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# Monitoring-Report: Digital Economy 2013

Digitalization and the new working world

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### **Text and editing**

TNS Infratest Business Intelligence

Overall Responsibility:

Dr Sabine Graumann, Prof Dr Irene Bertschek

Project Management: Tobias Weber

With the collaboration of Anselm Speich, Dr Jörg Ohnemus,

Dr Christian Rammer, Thomas Niebel, Patrick Schulte,

Michael Weinzierl, Carolin Schneider, Chris Merklein,

Maren Schuster

### **Design and production**

Kathleen Susan Hiller, viaduct b., PRpetuum (cover)

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### **Illustrations**

Malte Knaack

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### **Central procurement service:**

Tel.: +49 30 182722721

Fax: +49 30 18102722721

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# Welcome

The results of the new “Monitoring-Report: Digital Economy” show more clearly than ever the great importance of the ICT sector and the Internet economy for the German economy as a whole. With a contribution of just under €85 billion, the German ICT sector now contributes more to commercial value creation than traditional sectors such as mechanical and automotive engineering. The sales figures speak for themselves too. The ICT sector has an annual turnover of €228 billion. Nevertheless, the Digital Economy is more than just the ICT sector. In 2013, the Internet economy in Germany generated a turnover of just under €79 billion and thus accounts for three percent of gross domestic product.

In view of the fact that digitalization is progressing rapidly and affecting more and more areas of society and the economy, the government parties have decided to draw up a Digital Agenda. We as the Federal Ministry for Economic Affairs and Energy would like to put in place the basic framework needed for innovation and growth in the Digital Economy. Key areas of action in the Digital Agenda include the digitalisation of the economy (Industry 4.0), systematic digitalisation and networking in the energy, health, education, transport and government sectors, ensuring a high level of IT security and supporting new companies and medium-sized enterprises. Encouraging promising growth areas such as cloud computing or big data is equally important.

The “Monitoring-Report: Digital Economy” not only sets out Germany's credentials as a business location but also allows us to measure its performance. In the ranking of the 15 most important locations worldwide, the Digital Economy in Germany has moved up a position to fifth place. However, the report also shows where there is need for action. For example, there is room for improvement when it comes to the use of digital technologies and applications by citizens, companies and the authorities. At the same time, safeguarding data protection and data security plays an impor-



Brigitte Zypries,  
Parliamentary State Secretary at the  
Federal Ministry for Economic Affairs and Energy

tant role as trust is a key component in the success of digital innovations. Revelations regarding the misuse of data have led to great uncertainty among private and commercial users. It is therefore the responsibility of politicians to restore users' trust in digital technologies.

The Monitoring Report 2013 also looked at the effects of digitalisation on the world of work. New technologies and applications can play a key role in making the world of work more flexible and in helping people to balance their family and professional lives. They can also help to ease pressing demographic problems, increase efficiency within companies and further improve people's quality of life. We would like to follow these developments that are having such an effect on people's lives and work in the future too.

I would like to thank all the experts who entered into dialogue with us during workshops and other events. I am looking forward to dialogue with all players from the fields of politics, industry, science, and society. We would like to work together to develop and advance a Digital Agenda for Germany.

Best wishes

Brigitte Zypries

# Management Summary

**€228 billion** ICT sector  
turnover

**4,6 %** of global  
ICT turnover

**€79 billion** ICT Internet economy  
turnover

**900.000** in the ICT sector  
jobs

**6<sup>th</sup> place** for  
global performance

**4,7 %** through the ICT sector  
of value creation

**8,5 %** start-up rate  
in the ICT sector

**57 %** of ICT companies  
offer home office working

# Management Summary

## Digitalization and new worlds of work

Digital applications and technologies are growth drivers for the entire German economy. Whether it be Industry 4.0 or unified communications, social media marketing or online recruiting, no branch of the economy nowadays can do without the benefits that they bring. They are changing the world of work too. The Internet, new hardware and software, and the ongoing digitalization of all areas of work are making it easier for people to work when they want and where they want. New forms of communication and working processes are being created all the time. While these developments bring many opportunities, they also pose challenges for companies and employees.

When compiling this report, TNS Infratest Business Intelligence and the Centre for European Economic Research (ZEW) have therefore focused on new worlds of work in the service sector and in ICT. Just like last year, we have also analysed how Germany's competitiveness as a business location compares with other nations and collected key figures which show exactly how the German Digital Economy is performing.

### Central results

In terms of its Digital Economy, Germany has moved up to a respectable fifth place in the ranking of the leading 15 nations. As regards turnover, the German ICT economy accounts for a 4.6 percent share of the world market, making it the fourth-largest in the world.

The ICT sector in Germany has an annual turnover of €228 billion. With a contribution of just under €85 billion, it contributes more to commercial value creation than traditional sectors, e.g. mechanical and automotive engineering. Every year, the ICT sector invests €18.2 billion – 4.5 percent of total gross investments in the commercial economy.

