

Berlin *aktuell*

Digital Economy sets the Pace

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Editorial by the Chairman of the Board of Investitionsbank Berlin



Dr. Jürgen Allerkamp

Germany's digital economy is marked by a strong start-up spirit. The pace in Berlin, in particular, has increased significantly over the past 10 years and, within a short space of time, the city has advanced to become Germany's, if not Europe's, most important centre for digital companies of all kinds. In the early days, reports focused on Berlin-based companies in the online retail sector who continue to conduct their international business from Berlin. The focus of public interest is now on digital companies working in the fields of "Fintech", "Industry 4.0", "Smart Services" and the development of "Artificial Intelligence".

This is not without good reason, because the companies in the digital economy have a cross-sectional function and serve as pioneers for the entire economy. It is these companies who are using "disruptive innovations" to put the business models of entire industries on a new footing. They are initiating digital innovation and introducing both technical and economic progress into traditional industries, thus driving digital transformation. This transformation has already reached many sectors in Berlin and will lead to enormous additional economic growth in the years to come. Investitionsbank Berlin had a rather significant role to play in this development. In addition to creating urgently needed housing, supporting start-ups and providing traditional financing for SMEs, I now consider the shaping of the Digital Agenda to be one of

the most urgent tasks for the future which we need to implement together with industry, government and academia. Shaping the Digital Agenda is a long-term project that is already bearing fruit in Berlin. I would like to thank the authors of the study who, from the very beginning, have described the development of Berlin's digital economy on the basis of official statistics and who have shown us the economic potential it has to offer. This study shows that Berlin's digital economy has developed exceedingly well over the past decade. Today, a good 88,000 people are employed here – more than in any other major city in Germany. Recording sales of EUR 10bn, digital companies now generate more than construction companies (EUR 9.9bn). Digital technologies offer opportunities for new products and services combined with potential savings thanks to process optimisation.

I am convinced that Berlin's digital economy, which is currently bursting with strength, has the best prospects for success and will continue to have a positive impact on Berlin's overall economy over the next decade. But this process needs to be fostered and supported. Although the capital city is today the most dynamic digital location in Germany, it has yet to exploit all of its potential with a view to expanding digital infrastructure and the online availability of public services. As always, the right course will be set when all stakeholders work hand in hand to remove existing obstacles in order to take advantage of the enormous opportunities offered by digitalisation. I am looking forward to productive cooperation with business, government and academia.

A handwritten signature in black ink, appearing to read "J. Allerkamp". The signature is fluid and cursive.

Dr. Jürgen Allerkamp, Chairman of the Board of Investitionsbank Berlin

Results of the study at a glance

Digital economy as a whole

- A total of 1.2 million people are employed in Germany's digital economy.
- Close to 341,000 or 30% of all jobs in the digital economy are located in the nine major German cities in the comparison which, however, are home to only about 14% of the population.
- A total of 88,206 people are employed in Berlin's digital economy – more than in any other major city in Germany.
- Between 2008 and 2017, 47,397 new jobs were created in Berlin's digital economy. This corresponds to an average annual increase of close to 9%.
- One in seven new jobs in Berlin is created in the digital economy.

Core area of the digital economy

- In Germany, a total of 758,300 people work as software developers and data service providers in the core area of the digital economy which is essential for the economy as a whole.
- Compared to other major German cities, the majority of jobs are in the core area of the digital economy in Berlin (62,676).
- Employment in the core area of the digital economy (software development and data services) is growing at an average annual rate of 10.8% in Berlin, twice as fast as in Germany as a whole (5.2%).

E-commerce

- Berlin has the highest number of people employed in e-commerce, i.e. 16,520.

- Today, more people work in e-commerce in Berlin than in Hamburg, Munich, Cologne, Dresden and Düsseldorf combined
- In terms of Germany as a whole, every 8th job in e-commerce is based in Berlin (12.4%). For every 10,000 jobs in Berlin, 105 are in the online retail sector, the highest share in Germany.
- Since 2008, 4.5% of all jobs in Berlin were created in e-commerce.

