methods and thus serve as the engine of innovation.

On the downside, start-ups frequently suffer from an unfavorable cost/risk profile. Especially amid the uncertainties of the launch phase and in the capital-intensive growth phase, they are thus dependent on venture capital. VC is over-the-counter, exit-oriented start-up and growth funding in the form of equity or mezzanine instruments. Such capital is injected by public or private investors into young (mostly scientific or technical) companies that as yet have little revenue and poor liquidity, but that are targeting strong value growth.

Realigning support for start-ups

The availability of venture capital to finance promising business launches is thus an important indicator of an economy's ability to innovate. However attractive a business model may appear, a lack of funding sources reduces its chances of market survival to a minimum. That in itself is reason enough to think about a fundamental realignment of how assistance is provided to start-ups in Europe.

The gap relative to the United States is enormous: In the US, venture capital worth the equivalent of around 53

billion euros was invested in 2015, against a paltry 3.1 billion in Germany and just under 11.8 billion across Europe as a whole. →E About 0.1% of German GDP (and 0.08% of European GDP) flows into fledgling companies in the form of venture capital, against 0.36% of US GDP. While the US economy is 4.9 times bigger than that of Germany and 1.1 times bigger than that of Europe, America's VC investments exceed those of Germany and Europe by factors of 17 and 4.5 respectively. Silicon Valley was responsible for more than a quarter of all global VC investments in 2015. Moreover, these funds find their way into different, more forward-looking targets on the other side of the Atlantic: In the US, nearly two thirds of all venture capital is channeled into firms in the digital economy, compared to less than half in Germany.

Countries such as South Korea likewise provide comparatively attractive financing models for start-ups. South Korea's Ministry of Science, ICT and Future Planning has a budget of two billion US dollars that is set aside specifically to support promising business models and cultivate a vibrant start-up ecosystem. In 2014, government-backed stimulus was given a further boost by the injection of an extra 3.2 billion US dollars.

Gap in growth finance

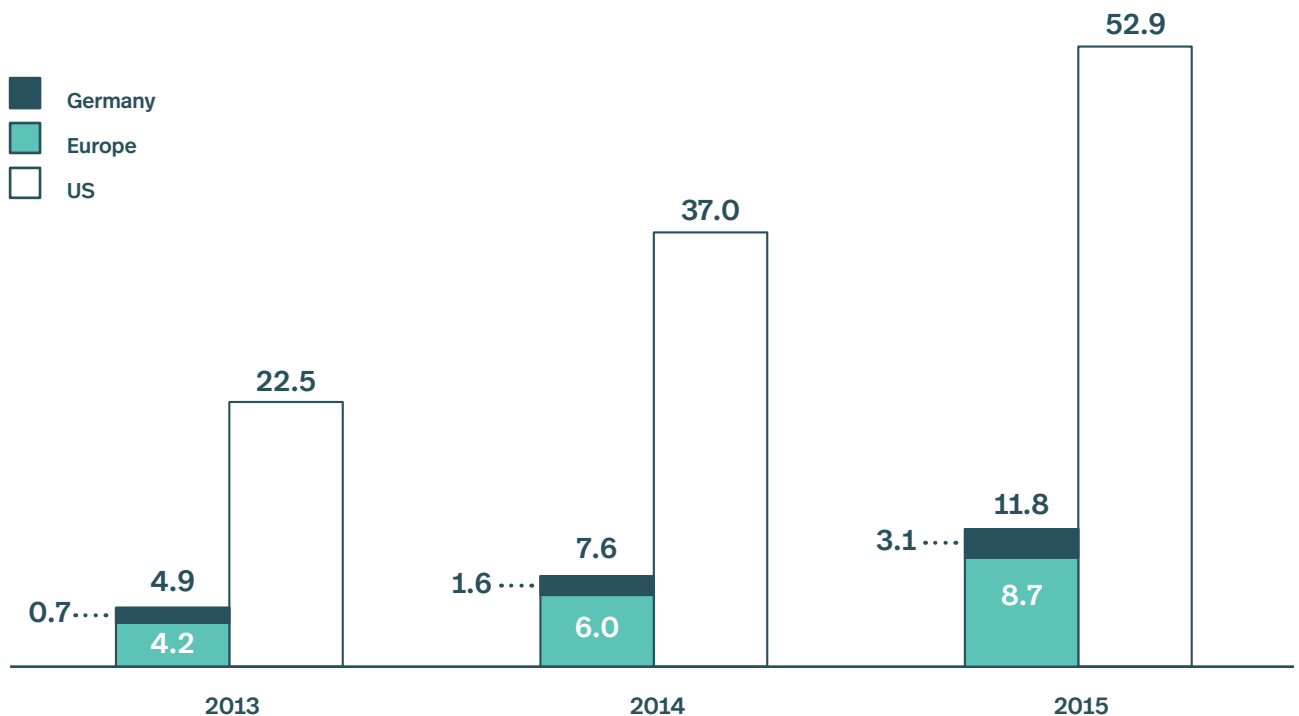
Like other European countries, Germany primarily lacks follow-up and growth financing. →F As a result, the gap between Germany and the USA with regard to later-stage venture capital is even wider – considerably so, indeed – than for VC invested during the start-up phase. Every third German VC recipient in 2015 was given more than five million euros of venture capital. The problem is that

promising business models still far too seldom make it to the subsequent growth phase – the phase that is critical to their economic success. Nor does Europe currently have much to compare with the magnitude of US mobility service provider Uber, for example, which raked in

more than two billion US dollars from its last round of financing. Recently, at least Swedish music streaming service Spotify managed to acquire around a billion US dollars of fresh capital to arm itself for the competitive battle with the likes of Apple.

E Advantage Silicon Valley: Young companies in the US have access to many times more venture capital – and Germany and Europe are falling further and further behind

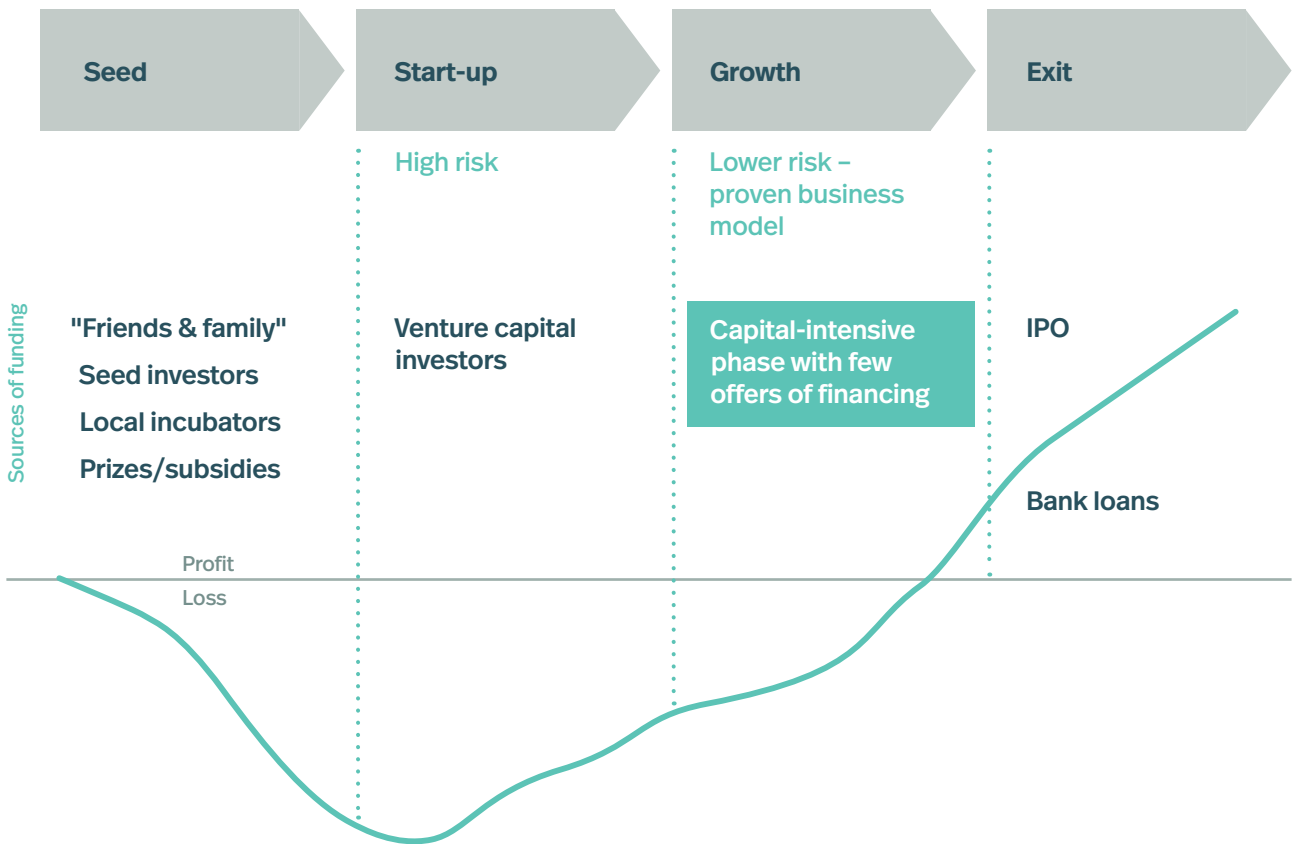
Venture capital invested in 2013-2015 [EUR bn]



Source: EY; NVCA; Roland Berger

F Lean years: German and European start-ups lack suitable offers of finance, above all in the capital-intensive growth phase

Phases and sources of financing in the start-up process



Source: IE.F; Roland Berger

The comparative immaturity of the German VC market in particular is also reflected in the lack of attractive exit options that might encourage potential investors to shoulder the inherent risks. The most appealing option for capital backers – the initial public offering (IPO) – is all but impossible in Germany at the present time. A sum total of eleven IPOs went through in 2014. Many start-ups are sold off ahead of the growth phase, as this seems to make better economic sense than taking on the burden of growth financing, access to which is difficult in Germany. The result? The economic potential that would drive fast-GDP growth and create more jobs goes to waste.

Knowledge and technology continue to "go west"

Also, US investors' huge financial firepower means that practically all the companies that buy start-ups are now based in the US. Even promising European business model innovations such as Spotify are thus in danger of sooner or later being swallowed up by US rivals. And as company shares head across the Atlantic, so too do entrepreneurs, talents, technologies, revenues and, ultimately, jobs. Exactly how a mature VC market translates into dynamic economic activity is highlighted by the following numbers: 42% of all the publicly traded US companies founded since 1974 have been funded with venture capital. Together, they account for 63% of total market capitalization and, at present, four of the country's six largest stock corporations.