Information and communication technologies are cross-sector technologies and thus create added value for other sectors too. Investments in ICT are responsible for 23 percent of productivity growth throughout the economy. The German ICT economy also helps to secure 360,000 jobs in non-ICT sectors.

Nevertheless, the Digital Economy is more than just the ICT sector. The Internet economy generates a turnover of just under €79 billion and thus accounts for three percent of gross domestic product.

Digital technologies and applications create new worlds of work. Unfortunately, German service providers rarely take full advantages of the opportunities on offer.

### German Digital Economy in fifth place in the international ranking

In order to analyse the performance of Germany as a business location, we identified and collected data on 33 key indicators which illustrate the market strength of the Digital Economy, the infrastructure-related conditions at business locations and the extent to which applications and technologies are used. These quantitative data were indexed, aggregated and weighted in order to present the global performance of the locations in a figure which would allow an international comparison.

**Global performance:** In terms of the performance of its Digital Economy, Germany is in a respectable fifth place with 49 out of 100 points, placing it in the top third of nations. This means it has moved up one place in the ranking since the previous year. The clear leader in the 15-nation ranking is the USA with 79 points, followed by South Korea in second place with 56 points. From third place onwards, the field is tightly packed. Indeed, only seven points separate Japan in third place and Finland and China in joint eighth place. In 2012, China scored an extra two points which means that it once again moved up a place.

If sub-categories are taken into account, Germany has reached sixth place both in the market and infrastructure sub-categories. When it comes to use, i. e. the use of new technologies and applications by citizens, companies and local authorities, Germany only manages eighth place. The fact that Germany ranks higher overall (in fifth place) is due to the fact that the other nations perform better in certain sub-categories but considerably worse in others. This means that they fall back in the overall ranking.

### Key figures relating to the Digital Economy in Germany

In order to be able to measure the importance of the Digital Economy, we have analysed selected key economic figures for the ICT sector when compiling the Digital Economy Monitoring Report. We have compared the results with the key figures from other economically significant sectors such as automotive engineering or the chemicals and pharmaceuticals industry. In order to provide information for the entire Digital Economy, we have calculated what turnover is generated in the Internet economy, i. e. through the Internet

**Value creation:** Since the crisis in 2009, the ICT sector's gross value creation has increased significantly to around €85 billion. With a 4.7 percent contribution towards commercial value creation, it accounts for more than automotive engineering (4.3 percent) and mechanical engineering (4.4 percent) as it did in the previous year.

**Turnover:** The ICT sector generates an overall turnover of around €228 billion. This is approximately €6 billion more than in the previous year. It therefore lies in second place in the comparison of sectors after automotive engineering with €369 billion.

**Jobs:** Around 900,000 people currently work in the ICT sector. In 2011, this figure was 842,423, 84 percent of whom worked in the ICT service provider sub-category. The ICT sector accounts for approx. three percent of all commercial employment in Germany and thus lies ahead of automotive engineering and the chemicals and pharmaceuticals sector. In the comparison of sectors, only mechanical engineering employs more people than the ICT sector.

**Gross fixed capital investments:** The ICT sector invests a total of €18.2 billion in capital equipment that they either acquire or produce themselves. This equates to 4.5 percent of all gross fixed capital investments for the commercial economy in Germany. As a result, the ICT sector is in first place. It is followed by automotive engineering with €12.5 billion and the chemicals and pharmaceuticals sector with €6.3 billion.

**Internet economy:** The Internet economy is recording growth of 10.4 percent and generates a turnover of just under €79 billion. This figure equates to a three percent share of gross domestic product. Compared to the previous year, the Internet economy has achieved further growth – both in terms of its value and its share of GDP.

### Effects on other sectors: ICT as a cross-sector technology

Companies from all branches of the economy use information and communication technologies in order to increase their productivity. We have therefore looked into how investments in ICT affect the increase in work productivity and what links exist between the ICT sector and the other sectors. Given the lack of current data, analysing the cross-sector effects is methodically demanding. We have therefore analysed effects which, according to experience, are highly stable over time. These include links between economic input and output.

**Contributions to productivity:** Overall work productivity in Germany has increased by 1.5 percent since 1995. Investments in ICT goods account for 23 percent of this improvement. The ICT sector's contributions are particularly high here – just under 47 percent in mechanical engineering and 68 percent in the area of business services.

**Links between ICT and other sectors:** Demand for ICT goods and services helps to secure 360,000 jobs in the other sectors in Germany. For every 1,000 jobs created in ICT, another 941 jobs are created in the upstream sectors. Every employee in the ICT sector contributes an average of €100,864 to gross value creation in Germany. This contribution is higher than in any other sector considered. Jobs in the ICT sector are therefore particularly important for Germany as a business location.

### Start-ups and innovations within the ICT sector

**Start-ups:** With a start-up rate of 8.5 percent in relation to existing companies, the ICT sector is well ahead of comparable sectors in Germany. The number of start-ups is particularly high among ICT service providers (including software). The start-up rate here is 8.7 percent – 2.0 to 3.5 percentage points above the figures for other knowledge-intensive service sectors such as the media, technical service providers or the consultancy / creative industry. In the area of ICT hardware, the start-up rate in the 2010 to 2012 period was 4.8 percent. This matches the level in the electrical, automotive and mechanical engineering sectors.