Sales and gross value added

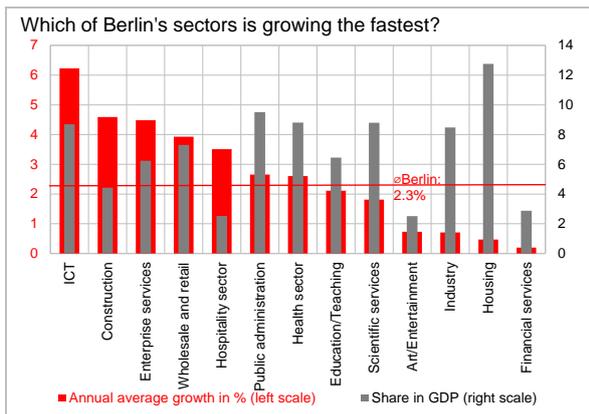
- There are currently 9,696 digital companies operating in Berlin.
- Berlin's digital companies have now, for the first time, exceeded the EUR 10bn sales mark.
- With sales of EUR 10.4bn, digital companies now generate more than construction companies (EUR 9.9bn).
- Gross value added totals EUR 4.5bn.
- Almost 15% of Berlin's economic growth over the past six years can be attributed to the digital economy.

Start-ups

- In Germany, 4,957 companies were launched in the digital economy in 2017; this figure totalled 521 in Berlin.
- The number of companies set up in the digital economy in Berlin is as high as Munich (153), Hamburg (224) and Frankfurt (137) combined.
- Every 10th start-up in Germany's digital economy was launched in Berlin.
- On average, one new digital company is set up every 17 hours.

The digital economy is a growth engine

For many years now, the information and communication technology (ICT) sector has been one of the most important growth engines in Germany's capital city. Economic output here rose more than in any other economic sector: From 2009 to 2017, the annual growth rate was 6.2%, 3.9 percentage points above than the long-term average increase in value added in Berlin (+2.3%). The ICT share in Berlin's overall value added now totals 8.7% (previous year: 8.5%). This means that the ICT sector share is now higher than that of Berlin's entire industrial sector (8.5%) and close to twice as high as that of the construction industry (4.4%). In 2010, the ICT share was still just 7.2% while the industrial share was as high as 10.5%.



Within the ICT sector of the economy, which also includes publishing, media and broadcasting services, companies in the digital economy are in a particularly strong position. The introduction of new technological and digital innovations offers huge potential for growth, not only for the digital companies themselves, but also for the rest of the economy. This is one of the reasons for the high level of attention being paid to the digital economy.

The present study is intended to enrich public debate with up-to-date figures on the digital economy based on official statistics.

Breakdown of the digital economy based on the official statistical industry classification

WZ-2008	Economic branch	Category
26.1	Manufacture of electronic components	ICT base infrastructure
26.3	Manufacture of devices and setting up telecom systems	
61.1	Line-based telecommunications	
61.2	Wireless telecommunications	
61.3	Satellite telecommunications	
61.9	Other telecommunications	Software and data service providers (core area)
58.2	Software publishing	
62.01	Programming activities	
62.02	Consultancy services in the field of IT	
62.03	Operation of IT facilities for third parties	
62.09	Other IT services	Hardware and infrastructure
63.11	Data processing, hosting and related activities (database service, data storage services)	
63.12	Web portal	
26.2	Manufacture of IT devices and peripheral devices	Consumer Electronics
26.4	Manufacture of consumer electronics	
26.8	Manufacture of magnetic and optical data carriers	
47.91	Internet and mail-order retail	

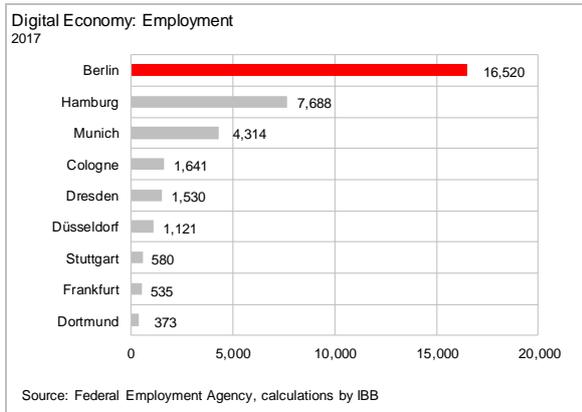
Source: Destatis, broken down by Investitionsbank Berlin

The digital economy brings together companies from industries that:

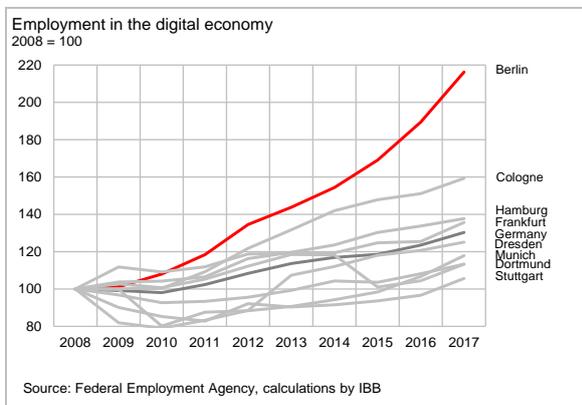
1. provide basic information technology infrastructures (basic ICT infrastructure)
2. create software and data services (core area of the digital economy)
3. manufacture electronic devices (consumer electronics)
4. organise e-commerce.

Especially companies involved in software development and data services are becoming increasingly important for many areas of the economy in the context of digital transformation. It is in the so-called "core area of the digital economy" that the software and data services necessary for digital transformation are being created. Furthermore, suppliers of hardware and infrastructure are also part of the digital economy. They provide the infrastructure needed to transmit (basic ICT infrastructure) and display (consumer electronics) the content and services generated in the core area of the digital economy. These are for the greater part telecom companies and manufacturers of terminal devices. E-commerce has also now become an integral part of Berlin's digital economy. With the expansion of the Internet, mail-order commerce changed dramatically, paving the way for new, innovative companies who to a very large extent are setting up shop in Germany's capital city and also operating on an international scale.

One in seven new jobs in Berlin is created in the digital economy



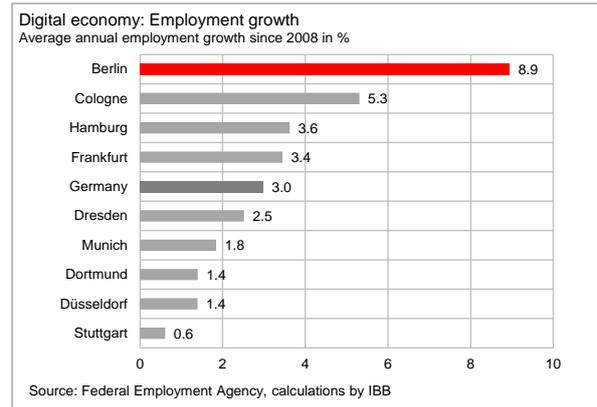
1.2 million people in total are employed in Germany's digital economy. Close to 341,000 or 30% of these people work in the nine major German cities compared in this study. Close to 11 million people, or around 14% of the German population, live in these cities. The digital economy is therefore located mainly in large cities where digital infrastructure has been developed and digital companies find it easy to recruit highly qualified staff.



In 2017, 88,206 people were employed in Berlin's digital economy – more than in any other major German city. In Munich (67,407), Hamburg (54,183), Frankfurt (29,149) and Cologne (28,974), on the other hand, there were far fewer people employed in the digital economy in absolute terms.

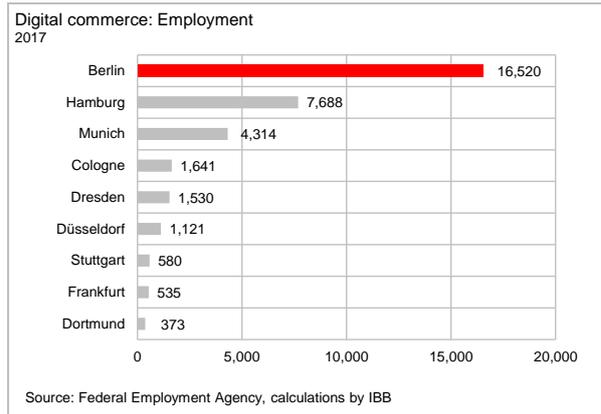
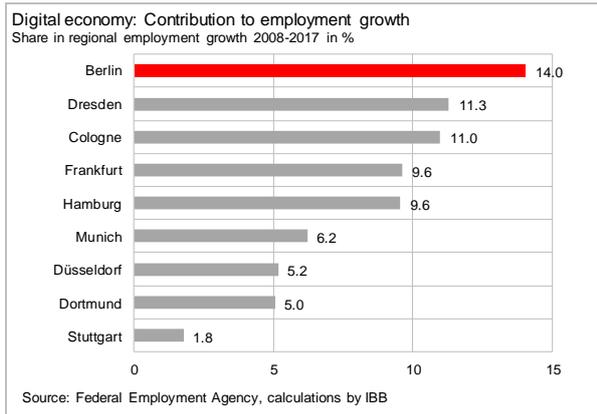
However, when adjusted for size, i.e. based on the number of jobs in a region, the digital economy in Berlin only ranks third. In Munich

and Dresden, for instance, the digital economy accounts for 725 and 702, respectively, out of every 10,000 jobs. Adjusted for size in Berlin, on the other hand, this figure totals only 562 jobs, followed by Hamburg and Frankfurt am Main with 513 and 477, respectively. The German average totals 319 digital jobs out of every 10,000 jobs.