That is why German and European companies need a helping hand. Even considering the different sizes of the respective economies, Germany has been short of almost 18 billion euros in VC investment over the past

three years. The figure for Europe is nearly 78 billion euros. If the US and even Asian countries such as South Korea are not to extend their lead still further, and if Germany and Europe are to build up their own digital economy as a counterweight to this dominance, bold steps must be taken. Ideas, at least, are not in short supply:

- Introduce flexibility clauses that allow regulated investors to pump (more) money into VC.
- Involve development banks such as Germany's KfW in VC funds to a greater extent.
- Give young companies equal opportunities regarding the awarding of public contracts. Requirements for references and capacity in the context of public procurement are often tantamount to protection(ism) for existing contractual relationships with large, established service providers.
- Create more incentives for young firms to engage in R&D (such as tax breaks and bonuses, especially in the initial loss-making phase).
- Create development models that use mixed financing from public and private sources. For Germany, a volume in the region of 50 billion euros, gradually ramped up over a period of five years, would make sense to close the gap with the US.

Measures that are currently in progress or in the pipeline, including development bank KfW's launch of the Coparion VC fund, are a good start. The 2025 Digital Strategy recently unveiled by the Federal Ministry for Economic Affairs and Energy likewise addresses this issue. Clearly, the need to take action has been recognized, and the prevailing climate is becoming more

“Germany has everything
it needs to catch up in the
coming years. Now, we need
to create the conditions
to make our country
competitive in the future.”



Sigmar Gabriel

Vice Chancellor and Federal Minister
for Economic Affairs and Energy

open to a large-volume program to support start-ups. However, the volume of the models introduced to date is nowhere near enough to supply the global market leaders of tomorrow with the growth capital they need and facilitate the necessary pace of acceleration.

Government subsidies can be leveraged

As they reorganize the support they provide to start-ups, European countries can benefit from the experience of the Juncker Plan. Launched as an investment offensive from 2015 through 2017, this plan had, by January 2016, already succeeded in using subordinate loans to leverage 7.5 billion euros' worth of public funds into around 50 billion euros. The underlying mechanism – risk reduction as an incentive for private investors – could in principle also be used to fund young companies in Germany, for example.

The 50 billion euros for the proposed development program should be disbursed over a five-year period. Given an average funding volume of 20 million euros, that would provide cash to around 500 companies a year. At least half of the funds would be contributed by private investors, who would face a lower default risk as a result. The public sector's role would be to offer interest rates on venture debt that are lower than current market rates. Additionally, the possibility of deferring interest for the first two years would make this approach to financing – still unusual in Germany in particular – very attractive to promising start-ups during the growth phase.

Manageable risks to the public sector

The misallocation of resources could be largely precluded because the flow of public funds would be made

contingent on investment decisions by private investors. Only if the latter were prepared to splash the cash would the government match private investment euro for euro (at most). Public investors would not suffer negative payment backflows unless the default risk climbed to roughly 40%, at which point actual losses would indeed be realized.

At a time of low interest rates and investment droughts, this kind of program could become an attractive segment for risk-aware private investors and regulated institutional investors alike. It would certainly help Europe to develop a start-up community capable of competing with Silicon Valley and even Israel – a community that could attract money from around the world. Moreover, there would be the realistic prospect of future global market leaders originating from Germany and/or other parts of Europe becoming the nucleus of a new digital ecosystem.

2. Infrastructure: The future needs gigabit networks!

A digital economy is quite simply inconceivable without the nationwide availability of a powerful, fiber optic-based infrastructure that delivers bandwidth by the gigabit. Europe must not settle for broadband goals that lack ambition: Now is the time to take the leap into the gigabit society.

Internet traffic will triple within five years

With data streams swelling relentlessly, this leap is long overdue. Global IP (Internet Protocol) traffic has quintupled in the past five years. One Cisco forecast suggests that it will triple again to two zettabytes per annum in the next five years. The growing strain on data networks can be accommodated only by an infrastructure whose very conceptual design posits the combination of the most advanced technologies.

As exponential growth continues unabated, existing targets for broadband expansion will not satisfy the need for a viable future infrastructure. As things stand, the German government plans to have 50 Mbit/s available in all households by 2018, while the EU plans to have 30 Mbit/s in place for all its citizens and 100 Mbit/s for 50% of them by 2020.

A recent study by WIK, Germany's leading research and advisory institute for communication services, nevertheless reckons that, ten years from today, a good 12 mil-

lion German households will need at least 1 Gbit/s downstream and 600 Mbit/s upstream data rates. Another 19 million households, it believes, will need bandwidths of 500 to 1,000 Mbit/s downstream and 300 to 600 Mbit/s upstream. By 2025, three quarters of all German households will therefore, in all probability, have a demand for bandwidth that cannot be met by the twisted-pair copper cables that currently cover the last mile in most cases.

The need for action is even more acute in the corporate customer segment. Two years ago, more than every second German company (54%) was already complaining about underperforming networks and, hence, about a key competitive disadvantage. And the wave of digitization has not yet reached its high water mark. High-bit-rate, quality-sensitive applications, especially in industry networks, communication, education, entertainment, transport, healthcare, energy and agriculture, →H are making gigabit networks to the end user indispensable.

Fiber the safest bet for the future

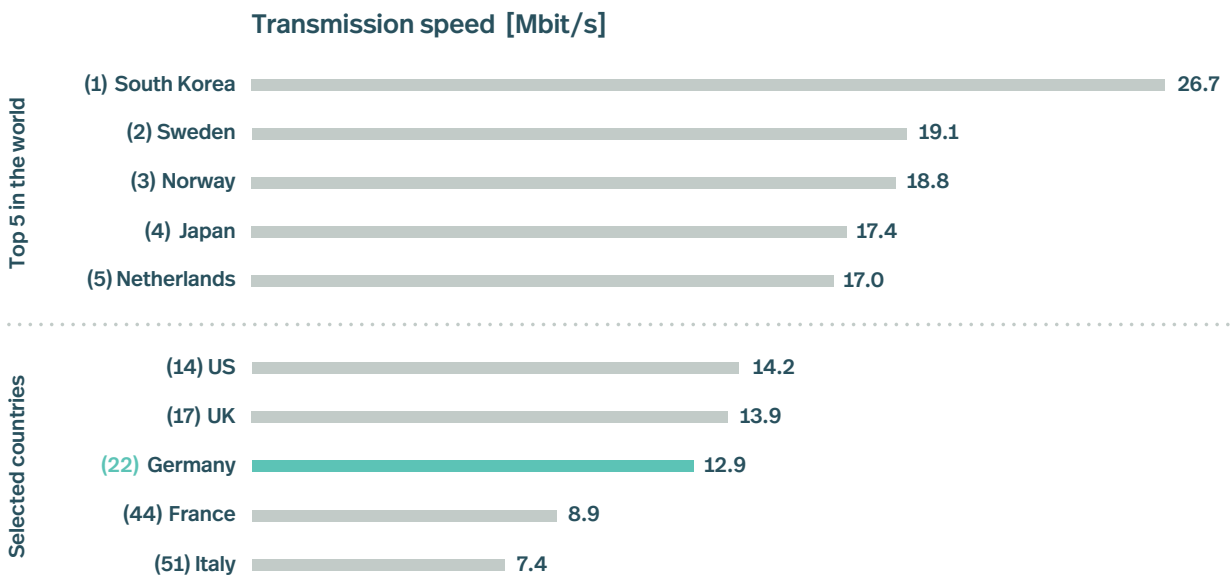
In the 2025 Digital Strategy it published in March 2016, the Federal Ministry for Economic Affairs and Energy rightly emphasized the need for a gigabit fiber optic network as the only way to satisfy retail and corporate customers' demand for bandwidth and quality in the future. Quality requirements center around reliability and accuracy of transmission, especially in the context of security-critical applications, and convenience. Hard cash is thus the key issue: In online retail, a page that takes a second to build up on screen already leads to a roughly 10% decline in turnover.

But the infrastructure in many European countries – the UK, France and Italy are all in the same boat as Germany →G – is not nearly capable of handling these growing demands for bandwidth and quality. Regarding expansion of fiber optic networks, which are the most powerful infrastructures currently available, Europe's most populous states lag way behind Scandinavia, the Iberian Peninsula and the Baltic states. In 2014, Germany ranked

fifth-last in the whole of the EU (with 4.7%), sandwiched between Poland and the Czech Republic. Sweden, by contrast, has performed the remarkable feat of raising its fiber optic network coverage by 30 percentage points to 70% in just three years. Meanwhile, generous state subsidies have helped global leaders South Korea and Japan to provide full nationwide coverage with fiber to the basement (FTTB) and fiber to the home (FTTH).

G High-speed Internet: Asia and Scandinavia top the table, Germany stuck in the middle

Average data rates [2015]



Source: Akamai

“We need ‘broadband
for all’, because a
high-speed network is
the bedrock on which
the digital future of
industry will stand.”



Ulrich Grillo

President of the Federation of German Industries (BDI)

Regarding availability of the current mobile communication standard Long Term Evolution (LTE), the situation is a little less bleak. On this score, coverage of 92% puts Germany well above the EU average. Europe as a whole claims just under 80% coverage with fourth-generation (4G) mobile networks, however, which is significantly less than the US (94% at the close of 2014). The next level – LTE Advanced, or 4.5G – is currently being rolled out and will deliver download rates of up to around 500 Mbit/s, albeit only given a correspondingly high (and expensive) density of radio cells.

High-performance mobile communication

We will have to wait at least until 2020 for the next big step forward: the roll-out of 5G. Latency of less than 5 milliseconds, network reliability of over 99.999% and transfer rates in excess of 1 Gbit/s should support even highly sensitive applications such as fully automated driving and remote surgery, laying the foundation for an Internet of Things that connects billions of smart objects to each other. Here again, however, a high-performance fixed network infrastructure is an indispensable prerequisite if data is to be fed into and out of a tightly meshed network of base stations.

Yet not even the next-generation mobile network can substitute for a leading-edge fixed network. → Why? Because, as with every shared medium, total capacity remains bound by physical and technological limits. On top of this, latency that remains stubbornly longer, limited upstream capacity and stability that depends on exogenous factors (such as weather conditions, physical obstacles and distance to the nearest radio

mast) constitute substantial drawbacks in the context of mobile-based broadband delivery.