The majority of business start-ups in the ICT sector can be found in or around the biggest cities, e. g. Berlin, Hamburg and Munich (all cities with over a million inhabitants) as well as the Rhine-Ruhr, Rhine-Main, Rhine-Neckar and Stuttgart economic regions.

**Innovations:** The ICT sector in Germany is planning to spend a total of €14.9 billion on innovation projects in 2013. While spending on innovations in the ICT service sector is increasing, spending on ICT hardware is falling.

The innovator quota in the ICT sector, i. e. the proportion of innovative companies, is increasing and is now 80 percent. There are therefore more innovative companies in the ICT sector than in the automotive or mechanical engineering sector.

### Digital worlds of work

When compiling this report, we asked service companies in Germany about the changes resulting from the digitalization of the world of work. The companies have a positive view of the new opportunities both now and in the future. According to the companies surveyed, the digitalization process is contributing to business success and is increasing competitiveness and work productivity.

However, the survey results also show that there is considerable room for improvement when it comes to the use of technical facilities, e.g. in the form of external access to network resources or the use of flexible workplace models. For example, while 57 percent of employers in the ICT sector offer home office working, only twelve percent of employees actually take advantage of this opportunity. According to the companies, the low uptake of flexible forms of working is due to the fact that they require their employees to be present on site. All sectors considered agree on this point. There is room for improvement when it comes to accessing network resources from outside the company too. Companies primarily allow access to the e-mail system from outside. Access to company applications and/or network drives is possible and allowed in far fewer cases.

### Fields of action

The Digital Economy plays a key role in Germany's future. It is marked by its rapid pace of development, close links to other sectors and high level of innovation. It is the responsibility of politicians to put in place suitable conditions in order to encourage development of this key sector. During our investigation, we identified the following main areas where there is need for action:

### Market: Promoting German ICT for the world market

When measured against Germany's otherwise strong export performance, exports from the German Digital Economy remain well below average. In 2011, ICT exports accounted for just 5.3 percent of all German exports. Compared to overall exports (€1.4 trillion, 17 percent growth), neither the absolute volumes (€73.8 billion) nor the growth rates (eight percent) make any significant contribution to Germany's export strength. Although Germany is in fourth place in terms of absolute export figures, it still lies well behind the leaders China and the USA. If trade balances are taken into account too, only IT services achieve an approximately balanced figure. When it comes to high-tech products and ICT hardware as a whole, the overall trade balance remains negative in spite of the small amount of progress made in recent years. Despite the critical voices, it is the responsibility of companies and politicians to make the German Digital Economy more export focused. Internationally competitive products (primarily in process design and in growth fields such as cloud computing), concentrated state support and, above all, companies' courage to conquer foreign markets are among the fundamental requirements for the success of the German Digital Economy.

### Infrastructure: Making fast networks possible

When it comes to infrastructure, the minimum requirement is shifting from "Internet for everyone" towards a discussion calling for a "broadband connection for every household". New, ever more complex applications such as video formats in 3D or ultra high resolution video will lead to an increase in demand for broadband in the future too. With an average speed of just under 22 Mbit/s, Germany currently lies in the bottom quarter of all OECD nations. Generally speaking, however, work to upgrade Germany's high-speed networks is making progress. At the end of 2012, broadband speeds of 50 Mbit/s or higher were available to just under 55 percent of German households, i. e. around 38 percent more than in the previous year. Nevertheless, the German Government's broadband strategy (50 Mbit/s for three quarters of households by 2014) remains a very ambitious goal. As with most infrastructure problems, improvements are only possible in the medium and long term.

A long-term strategic plan for infrastructure development is therefore still needed. Establishing fast networks will only be possible if there is intense dialog between politicians, businesses and other stakeholders. Ensuring the most effective, concentrated support possible from the Federal Government and taking advantage of multiplier effects will play a central role here.

#### **Usage: Winning (back) trust**

People's trust in new applications and technologies is a key requirement when it comes to the success of the Digital Economy. Data protection scandals and current developments in the NSA spying affair are threatening to undermine users' trust on a permanent basis. Although the Internet and mobile phones in Germany are now so ubiquitous that a significant drop in usage is unlikely, people's trust when it comes to data protection and data security in Germany has fallen further. In the long term, this will make people less willing to adapt new applications and technologies. Politicians must therefore take steps to ensure that user data are protected and to win (back) trust in the security of one's own data.

There is room for improvement when it comes to German e-government services too. Although the new E-Government Act, the introduction of DE Mail and the new identity card are steps in the right direction, the usage figures for e-government services are falling. The main barriers are people's dissatisfaction with the services on offer as well as their data protection concerns. A great deal of work needs to be done here in order to take full advantage of the digital technologies avail-

able. The operating concepts, clarity and comprehensibility of e-government services are increasingly being measured against the services provided by the private sector. Modern, comprehensible services and targeted communication are essential if e-government in Germany is to be a success.