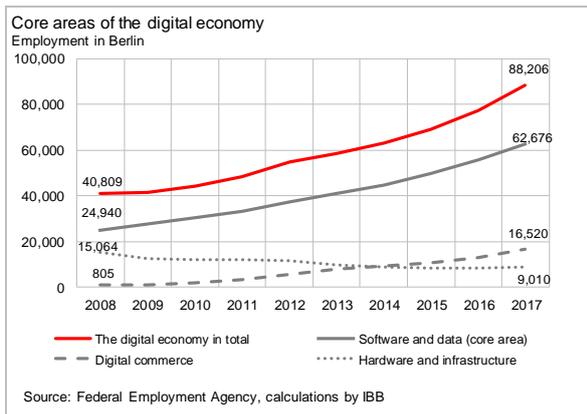
The importance of the digital economy for Berlin's overall economy has increased continuously in recent years. Between 2008 and 2017, 47,397 new jobs were created in Berlin's digital economy. This corresponds to an average annual increase of close to 9%. Compared to other cities, this is also the highest overall annual growth, followed by Cologne and Hamburg with annual increases of 5.3% and 3.6%, respectively. The German average growth rate for jobs in the digital economy is 3%. By comparison, total employment in Berlin rose by an annual average of 2.7% during this period (Germany: 1.4%).

Since 2008, every 7th new job in Berlin has in fact been created at a company working in the digital economy, corresponding to 14.0% of all new jobs. With this contribution to job creation, the digital economy has become comparatively important for Berlin's economy.



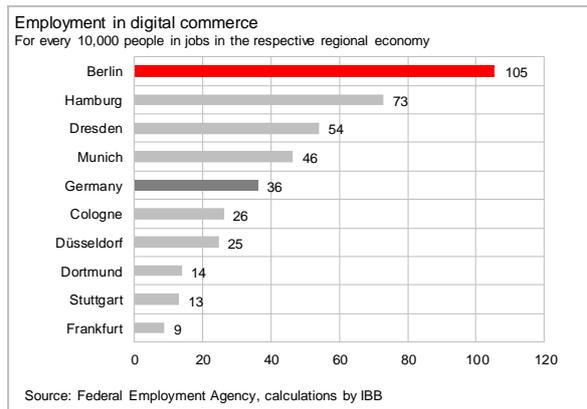
Dresden and Cologne were the only cities where the digital economy's contribution to regional employment growth reached double digits, i.e. 11.3% and 11%, respectively.

Berlin is a leader in e-commerce

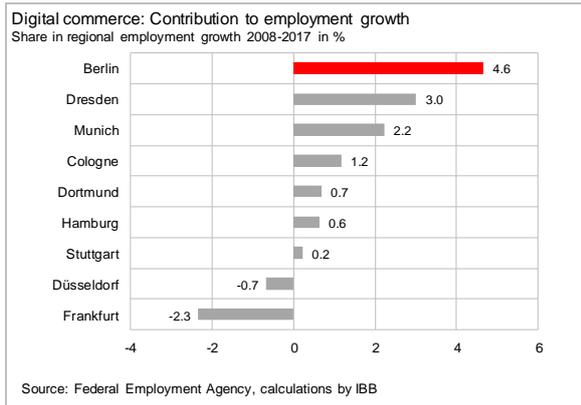


Since 2008, the capital city's digital economy has proven to be very adaptable. Although the number of jobs in the two combined sub-areas of consumer electronics and basic ICT infrastructure (in short: hardware and infrastructure) in Berlin has declined by 6,054 (-40%) since 2008, this decline was, however, more than compensated for by the strong growth in e-commerce where 15,715 new jobs have been created. The e-commerce sector in Berlin currently employs 16,520 people at around 1,000 companies. In all of Germany, this sector currently employs close to 133,200 people. In terms of Germany as a whole, this means that every 8th job in e-commerce is based in Berlin (12.4%).