90 billion euros needed for seamless coverage

How much will it cost to close the gap for the high-speed wired Internet in particular? EU estimates indicate that 90 billion euros will have to be invested if Europe is to meet its broadband targets for 2020. Calculations by technical service corporation TÜV Rheinland suggest that a similar amount would be needed to cover the whole of Germany with fiber optic cables (FTTB/H). Just to put that figure in perspective: Germany's national transport infrastructure plan through 2030 schedules the investment of 260 billion euros in roads, railways and inland waterways.

Investment in the network infrastructure is money well spent, because plugging the gaps will improve a country's quality and ability to compete as a business location. Empirical studies indicate that a 10% increase in broadband availability can add a good 1% per annum to per capita GDP growth. EU data also shows that high-speed Internet connectivity correlates to higher factor productivity. Finally, a broadband network bolsters SME structures and creates an environment that is attractive to trade and industry. While large corporations can have their own dedicated lines installed, small businesses in rural areas need low-cost standard solutions. That is why broadband with data rates upward of 1 Gbit/s is vital especially in these regions.

This compelling economic logic is flanked by sociopolitical necessity. Without fast, affordable Internet ac-

The high-speed applications of the future

A whole series of use cases that will need bandwidths of over 1 Gbit/s – and hence cutting-edge access technologies on the last mile to the user – are already foreseeable.



1. Internet of Things: Machinery and devices will in the future be interconnected to enable the superior control and management of processes and workflows. This will apply to Industry 4.0 applications, but also to applications in the private sector. Smart grids will capture and transmit vast quantities of data in order to optimize resource consumption in the connected households. Intelligent transport systems and connected cars will likewise demand sizeable bandwidths (both fixed and mobile) to enable efficient transport management and improve traffic safety. As driving becomes increasingly automated, the requirements will grow further still.

2. 3D applications: 3D blueprints have long been an essential ingredient in many business models, not only since 3D printing rose to widespread prominence. These design plans often take up several gigabytes and have to be made available to colleagues, customers and service providers. It takes about 15 minutes to send a 10 GB file via an Internet connection with a stable data rate of 100 Mbit/s. A superfast Internet connection (1Gbit/s) slashes this time to well under two minutes, allowing such transfers to be integrated far more efficiently in working routines. It also enables large files to be processed collaboratively and, in some cases, in parallel.

3. E-health: Both high-resolution videos and data for, say, the robot performing an operation must be streamed simultaneously for telemedical treatment. Running several such applications in parallel requires very fat bandwidth pipes and minimal latency. In the near future, data-intensive real-time applications such as the transmission of vital parameters will only add to bandwidth demand.

4. Home entertainment: In the medium term, data transfer rates of more than 1 Gbit/s will be needed above all to permit the use of high-resolution streaming services (in parallel, in some cases) for audiovisual consumption, videotelephony and multiplayer online games. More and more customers are already sourcing even linear TV programs and add-on offerings over the Internet. In the EU-21 countries, the number of smart TVs will rise from 39 million units today to 118 million in 2018.

5. Industry 4.0: Industry 4.0 is the term given to connectivity across the entire value chain, which is transforming rigid supply chains into highly flexible networked value chains. This is possible only if the relevant actors (machines, suppliers and customers) can communicate and exchange data with each other in real time. The resultant information density in turn opens the door to advanced levels of automation – but also presupposes fast and reliable broadband links.

6. Agriculture: Connectivity is driving up data volumes in agriculture too. Well-developed mobile broadband networks are essential if agricultural machinery is to be able to send and receive data in the field, e.g. in order to accurately dose seeds and fertilizers.

7. E-learning: Massive and selective open online courses (MOOCs and SOOCs) are new forms of virtual teaching events that participants can attend over long distances. In many cases, even real-time interaction with other participants is possible. Substantial bandwidth is needed to handle both live image transmission and the sharing of tuition materials.

cess, the digital divide in the population threatens to become a gaping chasm, as economically underdeveloped regions get left behind and see their populations dwindle. Germany already has a perceivable west-east and south-north digital divide.

The problem is that there is no business case for nationwide broadband coverage. Estimates assume that up to 80% coverage with 50 Mbit/s rates (or a far lower percentage for higher data rates) could be realized without subsidies. Federal government has understood the dilemma and launched a new 2.7-billion-euro development program. Together with the various programs run by Germany's federal states, this puts more than five billion euros in the pot for high-speed Internet. This sum, however, is too little to reach even the minimum targets. We therefore need to think again about new ways to finance and operationalize expansion of the broadband network. Here are a few suggestions:

Finance

- (More) KfW development support
- Access to private capital, e.g. via structured financial products with risk-adjusted returns
- Reduction of expansion costs (trenching, overground cables, sharing of infrastructure with energy and transport) by up to a quarter
- Tax deductibility of company and home connections

Operationalization

- A clear regulatory focus on competitive expansion of the most high-performance infrastructure (> 1 Gbit/s)
- More extensive regional clusters (5% of subscribers

are spread across a third of the country and thus account for a quarter of total costs!)

- Training of local players (broadband office)
- A central project management authority at municipal level
- Standardization of cable connections to buildings
- Demand-side stimulus (e.g. marketing support)

A package of measures can help the market overcome the aversion to risk evidenced by the current "slow mover contest". The three most important objectives are these:

First, private capital must be mobilized and regulation must become more stable and predictable. Only then will funding be found for risky projects that tie up capital for long periods and sometimes involve challenging payback scenarios.

Second, dynamic competition has to be jump-started. Experience in most territorial states suggests that there is no first mover advantage to offset the risks of investing in nationwide broadband expansion. To prevent the initial competitive dynamism from fading into mere incremental improvements to the existing infrastructure, the government must step into the ring more forcefully and create financial incentives for network expansion in the gigabit realm. →J However, this involvement should neither discharge the corporate community from its responsibility to invest, nor should it restrict competition.

Third, net neutrality (i.e. equitable, discrimination-free data transport on the Internet) must be further developed

Advantages and drawbacks of different broadband technologies



Not all network access technologies are universally applicable – and only one meets the most exacting demands for bandwidth and transmission quality.

Technology	Description	Advantages	Drawbacks
Vectoring	<ul style="list-style-type: none"> • Virtual upgrade to existing copper-based telecom lines • Reduction of interference thanks to the coding of entire cable bundles 	<ul style="list-style-type: none"> • Transfer rates of up to 100 Mbit/s • Use of existing infrastructure means less need for investment 	<ul style="list-style-type: none"> • Short ranges (no more than 1 km around the serving area interface) • Physical/technological limits to further development • Competitive issues unclear
Fiber optics (FTTB/FTTH)	<ul style="list-style-type: none"> • End-to-end fiber optics (fiber to the basement/home) 	<ul style="list-style-type: none"> • Outlook for transfer rates of well over 1 Gbit/s • Unlimited range • Maximum quality of service 	<ul style="list-style-type: none"> • Need for heavy investment
CATV	<ul style="list-style-type: none"> • Connection via coaxial TV cable based on the DOCSIS 3.x standard 	<ul style="list-style-type: none"> • Transfer rates of up to 400 Mbit/s • Use of existing infrastructure means less need for investment • Flexible upgrades (hybrid cables) 	<ul style="list-style-type: none"> • Low coverage (60% of German households) • Lower bandwidths than technically feasible in practice (shared medium) • Competitive issues unclear
LTE Advanced/ 5G	<ul style="list-style-type: none"> • Fourth to fifth-generation mobile communication standard (4.5G/5G) 	<ul style="list-style-type: none"> • Transfer rates of up to 500 Mbit/s (LTE-A) 	<ul style="list-style-type: none"> • Additional investment (more radio cells) needed for high bandwidths • Lower bandwidths than technically feasible in practice (shared medium) • Clarification of frequency requirements needed
Satellite	<ul style="list-style-type: none"> • Connection via geostationary satellites (like TV broadcasts) 	<ul style="list-style-type: none"> • Transfer rates of up to 150 Mbit/s • (Co-)Use of existing infrastructure • No geographical restrictions 	<ul style="list-style-type: none"> • Unsuitable for quality-sensitive applications because of high latency • Lower bandwidths than technically feasible in practice (shared medium)
Microwave radio relay	<ul style="list-style-type: none"> • Point-to-point connections based on radio technology 	<ul style="list-style-type: none"> • Transfer rates of up to 1 Gbit/s • Little need for investment • Ability to plug isolated gaps 	<ul style="list-style-type: none"> • Short ranges • Lower bandwidths than technically feasible in practice (shared medium) • Vulnerable to weather conditions • Ill-suited to the mass market

in line with modern needs. On the one hand, net neutrality creates ideal conditions for fair and dynamic competition and a level playing field for large and small companies alike. On the other hand, it is only a matter of time before security-sensitive applications in the context of automated driving, for example, make it necessary to depart from "absolute" net neutrality. Sensitive further development of this fundamental regulating principle in connection with more pronounced price differentials for different demand scenarios, especially at the high end, would appear necessary from a present perspective. Such an approach could also play a part in making it easier to finance investments in infrastructure. In this way, a whole new market segment for high bandwidths and top-level quality of service could be opened up.

The Achilles' heel of Germany's digital economy

An underdeveloped network infrastructure is regarded as the Achilles' heel of the German digital economy, like many others, alongside the shortage of skilled and specialist labor and too little emphasis on exports. The most advanced technologies must be combined if the existing gap is to be filled on a permanent basis. Economic and sociopolitical needs demand the nationwide expansion of a competitive infrastructure to shore up quality of life, prevent the exodus of both companies and the labor pool, lower unemployment and stimulate innovation.

Having said that, companies should not take the current lack of broadband connections in Europe's most populous countries as an excuse to put the digital transformation on the back burner. On the contrary, forceful digital players will increase the pressure for action on

the infrastructure front: Witness the US, where Google began by developing a gigabit network in eleven pilot regions, largely at its own expense.

Europe's digitization strategy should look far beyond 2020

For the reasons discussed above, German and European broadband policies need to be realigned. Their horizons should look far beyond 2018 and 2020! Maximizing broadband coverage with the highest possible bit rates should be anchored in Europe's digitization strategy, as this is the only way to meet the digital society's need for economic development options and social participation. It is equally important to learn the right lessons from the past – and from the example of the US. Europe's unique selling proposition – intensive network competition coupled with the expansion of high-bit-rate broadband – will empower its economy to realize the necessary transformation and occupy a leading position in the digital world.

High-speed Internet: Learning from others



There is no single solution that meets every need. But broadband expansion in territorial states has revealed a number of workable approaches.