#### **Digital worlds of work: Cautiously driving forward flexibility**

The digitalization of the world of work offers enormous opportunities for employers and employees alike. Flexible working, e.g. home offices, can reduce costs for employers and make it easier for employees to combine professional and family life. Online collaboration allows companies to organize cross-site working more effectively and can also ease the burden on staff. In an ideal scenario, transparent job markets, flexible working hours and workplace models as well as new technologies will allow people to organize their work in order to meet their individual needs. However, more flexible working brings not only positive effects. Temporary jobs and high staff turnovers can make it more difficult for individuals to plan their lives and can have a negative effect on people's job satisfaction. Current employment legislation does not adequately take into account the new circumstances. A check should therefore be carried out to determine how the legislature can respond to current developments and challenges. The most important thing here will be to put in place a legal framework which takes into account not only the new possibilities and opportunities offered by digital working but also the requirements and needs of employees. This legal framework must be carefully and continuously adapted in order to maintain the balance between companies' and employees' interests.

## Outlook

This Monitoring Report shows that the Digital Economy in Germany is strong and competitive and ranks among the top third of nations. A key challenge facing politicians, businesses and society will be to safeguard the future viability of the Digital Economy in order to ensure that this positive development can continue uninterrupted. In the future, competition from aspiring ICT locations such as China will increase even further.

It is the responsibility of politicians involved with economic policy to put in place conditions which will allow growth and innovations and safeguard Germany's competitiveness. However, this will only be possible with the help of people and businesses who, through their creativity and enthusiasm, shape the Digital Economy in Germany and advance it every day. This report should help to encourage discussions between politicians, businesses and citizens. We would therefore like to thank all of the experts who contributed to this study during workshops.



S. Graumann

Dr. Sabine Graumann,  
Senior Director,  
Business Intelligence,  
TNS Infratest Forschung GmbH

Tobias Weber



Tobias Weber,  
Project Manager,  
Business Intelligence,  
TNS Infratest Forschung GmbH

# The added value of the Digital Economy

**4,7 %** through the ICT sector  
of value creation

**900.000** in the ICT sector  
jobs

**€228 billion** ICT sector  
turnover

**€79 billion** ICT Internet economy  
turnover

**23 %** of productivity growth  
through investments in ICT

# The added value of the Digital Economy

## Germany becoming ever more digital!

What added value does the Digital Economy, i.e. the ICT sector and the Internet economy, create for Germany? As in 2012, this question is answered in the first part of the Digital Economy Monitoring Report from TNS Infratest Business Intelligence and the Centre for European Economic Research (ZEW) Mannheim.

### The ICT sector accounts for 4.7 percent of all commercial value creation in the country

The sector has further increased its contribution to value creation – from 4.6 percent to the current figure of 4.7 percent. With a contribution of just under €85 billion, it contributes more to commercial value creation than traditional sectors, e.g. mechanical and automotive engineering. The turnover of the ICT sector rose by around €6 billion. Nevertheless, its share of commercial economy turnover fell to around 4.2 percent. This means that the ICT sector still lies ahead of the chemicals / pharmaceuticals and mechanical engineering sectors.

### The ICT sector invests €18.2 billion

When it comes to investments (which likewise have risen sharply once again), the ICT sector is well ahead of the other sectors: it invests €18.2 billion – 4.5 percent of total gross capital investments within the commercial economy.

Employment in the ICT service sector in particular increased significantly between 2010 and 2011. In 2011, around 842,000 people worked in the ICT sector. As far as this point is concerned, only the mechanical engineering sector surpasses it in our sector comparison. In 2013, this figure is already around 900,000.

Around 61,000 employees are directly responsible for satisfying end demand for telecommunications services in Germany.

The number of employees who are indirectly involved, i.e. through providing the sector with upstream services from the telecommunication sector in Germany, is much higher – approx. 203,000. In terms of employment effect, overall end demand for telecommunications services is able to support around 265,000 jobs.

### ICT sector secures 360,000 jobs in other sectors

Demand for ICT goods and services helps to secure 360,000 jobs in the other sectors in Germany. For every 1,000 jobs created in ICT, another 941 jobs are created in the upstream sectors. Every employee in the ICT sector contributes an average of €100,864 to gross value creation in Germany. This contribution is higher than in all of the other sectors considered. Jobs in the ICT sector are therefore particularly important for Germany as a business location.

### Internet economy accounts for three percent of GDP

In 2012, the Internet economy generated a turnover of just under €79 billion. This figure equates to a three percent share of gross domestic product. Compared to the previous year, the Internet economy has achieved further growth – both in terms of its value and its share of GDP.

### 23 percent of productivity growth can be attributed to ICT

In the period from 1995 to 2010, work productivity in Germany increased by on average 1.54 percent per year. Around 0.36 percentage points can be attributed to investments in ICT. This means that 23 percent of productivity growth in Germany can be attributed to investments in ICT goods.