All in all, there are twenty times more people working in e-commerce in Berlin than back in 2008. The German average for employment in digital commerce, however, has merely doubled. Today, more people work in e-commerce in Berlin than in Hamburg (7,688), Munich (4,314), Cologne (1,641), Dresden (1,530) and Düsseldorf (1,121) combined.



Even after adjusting for size, the strong concentration of digital commerce in Berlin is still evident. For every 10,000 people employed in Berlin, 105 work in e-commerce. The German average is only 36. The same can be said for the other major German cities surveyed where fewer people are employed in this sector after adjusting for size. In Hamburg, this figure totals 73, followed by Dresden and Munich with 54 and 46, respectively, people working in e-commerce for every 10,000 people employed.

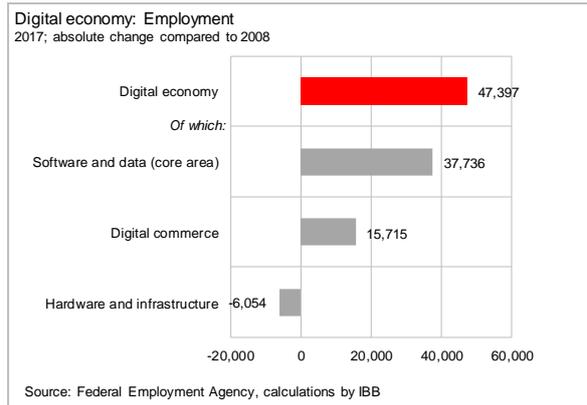


That being said, since 2008, 4.6% of all jobs in Berlin have been created in e-commerce. In Dresden and Munich, e-commerce accounts for only 3.0% or 2.2%, respectively, of growth in employment. In Dortmund, Cologne, Hamburg and Stuttgart, this figure was around 1% or less. In Düsseldorf (-0.7%) and Frankfurt (-2.3%), e-commerce even slowed down employment growth.

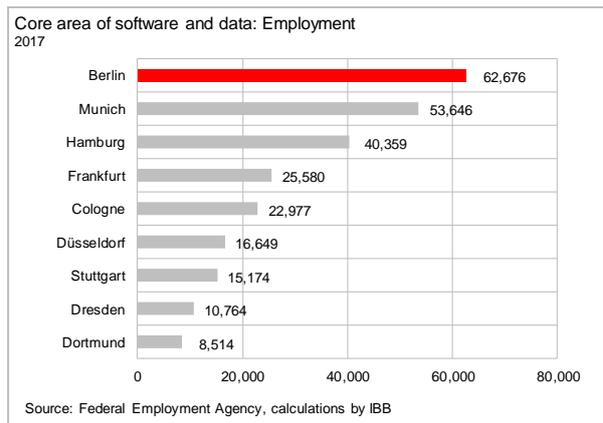
Developments in the online retail sector are now having a measurable effect on other areas of Berlin's economy. Exports to Switzerland, for instance, rose steeply in 2017 (+42% to EUR 834m). This development was driven by high growth in the footwear and clothing product groups (up EUR 422m). Thanks to the strong Swiss franc, there has been a sharp rise in cross-border shopping in neighbouring euro countries and in online shopping with foreign providers. Berlin-based online retail companies who have been active in Switzerland for a number of years benefited most from this development. One Berlin-based online retail company, for instance, was even able to become the second-largest provider in the Alpine republic. Switzerland has now, for the first time ever, moved up from 9th place to become the fourth most important export country for Berlin.

Highest rise in software and data providers in Berlin

Since 2008, the number the people working in Berlin's digital economy has increased by 47,397.

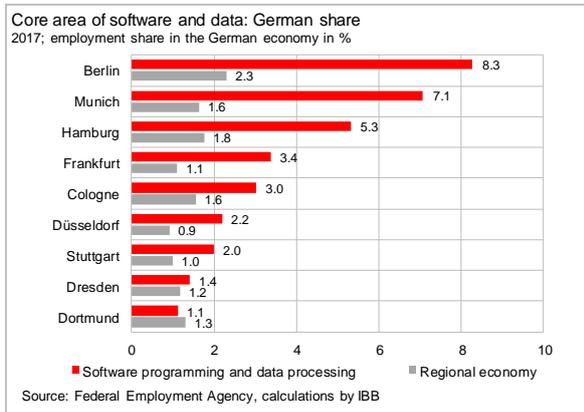


In addition to the 15,715 new jobs in online retail, more jobs have been created especially in software and data services (+37,736), the so-called core area of the digital economy, since 2008. This core area is extremely important and not just in Berlin. The products and services produced here are needed in many sectors of the economy throughout the world.