Development models

As far back as the early to mid-1990s, Japan and South Korea began injecting generous subsidies into the installation of high-bit-rate infrastructures as part of national development plans. Over the past 20 years, South Korea alone has pumped more than 100 billion US dollars into the Korea Information Infrastructure (KII). Like Japan, it has given its backing to intensive competition. Both countries today have the most densely packed fiber optic networks of all territorial states.

Stimulus models

To varying degrees, Australia, New Zealand, Switzerland and France are all playing the card of state involvement. Australia has assigned the task of building the network to a state-owned entity, the National Broadband Network Company, which makes an intermediate product available to service providers at a regulated price. Step by step, legacy incumbents are being forcibly migrated to the modern network, so network ownership and operation are gradually being separated. In New Zealand, infrastructure development is entrusted to private enterprise but licensed by the government and separated (in terms of corporate structures) from the marketing of services. Network development in Switzerland is being driven jointly as part of a universal public service obligation by Swisscom and the energy utilities, who together are adopting a "multi-fiber approach" that is without equal anywhere in the world. Lastly, French companies that develop infrastructure in economically weak regions (in some cases based on co-investment) receive government subsidies and a network license for up to 30 years, depending on their model. In return for this territorial protection, they must grant open access to alternative providers, thereby ensuring discrimination-free access to the entire network infrastructure. Up to now, however, incentives for network development have been too weak to trigger the dynamic expansion that would be needed in rural areas.

Market-driven models

The US and Sweden are putting their money on market-driven broadband expansion. In the US, telcos and Alphabet/Google are stepping up their investments in fiber optics: the former because of the dominance of the cable companies to date (with market coverage of over 90%), and the latter in eleven pilot regions to begin with. However, the lack of competition between providers, caused by regulation, leads to comparatively high consumer prices, as well as to limited offerings in some cases. In Sweden, competition between telcos and municipal utilities has been the main driving force behind network expansion. Also, a regulatory unbundling obligation (opening local loops to connection services from third-party providers) is fueling further competition for fiber optics.

Success factors in all three models: Government initiatives coupled with dynamic competition!

When called on to act as project sponsors, regional authorities often lack the necessary expertise. That is why assistance is needed in the form of broadband offices, for example. Except in the US (where we have already seen the consequences for price levels), discrimination-free (technical and economic) access for alternative providers freshens up competition and thus drives both innovation and network capacity utilization.

3. Competition: An end to data monopolies!

Platform operators occupy a pivotal position in the digital ecosystem. On the one hand, they act as "market makers", creating cross-side network effects for providers and users of content, goods and services. These primarily include operating systems, search engines, news aggregators, trading exchanges of all kinds, payment systems, social networks, streaming services, app stores and offerings in the sharing economy.

Platforms personalize and control Internet access

At the same time, platforms fulfill an important filtering function by personalizing the Internet and picking out suitable offerings from the masses of material available. Their knowledge of customers allows them to create attractive new bundles of products and services for users. In both of these roles, they frequently serve as genuine innovators. Of all digital start-ups, they therefore have the greatest likelihood of survival.

Platforms need to grow fast. They live or die by the ability to position themselves as intermediaries with large numbers of users and, as they coordinate market activities, by accumulating proprietary knowledge in the form of customer data. To put it bluntly, users are not so much their customers as their products, and platforms' knowledge of their customers is worth its weight in hard cash. The kind of sums involved are illustrated by the fact that around 30 to 50 US dollars per user have been paid in past M&A transactions.

Given their unique market position, some platform operators dominate an entire ecosystem – with far-reaching implications:

- Platforms tend toward monopolization. In many cases, only one platform reaches critical mass in each market segment ("winner takes all").
- There is little accountability for their "black box" usage of extensively collected customer data.
- Business relationships with platforms are starkly asymmetric: A pronounced power imbalance exists between the two sides.
- Platforms operate as gatekeepers, gaining a competitive advantage by occupying the interface to customers and possessing sovereignty over data.
- They disclose no information about the algorithms they use. Their filter criteria frequently appear to be market-driven.
- Their business models are similarly opaque (based on commissions). They attempt to establish discriminatory best-price guarantees.
- They are responsible for a large percentage of networks' data volume, but bear little or nothing of the cost of the infrastructure (the problem of "free-riding").
- Contractual terms and liability issues are often unclear.
- They cut themselves off from the open Internet. In extreme cases, such as Facebook, they become exclusive organizations to which there is no alternative.

As far as competition is concerned, one major worry is that the concentric way in which the Internet economy works puts platform operators in a position to build data monopolies. Lock-in mechanisms such as those used by

“Competition has
to stay fair – be it in
digital markets or in
traditional ones.”



Margrethe Vestager
EU Commissioner for Competition

Android →K are augmented by network effects: More users generate more benefits – either directly, through an exponential increase in possible links (Metcalfe's Law), and/or indirectly, through a growing number of potential transaction partners (as more demand attracts more providers: the theory of two-sided markets).

A business model like a perpetuum mobile

Taken together, these effects transform the business model of platform operators into a veritable perpetuum mobile. Every new user increases customer knowledge. Ever more extensive customer knowledge makes the platform increasingly attractive, driving smaller rivals out of the market – in extreme cases until only the last man is left standing. By this stage, platform operators possess a data monopoly that is almost impossible to break into. Even if new players do attempt to enter the market, every user who leaves the monopolist platform faces steep switching costs.

Numerous platform operators amplify these concentration-enhancing network effects by adopting practices that are questionable in light of competition and data protection law:

- Germany's Federal Cartel Office has initiated proceedings against Facebook because it believes the company does not provide users with sufficient information about what happens to their data. The allegation is that, in this way, Facebook is abusing its dominant market position. The Cartel Office thus sees a possible link between data protection law infringements and methods that violate competition law.
- The French data protection authority CNIL is also concerned about the fact that the company even records the data trails of Internet users who do not have Facebook accounts. Moreover, it does so using a cookie placed without consent when people visit publicly accessible Facebook pages such as event announcements. The cookie constantly collects information about user behavior on websites that use a Like button and sends the data to Facebook.
- Germany's Federal Court of Justice has declared Facebook's long-standing practice of sending unauthorized registration requests to non-members to be inadmissible. However, a number of faits accomplis have emerged in the course of the five-year lawsuit.
- The European Commission is investigating Google on a number of counts. The company is, for example, suspected of systematically giving preference to its own products in search results. Beyond that, Google is accused of violating competition law by preinstalling apps on smartphones, illegally creating links to its own products and obstructing modifications to Android.
- Back in September 2015, the Russian competition authority found that, by forcibly preinstalling its own services within the framework of the Android operating system, Google was in violation of current competition law. Google's appeal against this verdict was rejected.
- The European Commission and the German Federal Cartel Office are investigating a complaint against Apple and Amazon subsidiary Audible.com. The two firms are suspected of having concluded an exclusivity agreement for audio books at the expense of rival players. The Federal Cartel Office has also prohibited Amazon's use of best-price clauses under which

third-party providers are not allowed to sell their goods at a lower price anywhere else.

Protecting discrimination-free market access

Advertising, business and data use practices of this kind are by no means the least reason for platform operators' de facto monopoly. However, it is virtually impossible to do anything about them under the existing provisions of competition and antitrust law. To prevent the emergence of monopoly structures in the digital economy, the conditions of competition must be designed to create a level playing field and give offerings that originate in Europe discrimination-free access to the market. Here are some suggestions:

First, what is known as "home country control" must systematically be replaced by a "place of supply rule" if the fair conditions are to apply to all competitors.

Second, data must be recognized as an independent source of value creation. The absence of fee-paying business relationships must no longer be allowed to prevent or hinder the filing of competition lawsuits. Although the number of users and the volume of data are de facto at least as important as revenues, competition law as it stands makes no provision for this circumstance. Issues such as the number of users, the scope of data and the transaction volume should therefore be taken into account in the supervision of mergers from the perspective of competition law.

Third, full interoperability of platforms with the open Internet and with products from other suppliers must

be guaranteed. There should be no de facto standards that contradict this principle.

Fourth, it is time to think about a European cloud solution (see 4). At a trusted location governed by EU law, this solution could store sensitive customer data and, subject to users' authorization, be made available to other companies.

Fifth, applying these rules consistently should ensure that no platform operator can achieve a monopoly-like position in upstream or downstream links in the value chain, such as advertising. Today, Alphabet/Google accounts for around two thirds of online advertising business in Germany (and thus generates total revenues in excess of any German media company). A dominant platform must adopt a neutral stance in respect of all upstream and downstream value chain links. If this does not happen, there is the danger that platforms could morph into vertical monopolies that can dominate a whole industry as they see fit.

The minimum requirement for a free market economy – indeed for an open society – has to be freedom of choice. Companies must not be allowed to obstruct or even prevent competition. As good corporate citizens, they should also make their business practices transparent and spell out to users what happens with their data. Any market economy worthy of the name must tear down barriers to entry and enable genuine, fair competition on a level playing field.

Caught in the system

K

How Android chains customers to Google

Open – or not so open?

Android is a Linux distribution, i.e. essentially an open source platform. However, since it came on the market in 2008, the Open Handset Alliance founded by Google has continued to develop only the platform's proprietary add-ons. Frozen in its original state, the basic open source version is thus technologically obsolete. The resultant "closed source creep" and the control of interfaces to Android-compatible apps effectively excludes non-members of the Alliance from using the operating system, while members find themselves caught in a closed ecosystem.

In the firing line

The isolationist policy of the Open Handset Alliance has repeatedly sparked debate. Yet competitors such as Microsoft and Nokia go still further in their criticism, alleging that Google is using Android as a Trojan horse to monopolize the mobile communication market and control user data. They also argue that having killer apps such as Maps, YouTube, Gmail and Play Store preinstalled on Android smartphones and linked to user accounts is an illegal form of discrimination against competitors.

What is the alternative?

Android gives Google a nearly 75% share of the global market for mobile operating systems. Some manufacturers, such as Samsung, are now trying to free themselves from Google's clutches by developing and maintaining redundant "bloatware" as a fallback option. For customers, Apple's iOS is almost the only viable alternative. All other mobile operating systems together account for a global market share of just 7%.

Latest developments

On April 20, 2016, the European Commission sent a statement of objections to Google regarding Android, stressing that the company has, in breach of EU anti-trust rules, abused its dominant position by imposing restrictions on Android device manufacturers and mobile network operators. In the view of the Commission, Google seems to be harming consumers by stifling competition and restricting innovation in the wider mobile space. A further investigation will follow.