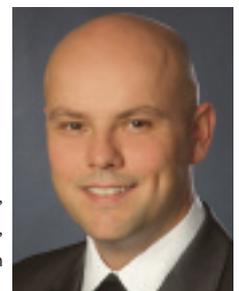


*Irene Bertschek*

Prof. Dr. Irene Bertschek,  
Head of the ICT research section  
ZEW Mannheim

*Jörg Ohnemus*

Dr. Jörg Ohnemus,  
Research associate,  
ZEW Mannheim



# Germany as a business location in comparison with other nations

**5<sup>th</sup> place** for  
global performance

**6<sup>th</sup> place** in the  
Market category

**6<sup>th</sup> place** in the  
Infrastructure category

**8<sup>th</sup> place** in the  
Usage category

# Germany in comparison with other nations

## Location assessment: Market, infrastructure, usage – Germany in fifth place

The success of Germany's Digital Economy is based on three pillars: the strength of the market, the infrastructure in place and the use of technologies and services.

In order to analyse the strength of the market and assess the performance of the business locations, this study looks at supply and demand, turnover and exports. On the basis of these key figures, the 15 nations in the benchmark can be compared with each other.

In order to carry out a comprehensive location assessment, however, the infrastructure must also be taken into account. In the Digital Economy in particular, this is an important requirement for a well-functioning market, for innovations and a key factor for the future viability of the location. Only with up-to-date, reliable infrastructures and general conditions can the new applications and business models for the digital age be developed and implemented.

Users play a key role in any location assessment for the Digital Economy. Only enlightened users with an affinity for technology will enable the market to develop further. And investments will only be worthwhile if there are enough users who are sufficiently receptive towards technological innovations. On the one hand, an understanding of technology is important. On the other hand, a critical mass of users is necessary in order to put in place new fields of application and business models.

In this report, the performance of the 15 most important ICT locations is analysed using 33 key indicators. In order to present the results in a manner which allows an international comparison, the best location in the 15-nation ranking is given 100 index points. The other nations are then positioned in relation to the best in each class.

In an excursus, the report also describes current developments in Russia and Brazil. Although they are not part of the benchmarking, they do represent dynamic future markets for digital technologies.

### Germany in fifth place in the 15-nation ranking

For the performance of its Digital Economy, Germany ranked a respectable fifth with 49 points, placing it in the top third. This year too, it has moved up one place in the ranking since the previous year. The clear leader in the 15-nation ranking is the USA with 79 points, followed by South Korea in second place with 56 points. With its solid performance, Great Britain avoided slipping down the table and finished in fourth place. From third place onwards, the field is tightly packed. Indeed, only seven points separate Japan in third place and Finland and China in joint eighth place. In 2012, China scored an extra two points which means that it once again moved up a place.

### Global performance, 2012

1.	(1.)	USA		79	(79)
2.	(2.)	South korea		56	(58)
3.	(3.)	Japan		55	(55)
4.	(4.)	United kingdom		54	(53)
5.	(6.)	<b>Germany</b>		49	(48)
5.	(5.)	Netherlands		49	(49)
5.	(6.)	Denmark		49	(48)
8.	(9.)	China		48	(46)
8.	(8.)	Finland		48	(47)
10.	(10.)	France		46	(44)
11.	(12.)	Brazil		37	(34)
12.	(11.)	Spain		36	(35)
13.	(13.)	Italy		34	(33)
14.	(13.)	Poland		33	(33)
15.	(15.)	India		26	(26)

Source: TNS Infratest, 2013; Previous year's figures in brackets

# Market

**6<sup>th</sup> place** in the  
Market category

**4,6%** of global  
ICT turnover

**2%** of GDP  
ICT expenditure

**28%** of total  
advertising turnover online

# Market

## Germany fourth-largest ICT market, weak Digital Economy exports

Two segments are particularly important for the Digital Economy in the 15 nations: the **strength of the market**, i.e. the turnover generated through the Digital Economy, and the **attractiveness of the market**, i.e. expenditure on ICT and the Internet economy in the various locations.

### USA at the top, Germany in sixth place

The USA is the clear leader with 81 index points. As in the previous year, China is in second place with 45 points, followed by Japan with 41 points. Germany is in **sixth place** – as it was in the previous year. With just 18 points, Poland and Spain are in joint last place.

### ICT turnover in Germany stable and at a high level

Germany's best ranking in the Market sub-category was for the proportion of IT turnover on the world market (5.6 percent). As in the previous year, Germany is the fourth-biggest market in the 15-nation ranking. With a 4.6 percent share of the world turnover, the entire German ICT economy remains the fourth-largest. After weak growth in 2011, the ICT sector in Germany grew slightly faster in 2012. Turnover in the TC sector grew by 1.8 percent, while growth in the IT sector was as high as 4.1 percent.