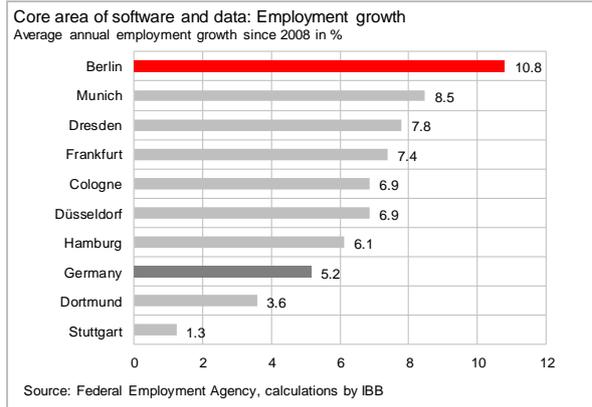
758,300 people in Germany are currently employed as software developers and service providers in the core area of the digital economy. Compared to other major cities in Germany, most of these jobs are based in Berlin (62,676). This is followed by Munich (53,646) and Hamburg (40,359). Far fewer people are employed in this sector in Frankfurt (25,580), Cologne (22,977), Düsseldorf (16,649), Stuttgart (15,174), Dresden (10,764) and Dortmund (8,514). This means that in Germany's nine major cities (each with a population of more than 500,000) around 256,000 people work as software developers and data service providers. All in all, around one third of all

German software developers therefore work in the major cities. Already 8.3% of all jobs in this industry in Germany are based in Berlin alone, so that this industry's share in Berlin is 4.1 percentage points above the city's share in overall employment in Germany (4.2%).



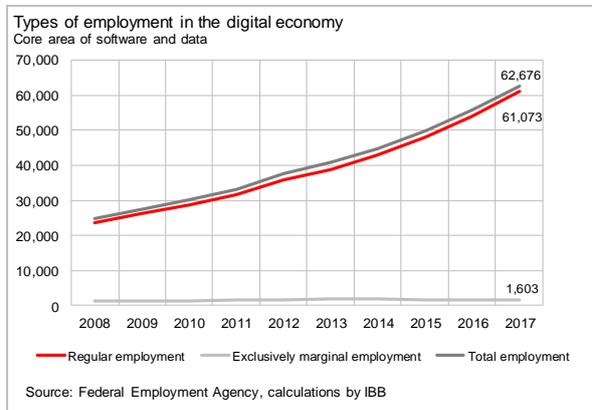
In Munich, the core area of the digital economy accounts for a 7.1% share of all jobs in Germany in this sector. However, the difference of 4.6 percentage points in Munich's very low share in overall employment in Germany (2.5%) in this sector is slightly higher than in Berlin. Compared to Berlin, Hamburg (5.3%), Frankfurt (3.4%), Cologne (3.0%), Düsseldorf (2.2%), Stuttgart (2.0%), Dresden (1.4%) and Dortmund (1.1%) account for much smaller shares in overall employment in Germany in this sector.

Development of the core area of the digital economy in Berlin was dynamic, even compared to other major German cities, with an average annual increase of 10.8%. Neither Munich (+8.5%), Dresden (+7.8%) nor Frankfurt (+7.4%) were able to achieve such good growth in employment. Cologne and Düsseldorf (+6.9%) along with Hamburg (+6.1%) still managed to achieve above-average job growth in the core area of the digital economy compared to Germany as a whole (+5.2%). Job growth in Dortmund (+3.6%) and Stuttgart (+1.3%), on the other hand, was below average.



The digital economy needs a skilled workforce

It is mostly regular jobs that are being created in the software and data services sector. In total, 97.4% of all jobs in this sector are subject to social insurance contribution payments (61,073). Since 2008, jobs subject to social security contribution payments in the software and data services sector have risen by 37,441 (+11.1% per year on average). On the other hand, marginal employment rose by an average of only 2.3% each year to 1,603 people most recently.