4. Data protection: More sovereignty for Europe's citizens!

The principal currency used for payment on Internet platforms is not dollars or euros. It is data. This fact is precisely where regulatory approaches that focus solely on revenue miss the point. To put it bluntly: Make an entry in a search screen or log into a social network and you are effectively signing an order to sell your personal data.

Even the most intimate information – about sexual orientation and religious or political worldview, for example – is gathered. Facebook's customer data builds a comprehensive personality profile. Amazon knows our consumption behavior better than our life partner. Eric Schmidt, former Google CEO and serving Chairman of the Supervisory Board at Alphabet, goes even further: "We want to predict customers' wishes before they know them themselves. We will know what they want before they do."

Most EU citizens claim to be unhappy with these practices. Various surveys attest that at least two out of three Europeans express concern at the lack of control over their personal data and call for stricter data protection rules. Partly due to the experience of history, these reservations are especially pronounced in Germany, where nearly nine out of ten users find it unacceptable that online applications automatically access their personal data.

Fanned into flame by the disclosures of Edward Snowden, for instance, this mistrust has far-reaching

economic implications. Skeptical citizens are more cautious about using the opportunities afforded by digitization. According to the European Commission, the possible misuse of data (particularly credit card abuse) is one of the primary obstacles to online retail. Even companies themselves see the guarantee of data protection as a huge problem – all the more so now that the European Court of Justice has declared the Safe Harbor agreement with the US to be invalid.

The issues at stake are fundamental ones. Tremendous importance is today attached to user data as a source of innovation. The significance of data-driven business models will increase further, so there is a need for data protection that facilitates business model innovation without compromising elementary freedoms such as the right of individuals to decide what is done with their information and by whom ("informational self-determination"). Too many innovative business models fall at the hurdle of legal uncertainty!

Personal data protection: Wanted by everyone, but hard to find in practice

It is possible to strike a balance between workable data protection and the safeguarding of innovative potential. Consumers are perfectly willing to share personal data, provided they see commensurate benefits to themselves. Experts talk about the "privacy paradox": In theory, most Internet users insist on strict data protection. But then they go online, access a platform and willingly disclose their data, accepting terms and conditions they have usually not even read with a careless click of the mouse. They do so because they are un-

aware of alternatives (to Google, for example), or because there really are no valid alternatives at the moment (to Facebook, for example).

Freedom of choice and decision-making autonomy

What we need is not data protection at all costs, but greater data sovereignty. After receiving comprehensive instruction, consumers should decide for themselves what data they wish to share and what they do not. Moreover, these decisions should be made in a context of genuine freedom of choice.

First steps in this direction have already been taken. To prevent abusive practices, the EU has given itself a new General Data Protection Regulation, although this will not come into force until 2018. The regulation aims to create greater legal consistency and certainty, for example by improving access to data and introducing the right to be forgotten, the option of data portability and the requirement for companies to notify customers if user data is hacked.

The legal position will nevertheless remain unsatisfactory in the future. Above all, there is no guarantee of identical implementation across all member states.

On the one hand, the new General Data Protection Regulation will strengthen the position of leading US platform operators at the expense of European and German sector specialists. Close ties to users (especially users of operating systems) and the sheer indispensability of their digital ecosystems (communities) will ensure that the former gain untroubled and extensive access to all

the consents they require, while specialists will have to beg for similar opt-ins separately for each and every one of their applications. At the same time, the latter will even be prevented from using pseudonymized customer information, i.e. aggregated and not individually traceable data derived from cohorts.

Additionally, the fact that Safe Harbor has been declared invalid creates a legal vacuum. Businesses do not even know whether the alternative legal foundations (standard contractual clauses and corporate binding rules) will enable the legally watertight transfer of personal data across the Atlantic in the medium term. For every company that has offices abroad, this is an untenable situation.

Dragging the use of personal data out of its legal gray area

Business models that depend on fast-moving data flows must not be forced to exist in a legal gray area. Today, the flexible use of personal data is a core factor of competition, and combining complementary data frequently lays the basis for innovative business models. To take one concrete example: Experts expect that, in the healthcare sector, real-time vital parameters will trigger the next medical revolution and will have a greater impact on public health than new therapies.

The conditions for sensible and legally certain data protection have yet to be put in place:

First, it must be recognized that unhindered access to adequately protected information and the flexible use

“Digitization is
about nothing less
than the question of
how we want to live
in the future.”



Martin Schulz

President of the European Parliament

of unclassified and pseudonymized data are indispensable factors of production in the digital economy. Failure to differentiate between data that genuinely merits protection and data that is only useful in the context of cohorts weakens the competitive position of innovations from Europe and effectively gives one-sided benefits to platform operators, especially those that enjoy light-handed US regulation. Nor is that all: Treating pseudonymized data and data that can be linked to an individual person as one and the same thing ultimately weakens data protection. Since the effort involved is the same, most companies will ask their customers to opt in to the processing of personalized raw data, which is more valuable to them. That is why EU law too should permit firms to use pseudonymized data without the need for additional explicit consent.

Second, data protection cannot be used as the knock-out argument against any form of transparency in heavily regulated industries. Germany's experience with the electronic health insurance card shows that the potential afforded by digitization can only be put to good use if an unambiguous legal foundation has first been laid. Current practices (such as sending doctors' letters in unencrypted e-mails) effectively pose a much greater threat to data protection than legally regulated central data storage, from which considerable positive effects on the economy could be gained – effects that would have a direct and tangible impact on every citizen!

Third, personal data belongs to the citizen. Each citizen must be able to take their data with them at any time. Moreover, assuming full information has been

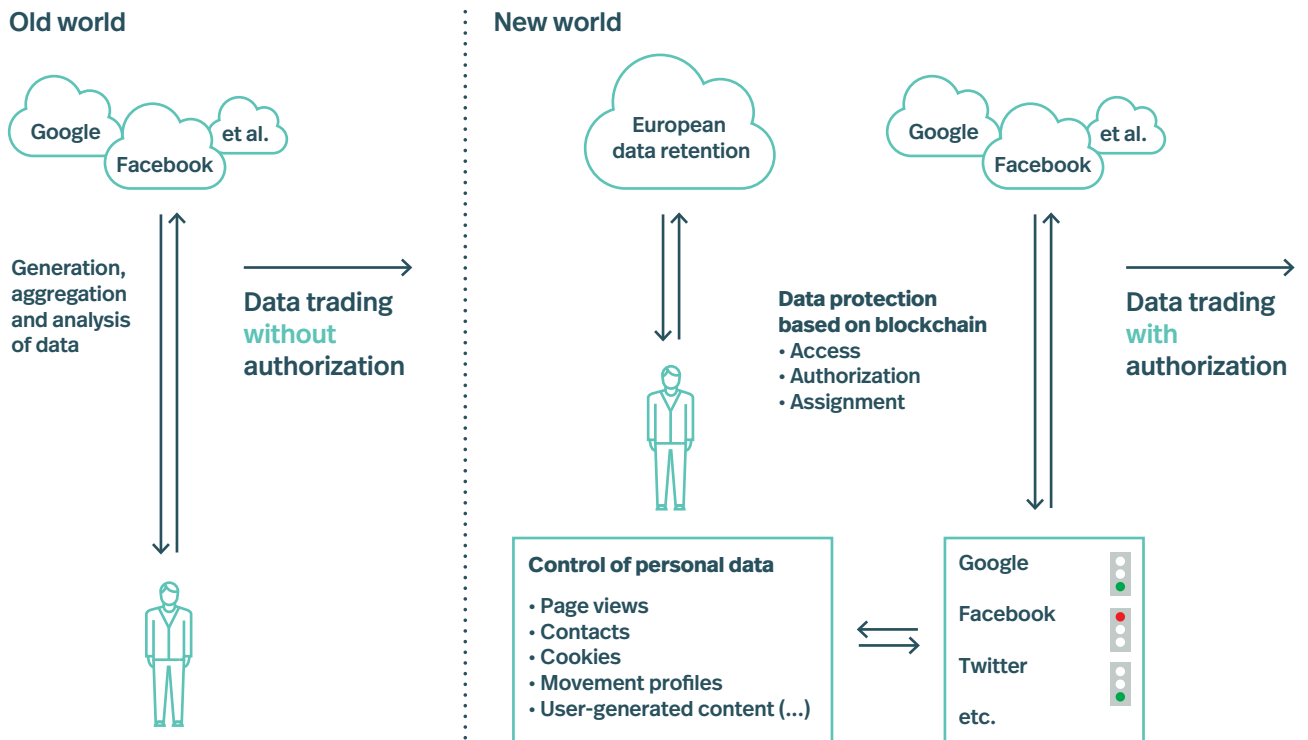
provided in advance, it is up to citizens to decide which offers they wish to use and which they prefer to decline.

Fourth, it is time to think about a ground-breaking European data protection solution rather than continually complaining about the competitive practices of platform operators and the supervisory practices of US authorities. The systematic build-up of an EU data protection organization and a European cloud solution →L could provide just such a major breakthrough, allowing European citizens' data to be stored safely in accordance with EU law and protected from access by foreign secret services, for example. Also, if a European data retention instance were set up, firms based in the EU would no longer have to export their data to the US.

Robust data protection as a European USP

Regulations to this effect – drafted within a clearly defined legal framework – would facilitate development of the data-driven business models that are crucial to Europe's future as a force to be reckoned with in the digital economy. The ability to establish central databases and, subject to the condition of customers' sovereignty over the data, the permission to use them will be critical to future development of the digital economy throughout Europe. At the same time, the associated high level of data protection would largely preclude the possibility of abuse, thus giving Europe a competitive advantage over unregulated offerings.

L Guarded against unauthorized access: A European cloud solution could give EU citizens greater data sovereignty



Source: Roland Berger

5. Governance: Down with digital parochialism!

Across much of Europe, digital transformation gives the impression of being an uncontrolled, ad hoc process. Since 2014, the most important competencies at the European level have been concentrated in the hands of Günther Oettinger, the EU's Commissioner for Digital Economy and Society. Margrethe Vestager, Commissioner for Competition, possesses complementary competencies in the field of competition law. The work of both is coordinated by Andrus Ansip, Vice President for the Digital Single Market. While not exactly friction-free, this model of shared responsibilities has given efforts to map out a European digital strategy far greater traction. By contrast, parochialism is still the order of the day in most member states. With the exception of Belgium, Poland and Romania, no EU country yet has a ministry or government department dedicated to digital issues.