### Below-average spending on TC in Germany

The proportion of TC spending in relation to gross domestic product is a measurement of how strong the telecommunications economy in a particular location is. Although a poor position in the ranking may indicate that costs and prices are low, it should also be seen as an indicator that margins and thus companies' scope for investment are low too. For this indicator, Germany was in 12th place, the worst position in the Market sub-category. In 2012, TC spending accounted for just 2.2 percent of GDP. Overall, approx. two percent of German economic output is invested in ICT.

### Increasing the export focus of the Digital Economy

When measured against Germany's otherwise strong export performance, exports emanating from the Digital Economy in particular remain well below average. When it comes to trade balances too, only IT services achieve an approximately balanced figure. In the area of high-tech products and ICT hardware as a whole, the overall trade balance remains negative in spite of the small amount of progress made in recent years.

### Average performance in the Market category, 2012

1.	(1.)	USA	81	(80)
2.	(2.)	China	45	(43)
3.	(3.)	Japan	41	(41)
4.	(4.)	South korea	38	(40)
5.	(5.)	United kingdom	37	(35)
6.	(7.)	Brazil	31	(27)
6.	(6.)	<b>Germany</b>	<b>31</b>	<b>(30)</b>
8.	(8.)	France	28	(26)
9.	(8.)	Netherlands	27	(26)
9.	(8.)	Denmark	27	(26)
11.	(11.)	Finland	25	(23)
12.	(12.)	India	20	(22)
13.	(13.)	Italy	19	(18)
14.	(13.)	Poland	18	(18)
14.	(13.)	Spain	18	(18)

Source: TNS Infratest, 2013; Previous year's figures in brackets

# Infrastructure

**6<sup>th</sup> place** in the  
Infrastructure category

**4<sup>th</sup> place** for the  
mobile phone penetration

**33 %** of the Germans own a  
Smartphone

**14** per million inhabitants  
ICT patent application

# Infrastructure

## Infrastructures and basic conditions must be further developed on an ongoing basis

Technical infrastructure paves the way for growth and innovation. However, other basic conditions must also be considered when analysing the performance of business locations. Legal regulations are just as important for the development of the Digital Economy as the provision of initial and further training for specialists or further basic conditions such as the availability of venture capital.

### Finland in first place, Germany sixth

With 82 index points, Finland did best in the infrastructure sub-category of the 15-nation ranking. Second place goes to the Netherlands and South Korea. Germany scored 71 index points and thus remains **sixth** in the ranking. India was in last place with just 31 points.

### Long-term infrastructure planning necessary

When it comes to infrastructure, Germany remains in sixth place. The fact that Germany scores highly when it comes to the number of computers available (fourth place), performs well in terms of the availability of broadband connections (fifth place) and achieves

above-average positions as regards innovation indicators such as ICT patents (sixth place), start-ups (fifth place) and innovative capability (sixth place) should not disguise the fact that the ICT infrastructure is in need of constant improvement. Network speeds along with initial and further training are key factors not only for the Digital Economy but for Germany's overall competitiveness too. As with most infrastructure problems, improvements are only possible in the medium and long term. In this sub-category, venture capital (seventh place), ICT legal frameworks (eighth place) and availability of specialists (11th place) remain on the agenda.

### “Broadband for everyone”

Demands for “Internet for everyone” are increasingly giving way to discussions regarding the need for “broadband for everyone”. With an average speed of just under 22 Mbit/s, Germany currently lies in the bottom quarter of all OECD nations. Generally speaking, however, work to upgrade Germany's high-speed networks is making progress. At the end of 2012, broadband speeds of 50 Mbit/s or higher were available to just under 55 percent of German households, i. e. around 38 percent more than in the previous year.

Average performance in the Infrastructure category, 2012

1.	(2.)	Finland		82	(83)
2.	(1.)	Netherlands		80	(84)
2.	(3.)	South korea		80	(81)
4.	(4.)	Denmark		76	(79)
5.	(5.)	United kingdom		73	(76)
6.	(6.)	<b>Germany</b>		71	(72)
6.	(7.)	France		71	(71)
8.	(9.)	Japan		68	(69)
8.	(8.)	USA		68	(70)
10.	(10.)	Spain		57	(55)
11.	(10.)	Italy		55	(55)
12.	(13.)	China		52	(49)
13.	(12.)	Poland		50	(52)
14.	(14.)	Brazil		36	(36)
15.	(15.)	India		31	(27)

Source: TNS Infratest, 2013; Previous year's figures in brackets

# Usage

**8<sup>th</sup> place** in the  
Usage category

**5<sup>th</sup>** for the  
public's Internet use

**4<sup>th</sup>** for the  
use of new technologies  
within businesses

**1,6 music titles** pro person  
download

# Usage

## Germany stable when it comes to the use of new technologies and applications

Whether and how companies, private users and the public sector use new technologies and applications is a central issue when assessing a location. Only if new technologies are heavily used do new markets develop. This is the only way to ensure not only that the Digital Economy can realize its cross-sector benefits throughout the economy but also that the necessary knowledge of new applications and technologies is actually available. In this report, three user groups are analysed: private users, companies and the public sector.