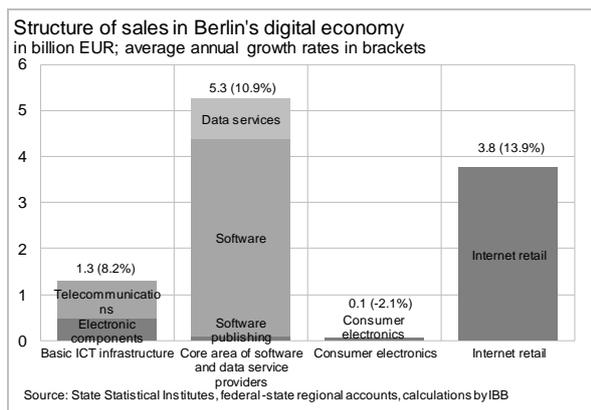
Due to strong growth in this sector, companies are continuously on the lookout for programmers, database specialists and web designers. Even though Berlin has been a popular international destination for young people starting out in their careers, the influx is no longer sufficient for this sector. Companies are increasingly trying to hire employees as a precautionary measure. Potential applicants are being offered good

working conditions and high salaries. Compared to other sectors in Berlin, gross salaries offered in this sector are now well above average totalling around EUR 4,700 (Berlin: just under EUR 3,600).

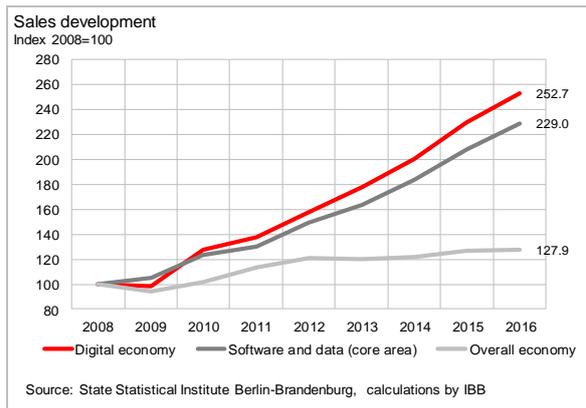
Internet companies generate sales of more than EUR 10bn for the first time

In 2016 (latest available figures), the 9,696 Internet companies in Berlin surpassed the EUR 10bn sales mark for the first time. With sales of EUR 10.4bn, digital companies now generate more sales than all of the companies in the construction industry (EUR 9.9bn).

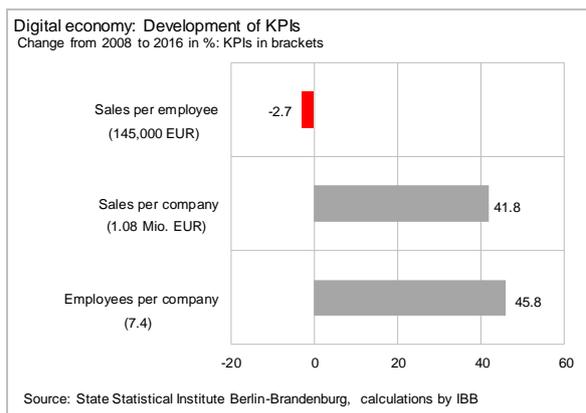
Compared to the previous year, sales in the digital economy increased by 10.2%. On the other hand, this figure was only 1.0% for all companies in Berlin.



From 2008 to 2016, all sales recorded by companies in Berlin rose by 27.9%, corresponding on average to an annual increase of 3.1%. In the core area of the digital economy (software and data services), where the number of companies most recently totalled 7,792, sales have even increased by 129% since 2008, rising from EUR 2.3bn to around EUR 5.3bn. This corresponded to an annual average increase of 10.9%. The positive development in the core area is even surpassed by sales developments in the digital economy as a whole.



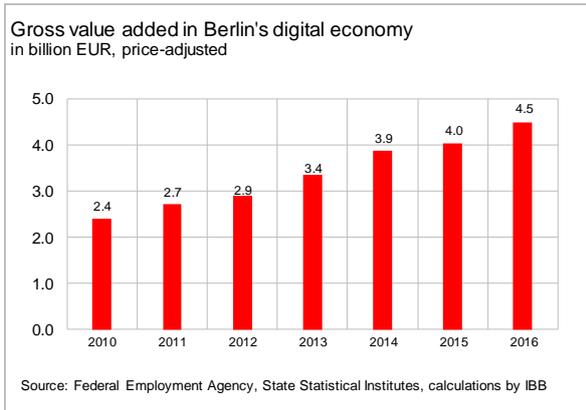
From 2008 to 2016, sales recorded by the 9,696 digital companies in Berlin rose by a total of EUR 6.3bn to EUR 10.4bn, corresponding to an average annual increase of 12.3%. This development is due to above-average annual sales growth in e-commerce which is as high as 20%.