Party politics and dysfunctional rivalries

An end must be put to the incessant political wrangling at the national level. The situation in Germany is particularly confusing: →M Sigmar Gabriel, Minister for Economic Affairs and Energy, sees digitization through the filter of economic interests and competition policy. Thomas de Maizière, Minister of the Interior, represents the security policy standpoint, while Minister of Transport and Digital Infrastructure Alexander Dobrindt is responsible for network expansion. Other ministries that also have a finger in the pie include the Ministry of Education and Research (which oversees science, tech-

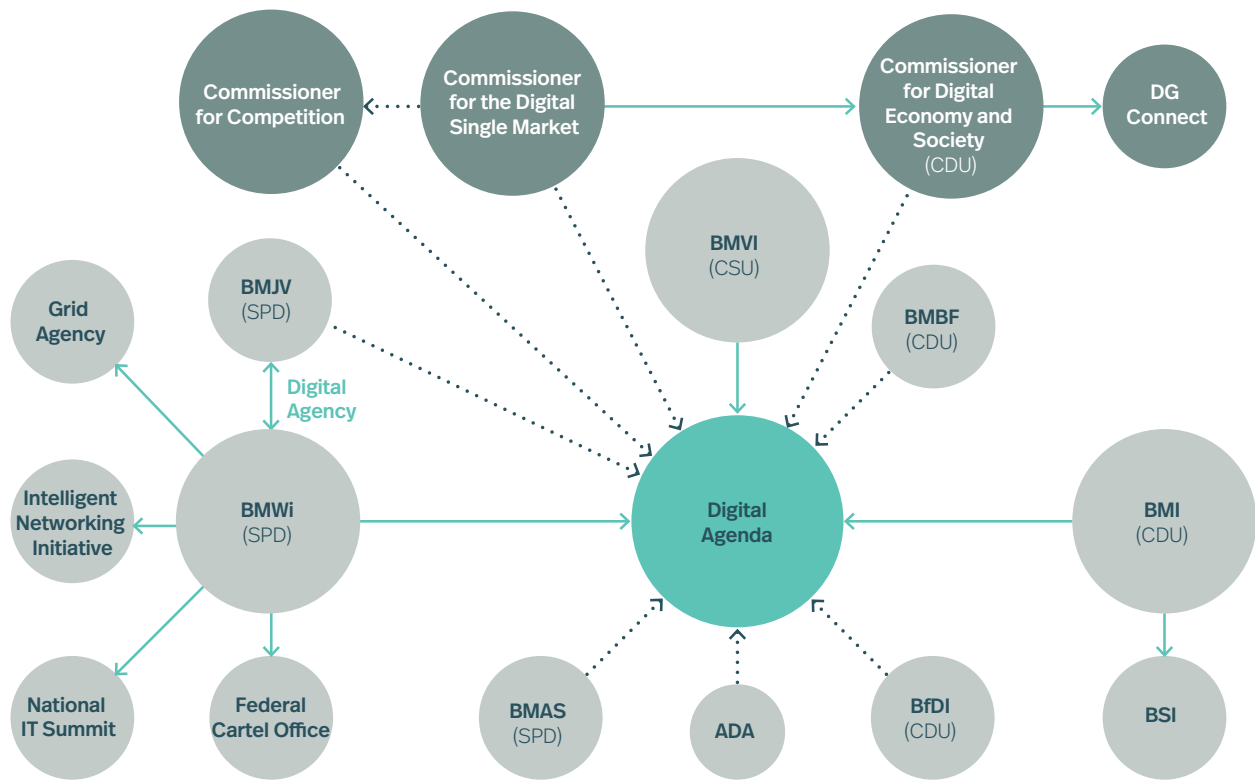
nology and the media), the Ministry of Justice (consumer protection and legal policy) and the Ministry of Labor and Social Affairs. This piecemeal split of responsibilities, coupled with meticulous attention to proportional representation for the parties that make up the Grand Coalition government, ultimately nurtures a spirit of rivalry between ministries and departments that makes the whole construct little short of dysfunctional.

Ministerial wrangling over who is in charge of what

As things stand, the ministers responsible are repeatedly finding themselves caught up in petty party political bickering. To take only the most recent example: The two SPD-led ministries in charge of economic affairs and justice proposed a digital agency that would oversee competition, market and consumer topics. The immediate riposte from the Ministry of Transport and the government's Commissioner for Data Protection (both representing the CDU/CSU), however, was to call the whole idea into question. The Ministries for Economic Affairs and Transport in particular haggle over who is responsible for what. Inefficiency and the duplication of structures has been the outcome.

Germany's federal agencies seem to be entangled in the same questioning of authority. The Cartel Office and the Grid Agency report to the Ministry of Economic Affairs, while the Office for Information Security is overseen by the Ministry of the Interior. Commissioner for Data Protection Andrea Vosshoff only saw her office carved out of the latter ministry at the insistence of the EU. One widespread criticism is that ministries are happy to point the finger at each other whenever anything doesn't work.

**M Responsibility sharing, German-style:
Few European countries have harmonized digital governance**



EU
 Germany
→ Direct influence
····→ Indirect influence

BMWi Federal Ministry for Economic Affairs and Energy
BMVI Federal Ministry of Transport and Digital Infrastructure
BMI Federal Ministry of the Interior
BMAS Federal Ministry of Labor and Social Affairs
BMJV Federal Ministry of Justice and Consumer Protection

BMBF Federal Ministry of Education and Research
BfDI Commissioner for Data Protection and Information Freedom
ADA Digital Agenda Committee
BSI Federal Office for Information Security
DG Connect Directorate General for Communications Networks, Content & Technology

Source: Roland Berger

Since its inception in February 2014, the Bundestag's Digital Agenda Committee has sought to establish a counterweight to decentralized organization at government level. To begin with, it only had an advisory function: Important decisions were still made by the panels for internal affairs, legal affairs, economic affairs and transport. Only in October 2014 was the new committee given the lead role in some aspects of the government's Digital Agenda, although it has since provided little in the way of fresh impetus.

For its part, the government's Digital Agenda points in the right direction but misses the mark. For the first time, it enshrines digital innovation and regulatory policy, network expansion, media competence, data protection and IT security as areas of emphasis in German government policy. However, it merely formulates the goal of making digitization a job for the whole of federal government. What it does not do is say anything about overall governance under consistent leadership.

Getting the various ministries to agree to this program was admittedly long overdue. Even so, it remains unclear – and the subject of dispute between the ministries – who is responsible for many key issues. Experts thus question whether the existing management model is at all suitable to get the government's Digital Agenda implemented in a coordinated and effective manner.

Digital Agenda remains an empty promise

This is one of the main reasons why the Digital Agenda remains devoid of life and vitality. Summing up what had happened by mid-2015, digital association Bitkom

noted that, of the 121 individual actions defined in the Agenda, 36 had been implemented, work had begun on 60 and 25 had yet to be tackled. As far as they go, further government programs and platforms such as the Intelligent Networking Initiative and the National IT Summit are all well and good. However, their disparate nature only reinforces the impression that the digital transformation in Germany has a governance problem.

Legal situation rendered obsolete by reality

This state of affairs is made all the worse by the fact that an outdated legal system puts European companies at a serious competitive disadvantage. In its present form, copyright and intellectual property protection law, for example, has long since been rendered ineffective and needs to be aligned with the conditions that prevail in the digital economy.

The need is for a balanced regulatory regime that limits market power and encourages competition. Imposing too narrow conditions (overregulation) will inhibit innovation; on the other hand, legal prescriptions that are too weak (underregulation) will only encourage monopolistic tendencies. The US regulatory regime tends to be more lax than that in Europe, with regulations often imposed ex post and in the national interest. What, then, is the right path for Europe to tread?

First, national governments should follow Brussels' example and bundle their digital competencies in a single dedicated ministry or department. This move would make the digital transformation significantly more effective.

Second, governments should maintain a sense of proportion when defining regulations. Dematerialization and deterritorialization are characteristic of the digital economy, which also transcends the boundaries between industries. As a result, new providers are difficult to pin down and regulate appropriately under existing law – unlike players within the framework of physical infrastructure, for example. This situation presents huge challenges to competition and antitrust law. A balanced regulatory regime is therefore needed that accommodates the special needs of the digital economy and gives young companies a chance to achieve critical mass in the first place. As things stand, it is not unreasonable to assume that a company such as Uber would never have become a global corporation if it had had its roots in Europe! At the same time, the monopolistic tendencies of platform operators must be arrested at an early enough stage to ensure that customers retain genuine freedom of choice between different providers.

Third, the Digital Single Market must be ramped up at European level on the basis of these three pillars:

- Better online access for consumers and businesses
- Creation of the right conditions and a level playing field for flourishing digital networks and services
- Optimized exploitation of the growth potential that awaits Europe's digital economy.

To realize this goal, it will be necessary first and foremost to develop a data economy based on open, interoperable and location-independent systems. Another cornerstone is the radical replacement of home mar-

ket control with the place of supply rule in order to create fair conditions for everyone.

Europeans must work together to develop the potency they need to combat the supremacy of US platform operators with an independent Internet economy that is populated by confident, fast-growing firms. It is thus imperative to do away with today's digital parochialism.

6. Digital literacy: As important as reading and writing!

Programming languages are the lingua franca of our day. Any enterprise that wants to make its mark in the digital world therefore needs to have an adequate pool of highly qualified programmers. It will also require strategic capabilities in core technologies such as big data, mobile enterprise, cloud computing, social business and cyber-security, all of which are of paramount importance to companies' ability to compete in the future.

Seven times more job growth in the digital economy

Skills in these disciplines are essential to safeguard our prosperity. Between 2000 and 2012, job growth in the digital economy was seven times faster than that for the economy as a whole throughout the entire EU (with Sweden and Finland leading the way). However, a shortage of specialists is already seriously hampering growth: Forecasts indicate that, by 2020, Europe will lack more than 800,000 ICT professionals.

As part of its Digital Agenda, the EU has therefore put "improving professional ICT skills" right at the top of its list of priorities. In the future, nine out of ten jobs will require a minimum level of digital skills. Young people who have not been taught to use digital technologies will find it hard to gain a foothold in the labor market.

Alongside qualified staff, savvy consumers will also be needed to put wind in the sails of Europe's digital econ-

omy. People must be made more aware of the opportunities opened up by digitization – not in the sense of a blind belief in technology, but in a spirit of responsible and indeed critical dealings with digital media. Without an awareness of the value of personal data and a fundamental grasp of digital marketing processes, for example, it will not be possible to break the stranglehold of today's data monopolies.