### Germany remains in eighth place

In the use sub-category, Germany improved slightly on 2012, but remains in **eighth place** in the 15-nation ranking. Growth in Internet use (increase of one percentage point) as well as in mobile Internet use (increase of eight percentage points) shows that there is continued interest in digital technologies and applications. However, this growth in usage figures still remains behind that of most other nations in the benchmark. As a result, Germany can hardly make up any ground in this area.

### Online music gaining ground

Sales of online music in Germany increased by 1.4 songs on average in 2011 to 1.6 songs now. This means fourth place in the international ranking. It appears that the music industry in Germany has entered the digital era with its products, services and business models.

### Fourth place for the use of new technologies within businesses

As far as the use of new technologies within businesses is concerned, Germany did well, finishing in fourth place. As in the previous year, Internet use within companies remains in a respectable fifth place.

### Public sector in a position of responsibility

The public sector is particularly important for Germany as a business location. After all, it creates demand for ICT and can take on a leading role when it comes to using innovative solutions and efficient, citizen-friendly technologies. Nevertheless, Germany is still well behind other nations when it comes to the quality of e-government (tenth place) as well as the use of ICT and administrative efficiency (ninth place).

### Average performance in the Use category, 2012

1.	(2.)	Denmark		<b>88</b>	(85)
1.	(1.)	South korea		<b>88</b>	(88)
3.	(4.)	United kingdom		<b>87</b>	(84)
4.	(2.)	Japan		<b>86</b>	(85)
4.	(5.)	USA		<b>86</b>	(83)
6.	(6.)	Finland		<b>85</b>	(81)
6.	(6.)	Netherlands		<b>85</b>	(81)
8.	(8.)	<b>Germany</b>		<b>79</b>	(76)
9.	(9.)	France		<b>76</b>	(72)
10.	(10.)	Spain		<b>70</b>	(67)
11.	(11.)	Poland		<b>60</b>	(58)
12.	(12.)	Italy		<b>59</b>	(56)
13.	(13.)	Brazil		<b>58</b>	(54)
14.	(14.)	China		<b>54</b>	(51)
15.	(15.)	India		<b>40</b>	(38)

Source: TNS Infratest, 2013; Previous year's figures in brackets

# Start-ups and innovations within the ICT sector

**8,5 %** in the ICT sector  
start-up rate

**€14,9 billion** in the ICT sector  
planned expenditure on innovation projects

**7,4 %** of turnover in the ICT sector with  
innovation projects

**80 %** in the ICT sector  
innovator quota

**Start-ups** in the ICT sector mainly in  
major cities or metropolitan regions

# Start-ups and innovations within the ICT sector

## High start-up rate and level of innovation in the ICT sector

The ICT sector is both highly innovative and responsible for a large number of start-ups. As a result, it generates new ideas and business models and can also set the course in the ICT user sectors.

### Start-up rate in the ICT sector well above average

With a start-up rate of 8.5 percent in relation to existing companies, the ICT sector in Germany is well ahead of comparable sectors. The number of start-ups is particularly high among ICT service providers (including software). The start-up rate here is 8.7 percent – 2.0 to 3.5 percentage points above the figures for other knowledge-intensive service sectors such as the media, technical service providers or the consultancy/creative industry. In the area of ICT hardware, the start-up rate in the 2010 to 2012 period is 4.8 percent. This matches the level in the electrical, automotive and mechanical engineering sectors.

The majority of business start-ups in the ICT sector can be found in or around the biggest cities, e.g. Berlin, Hamburg and Munich (all cities with over a million inhabitants) as well as the Rhine-Ruhr, Rhine-Main, Rhine-Neckar and Stuttgart economic regions.

### Significant innovation in the field of ICT hardware

In 2013, the ICT sector in Germany planned to spend a total of €14.9 billion on innovation projects. While spending on innovations in the ICT service sector is increasing, spending on ICT hardware is falling.

The innovator quota (the proportion of innovative companies) in the ICT sector continues to grow. In 2011, it was 80 percent. There are therefore more innovative companies in the ICT sector than in the automotive or mechanical engineering sectors.

In 2011, the ICT sector set aside 7.4 percent of its turnover for innovation activities. When it comes to ICT hardware, this quota is 10.3 percent – slightly higher than in the ICT service sectors, where the quota is 6.7 percent. In the past five years, the level of innovation within the ICT sector in Germany was relatively constant – between seven and eight percent.

In 2011, the ICT sector generated 26 percent of its turnover through product innovations. This is well above the average for the German economy as a whole (14 percent) and is above the average figure for the processing industry (24 percent). The driver behind this high figure is ICT hardware which in 2011 accounted for 37 percent of turnover generated from new products.