Nearly every fifth European has never surfed the Net

Today, however, a good third of all EU citizens possess few digital skills or none at all. Nearly every fifth European has never even surfed the Internet! The European Commission is right to deliver a stern exhortation: "A digitally skilled workforce and digitally competent consumers will be a driving force for the achievement of a truly connected DSM and a precondition for Europeans' participation in the digital world of e-commerce, services, communication and other forms of interaction."

Germany's digital skills – especially those of its younger population – currently put it in mid-table at best compared to other economies, and the same holds true for lots of EU members (with the exception of the Nordic countries). Germany's proportion of schoolchildren with very high competence levels is a meager 1.5%, well below the comparable figure for Europe as a whole (2.2%). Nor is this the only worrying study finding:

- The PISA study identifies a ratio of 4.2 pupils to a computer, which puts Germany 28th out of the 34 OECD countries surveyed. Far too little use is also made of the Internet as an aid to completing school assignments.

“Digitization will also
create new jobs. But many
of these jobs will require
a good education.”



Clemens Fuest

President of the ifo Institute for Economic Research

- The use of the Internet in German schools stands at 66%, again below the average for all OECD countries (71%). By comparison, Internet usage in Swedish schools hits 88%.
- The proportional use of new digital media such as tablets (6.5%) and interactive whiteboards (5.5%) in German schools is below the average for the European comparison group.
- At present, only 17% of German schoolchildren feel prepared for the demands of a digital world of work. Only 8% rate their teachers as highly skilled in dealing with digital media.
- Germany's working population falls short of the European averages for the highest competence levels in both computer know-how and Internet skills.

Digital media still a marginal phenomenon in schools

Summing up, the authors of the international education study ICILS (2013) note that "if digital media are not conceptually anchored in school teaching and learning processes with a view to the competent handling of new technologies, Germany will, in international comparison, achieve nothing more than an average performance level in the future."

The following actions should therefore be set in motion without delay to make up the lost ground:

First, as a cultural technology, programming should be integrated in secondary level 1 of the education system in a similar way to reading, writing and arithmetic. It should also be a basic component of education and advanced training for teachers.

Second, schoolchildren should be able to handle digital systems confidently and in a self-determined manner. With a view to acquiring comprehensive media skills, they should also be able to understand sociocultural interrelationships and interdependencies in the digital world.

Third, the use of digital media in schools should be institutionalized. All too often, efforts to familiarize pupils with digital topics are left to the initiative of individual teachers (for whose endeavors there is too little incentive).

Fourth, informatics should be understood as a new key discipline and integrated to a greater extent in the curricula for other subjects and training courses. It is imperative to dovetail engineering and informatics courses in higher education. At the same time, students of other disciplines too should at least acquire a basic knowledge of digital technologies and applications in their chosen fields.

Fifth, when selecting elite universities and clusters of excellence, more attention should be paid to their digital research profile. Universities supported in this way should also make successful contributions to transferring the knowledge gained from research findings to the economy and society.

Sixth, support should be provided for the integration of digital media at universities, covering everything from the digitization of library stocks to offers of massive open online courses (MOOCs) or – better still – dig-

ital learning in small groups (SOOCs). The benefits are twofold: The latest content in each discipline will be taught in an attractive didactic form, while methodological ICT skills are communicated at the same time.

Seventh, and by no means least, considerably more importance must also be given to digital content in the context of dual vocational education and training (sandwich courses).

The marriage of analytics and creativity

For all our enthusiasm for technology, education and training must not be restricted to the teaching of digital skills or even programming languages only. The success of Silicon Valley is rooted partly in its proximity to first-class universities and research organizations, but partly also in a free-thinking tradition, in creating interdisciplinary knowledge and the ability to bring analytics and creativity together. It is only by thinking out of the box that underlying patterns and hidden cause-and-effect relationships come to light, resulting in unique business models.

To nurture the corporate champions of tomorrow, it is therefore important to complement the necessary hard skills by kindling enthusiasm and teaching dedication, fostering self-initiative and encouraging a spirit of invention. Last but not least, entrepreneurship and a start-up mentality must become established as guiding principles in society.

7. Business culture: Think big, act fast, be bold!

The quintessential requirement spawned by the digital transformation is this: We need a radical rethink! If Europe, with Germany as its biggest economy, sticks to its current growth trajectory, it will never be able to establish a counterweight to Silicon Valley and will continue to fall further behind Asia. The status quo highlights this point in no uncertain terms:

- Europe is way behind on ICT research and digital innovation, investing just 0.21% of its GDP in ICT, compared to 0.57% in Japan, 0.58% in the US and 1.47% in South Korea.
- The EU's Digital Economy and Society Index puts Germany in tenth place and sees it rising slowly. France and Italy are even more digitally underdeveloped. Scandinavia leads the field. →N
- The US alone boasts 92 unicorns (start-ups valued at at least a billion US dollars), compared to twelve in the whole of Europe, four of which come from Germany.

Other statistics underscore the finding that Germany and other EU members are right now not only lagging behind, but in danger of dropping further down the field:

- Whether or not digitization becomes a sweeping success depends on a company's digital maturity. Especially in terms of the customer interface, value-added processes and the degree of digitization, the gap between Germany and the US is very wide indeed.

- Digitization requires the ability to work together. Initiatives cannot be developed in isolation. Value is increasingly being added in flexible networks (known as the "extended enterprise"), and a willingness to cooperate is much more evident in the US. Collaboration with universities in particular is underdeveloped in Germany, despite the fact that start-ups in the orbit around good universities have some of the best prospects.
- The start-up rate in Germany has been in decline since 2004. This trend is especially noticeable for high-tech start-ups, which plunged by 40% between 1995 and 2015. A culture of experimentation, of trying things out is conspicuous by its absence – unlike in the US, where "fail faster: next time we will make better mistakes" aptly sums up the mentality. In Germany, entrepreneurial failure still carries with it a powerful social stigma.

Time to wake up and challenge vested rights

While many European countries currently lack the means to fund large-scale digital offensives, Germany appears to be fast asleep – and, despite its current economic success, about to miss out on the future. There is, however, no alternative: All players in the digital economy need to repeatedly take a critical look at themselves and call their organizational routines into question. They must wake up and bid farewell to vested rights and comfort zones. Now is the time to act.

Digital enterprises are making inroads into ever more sectors. Media, telecommunications, retail and the travel industry have all already been disrupted; automotive and logistics will soon come into digital challengers' firing line. The next five years are also expected

to bring profound change to finance, healthcare/medical engineering and the energy industry. In the process, technological trends such as service robots, drones and augmented reality will continue to blur the lines between industries. Yet every third company boss in Germany still sees no reason for their company to engage in its own digitization activities!

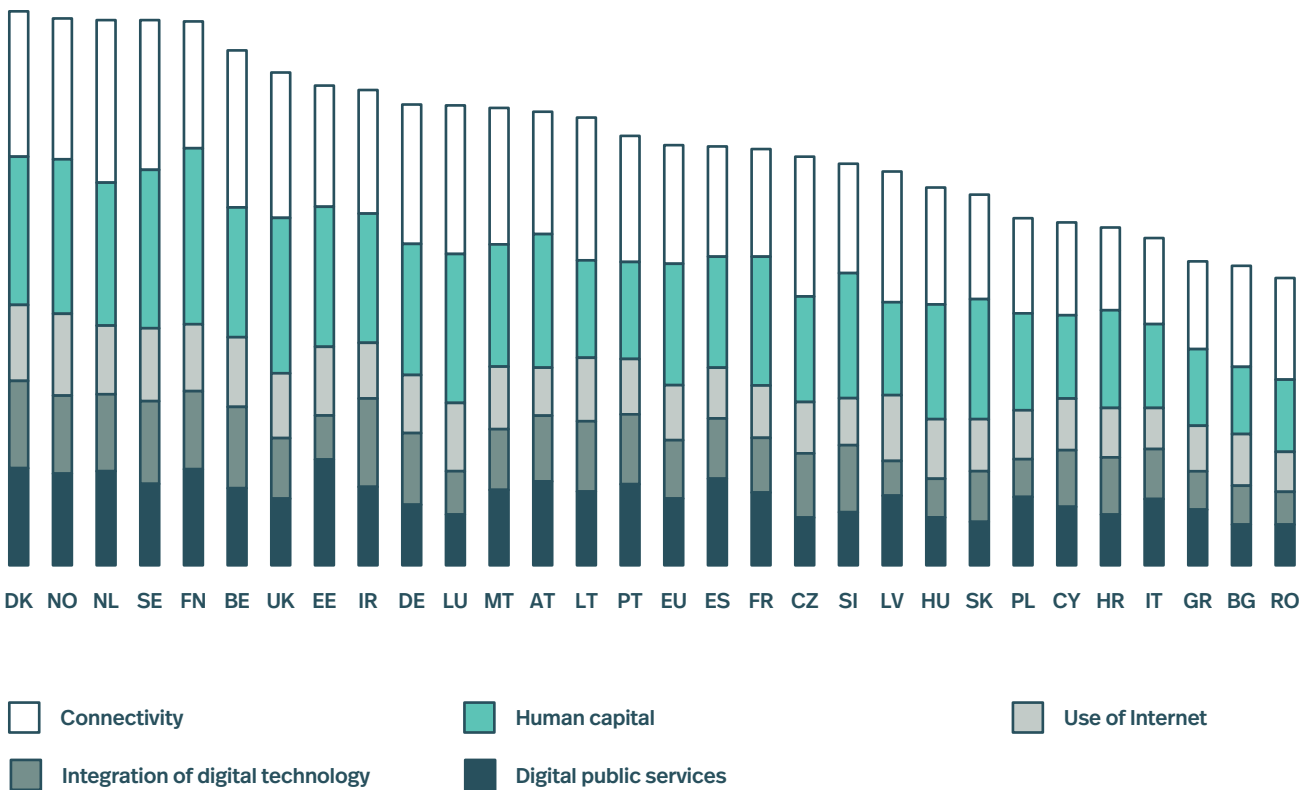
Less despondency, more willingness to take risks

If the digital transformation is to succeed, we need more courage, less despondency and more self-confidence. Essentially, a new business culture. We need to think big, accept risks as a given and act fast. In terms of entrepreneurial spirit, Germany doesn't make the cut: It lags behind the US, but also behind other countries. → To take just one example of how German hesitancy can cause even market-leading positions to be lost to US rivals: Tesla founder and Silicon Valley icon Elon Musk last year put on a big show to launch a home battery called Powerwall, a "revolutionary innovation" for which he drew popstar-like adulation. Interestingly, however, a Bavarian company by the name of Sonnenbatterie has already been manufacturing comparable storage systems that can be slotted into smart grids since 2014.

Two further examples illustrate both America's sense of mission and its unerring eye for entrepreneurial potential: Travis Kalanick stepped into the ring with the bold aspiration of making Uber the world's leading mobility-on-demand platform. For his part, Facebook founder Mark Zuckerberg never opted to make a fast buck and remains the biggest single shareholder in the world's leading social network to this day.

N Measuring digital maturity: The EU's current Digital Economy and Society Index (DESI) puts Scandinavia out in front – Germany leads the mid-table group

DESI 2016



Source: European Commission

Entrepreneurs of their ilk combine an ambition that wants to lead the world with a clear vision of a sustainable business model. When they think about business, they think in global dimensions, driving their plans forward very fast and with great tenacity. Nor do they ever stop developing new offerings, always with customers' needs in mind. Airbnb, Uber, Google and other "pure digital players" eliminate inefficiencies such as vacant apartments, empty taxis and vague Internet search results. Scale, speed and service is their mantra, the foundation on which they build proprietary ecosystems that disrupt the activities of "old economy" players.

**Internet companies' recipe for success:
scale, speed and a unique service proposition**

European companies will only successfully complete the digital transformation if they too master "the three S's". Accordingly, they must formulate a unique service proposition, scale it up to global level and speedily establish themselves on the market. Only then can they diversify horizontally, vertically and, where appropriate, laterally from a position of strength. To do so, they need first and foremost:

- Excellent innovation
- An open standard
- The right allies

Yet that alone is not enough. Even in the US, significant stimuli – especially in the form of basic innovations – have repeatedly come from the government or public institutions. To usher in the digital transformation today, Germany and Europe likewise need the public sec-

tor, private enterprise and business associations – at national or, better still, international level – to work hard and hand in hand. All three groups must also press ahead with lighthouse projects, three of which immediately spring to mind:

Establish European standards

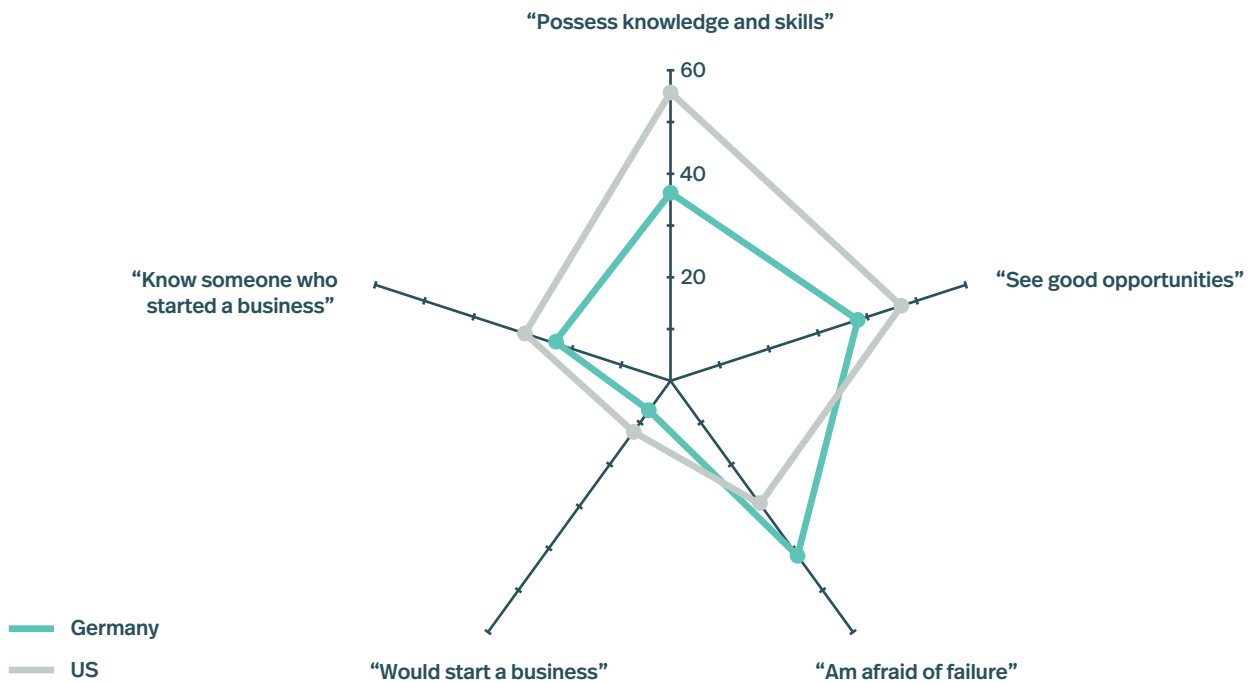
It takes a long time to establish standards to the point where scale effects can be exploited. And establishing standards necessarily involves making compromises. Standards can take root faster at higher service levels, so speed is of the essence in this context. From a European perspective, the important thing is to strike the right balance between rapid standardization that will protect investments and facilitate economies of scale on the one hand, and maximum system compatibility and interoperability on the other hand in order to tap substantial value-added potential. Europe's three technical standardization bodies – CEN, CENELEC and ETSI – should close ranks and contribute more to the debate. This ground should not be ceded to US-dominated institutions such as the Internet Corporation for Assigned Names and Numbers (ICANN) and the Industrial Internet Consortium (IIC) without a struggle. The fact that it is possible to achieve this goal is evidenced by successes in the standardization of mobile communication.

Let public administrations show the way

As things stand, the potential of e-government is far from exhausted throughout Europe. Merely implementing the "once only" principle (avoiding the repeated collection of the same personal data by different authorities) could cut costs by five billion euros a year

**○ Psychological barriers: Where is Germany's entrepreneurial spirit?
Americans act more confidently and boldly face up to risks**

Attitudes to company start-ups [percentage of respondents*]



*Population between 18 and 64, excluding existing or prospective entrepreneurs

Source: Global Entrepreneurship Monitor; Roland Berger

across the EU, according to a European Commission study. Right now, e-government is inconsistent, full of holes and not exactly user-friendly in most European countries (with a few notable exceptions, such as Estonia). Well-developed e-government makes a country more attractive to businesses, for example by accelerating approval processes. Today, it is regarded as an indisputable advantage in competition between countries. Moreover, the resultant productivity gains free up as much as 20% of administrative capacity, which in turn benefits both corporate and private citizens.

Press ahead with a European cloud initiative

According to one IDC study, cloud computing can facilitate GDP growth of as much as 450 billion euros and the launch of 300,000 new companies between now and 2020. Small and medium-sized enterprises in particular stand to benefit from lower IT investments and more scalable business models if they source software as a service. An accredited European cloud solution based on blockchain technology would also be a good way to establish a unique selling proposition with regard to data security and sovereignty.

These are only three of many examples of how Germany and Europe can initialize the digital transformation. Further initiatives and lighthouse projects could be launched in e-health, payment systems, cyber-security, smart grids, logistics, education and moves to simplify the legal basis for digital business models. The most important thing is to think big and get started quickly – not to wait until platform operators also occupy these and other areas for themselves.



HUGE EFFORT: GET TO WORK!

Rigorous digital reforms can pave the way to twice as much economic growth as we have seen in the past ten years. That would give Germany and Europe much-needed momentum for the major challenges ahead.

Germany and Europe have reached a crossroads. Do we want to stand idly by and watch how the mostly US platform operators continue to write the rules of the digital economy – and do the same for B2B too in the future? Or do we want to develop our own independent Internet economy as a counterweight

- To make our companies more innovative and more competitive
- To lay the foundation for forward-looking products and services that add greater value
- To give our citizens, institutions and organizations greater freedom of action and more sovereignty over their data
- To facilitate greater participation and integration, particularly for the weaker links in society
- And to safeguard growth and prosperity for the next generation?

If Germany wants to remain a wellspring of ideas and the engine of the European economy, it has to lead the way and set a good example. In short, it must:

- Launch a 50-billion-euro growth program to provide more support to young companies
- Create a world-class broadband infrastructure based on state-of-the-art access technologies such as fiber optics and LTE-A/5G
- Work with its EU partners to regulate dominant platform operators in such a way that citizens have genuine freedom of choice and innovative European companies do not suffer discrimination
- Give citizens and companies greater sovereignty over

their data, e.g. by having data retained in a shared European cloud

- Understand that the digital transformation is a job for political actors and entities that must be tackled systematically and managed with clearly defined areas of responsibility
- Cultivate new digital skills in order to make people more employable and companies more competitive
- Foster a business culture that rewards courage, entrepreneurial ambition and far-sighted strategies, and that confidently steps into the global ring to compete with the best.

Across-the-board digital transformation is a huge, concerted effort that can succeed only if national governments, the European Union and all other political, economic and social partners pull together in the same direction. It needs an innovation-friendly ecosystem made up of core and start-up funding from the government, a modern infrastructure, resolute entrepreneurial action, qualified employees and social demand. Another essential precondition is to ensure sustainable competition for both infrastructure and services.

The stakes are high: If Europe does manage to free itself from the clutches of the dominant, mostly US-based platform providers and once again become an independent force to be reckoned with thanks to its own extensive digital reforms, the prize could be many years of GDP growth averaging twice that of the past ten years (2005-2015: Germany 1.4%, Europe 0.9%). This achievement would also give Europe much-needed momentum as it tackles challenges and tests such as the public

debt crisis, the influx of refugees and problems with the acceptance of European institutions.

The conditions are favorable: Compared to other regions of the world, Europe is seen as very trustworthy. As a fragmented continent, it can draw on a wealth of experience in dealing with decentralization, diversity and adaptability. It scores with its excellent market knowledge and in-depth understanding of customers. It possesses proven expertise in numerous technical disciplines, as well as unique process knowledge. By no means least, it has repeatedly demonstrated its ability to connect and cooperate.

Diversity breeds innovation; and there is no cultural space on Earth as diverse as Europe. When tackling innovation processes, the trick is to have as many pieces of the puzzle as possible on the table, combine them intelligently and fit them together seamlessly. And who should be better able than Europe to reap rich rewards from diversity, adaptability and competition?

The final key ingredient for success is a visible, perceivable will to get the job done. It has to be crystal-clear that every player must commit themselves to the success of these reforms. Our single European motto should be this: Digital transformation can succeed – if we start work now!

**Our single
European
motto should
be this: Digital
transformation
can succeed –
now!**

“Digitization
will recreate our
prosperity.”



Lars Hinrichs

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