# Expert workshop: Digitalization and new worlds of work



# Expert workshop: Digitalization and new worlds of work

## Careful adjustment of the legal framework necessary

As part of this “Digital Economy Monitoring Report 2013”, TNS Infratest Business Intelligence held an expert workshop at the Federal Ministry of Economics and Technology (BMWi) on 25 September 2013. During the workshop chaired by Bernd-Wolfgang Weismann (BMWi), 34 renowned representatives from the ICT, services and media sectors along with research experts took part in a lively, critical discussion regarding the preliminary results of the report.

The workshop focused on how digitalization is affecting the world of work as well as the resulting opportunities and challenges for employers, employees and politicians.

Key results:

### The opportunities offered by new applications and technologies must be seized

Making the world of work more flexible with the help of technology offers opportunities for employers and employees alike. Flexible working, e.g. home offices, can reduce costs for employers and make it easier for employees to combine professional and family life. Online collaboration allows companies to organize cross-site working more effectively and can also ease the burden on staff. In an ideal scenario, transparent job markets, flexible working hours and workplace models as well as new technologies will allow people to organize their work in order to meet their individual needs.

## Making the world of work more flexible brings major challenges for employees

Even if more flexible working thanks to new (technology-supported) approaches offers significant opportunities for individuals, there are drawbacks too. Temporary jobs and high staff turnovers can make it more difficult for employees to plan their lives and can reduce employees' loyalty towards their companies. Furthermore, more flexible working arrangements demand a high degree of self-organization and responsibility on the part of each individual employee. The blurring of people's private and professional lives can also result in structures which require more intensive work. Employers must therefore ask themselves how staff management and monitoring can be achieved in these new worlds of work.

## The legal frameworks need to be checked

The digitalization of the world of work offers enormous opportunities for employers and employees alike. However, more flexible working brings not only positive effects. Current employment legislation does not adequately take into account the new circumstances. The most important thing here will be to put in place a legal framework which takes into account not only the new possibilities and opportunities offered by digital working but also the requirements and needs of employees. This legal framework must be carefully and continuously adapted in order to maintain the balance between the interests of companies and employees.



# Case study: Digitalization and new worlds of work

**39 %** of employees in the ICT sector  
use Notebooks

**74 %** of the ICT service providers  
access to network resources from outside

**57 %** of ICT companies  
offer home office working

**12 %** of employees in the ICT sector  
use Home Office

## Case study: Digitalization and new worlds of work

Digital working allows businesses and employees new forms of spatial and temporal flexibility at work. Individual working time models help to increase specialists' loyalty to their companies and enable employees to better combine their professional and private lives. At the same time, they pose a challenge for businesses and employees, namely how to use the new opportunities efficiently and responsibly. This development is particularly relevant to companies from the service sector where the physical presence of employees is not essential in all stages of value creation. In order to compile this Monitoring Report, a representative company survey was carried out. The aim was to find out how the digitalization of work affects selected sectors of the German economy. Key results:

### **Notebooks are the most commonly used end devices**

Notebooks are the most commonly used end devices, ahead of smartphones and tablets. However, the use of smartphones and tablets in particular is expected to increase dramatically by the end of 2014. Mobile end devices are usually provided by companies themselves.

### **Access to network resources from outside the company could be improved**

Mobile working requires not only suitable end devices but also access to company information and applications. Regardless of the types of end devices used, companies mainly offer access to the e-mail system from outside. The number of companies allowing access to network drives or use of company applications is much lower.

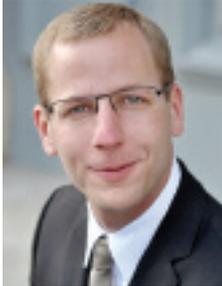
### **Flexible workplace models are still restricted to a small number of employees**

When it comes to flexible workplace models, the home office is in first place, ahead of co-working spaces and desk sharing. However, only a very small number of employees currently use these models. For example, just under 12 percent of employees in the ICT sector and just 13 percent of staff at ICT service providers use home office facilities. According to the companies, the low uptake of flexible forms of working is due to the fact that they require their employees to be present on site – all sectors considered agree on this point. As far as this problem is concerned, many companies will need to have a rethink if they would like to attract and retain highly qualified specialists in the future.

### **Companies believe that the digitalization of work has a positive effect on their business success**

From a business perspective, it is important to ensure that the digitalization of work has a positive effect on business results. Overall, companies believe that the digitalization of work will make a positive contribution towards their competitiveness, productivity and general business success – both now and up until the end of 2014. In this respect, there are only slight differences between the sectors considered. However, the survey results also show that there is considerable room for improvement when it comes to the use of technical flexibility, e.g. in the form of external access to network resources or the use of flexible workplace models. Without doubt, questions regarding IT security and legal issues which pose challenges for many companies need to be clarified here.

# Contact

**Tobias Weber**

Project Manager “Monitoring Report Digital Economy”

TNS Infratest Business Intelligence  
Email: [tobias.weber@tns-infratest.com](mailto:tobias.weber@tns-infratest.com)  
Phon: 089 5600 1760

Downloads and more informationen: [www.tns-infratest.com/bmwi](http://www.tns-infratest.com/bmwi)