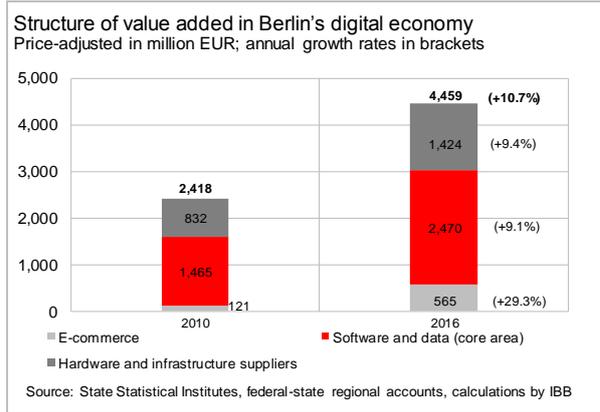
The companies in Berlin's digital economy have been growing at record speed for a number of years now. Since 2008, the number of jobs has risen by 45.8% to an average of 7.4 employees per company. From an entrepreneurial perspective, these jobs are needed because sales per company (EUR 1.08m) have also risen by 41.8%. On the other hand, however, the sales productivity figure for digital companies is down by 2.7% to only around EUR 145,000 per employee. Companies are securing future sales growth in new markets by hiring additional staff today – but this takes place at the expense of sales productivity. The shortage of skilled workers is now proving to slow down productivity.

The digital economy accounts for 15% of economic growth in Berlin

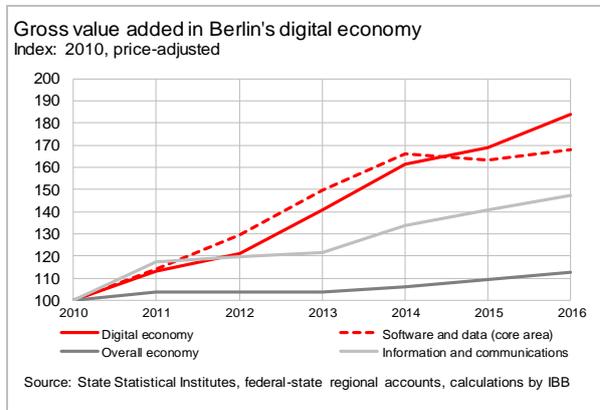
Since 2010, gross value added in Berlin's digital economy has almost doubled to around EUR 4.5bn (last available official figures from 2016). Around 55% of gross value added is generated in the core area of software and data services (EUR 2.5bn). Hardware and infrastructure accounted for EUR 1.4bn and e-commerce with its dynamic growth for EUR 565m.



One should be careful not to underestimate the importance of the digital economy for Berlin's economy as a whole. Especially since the value added generated by the digital economy in 2016 accounted for only 4% of Berlin's total value added. However, if we look at the period from 2010 to 2016, the digital economy accounted for close to 15% of overall economic growth in Berlin. The reason for this is that since 2010 price-adjusted gross value added generated by Berlin's digital economy has grown by EUR 2bn (by an average of 10.7% annually) to EUR 4.5bn. By comparison, the price-adjusted increase in Berlin's economy as a whole totalled EUR 13bn (average of 2.0%) over the same period.

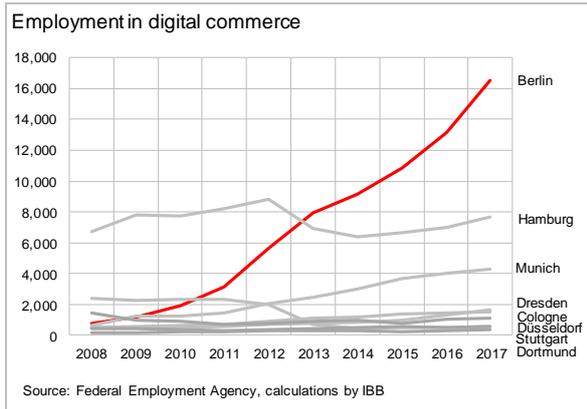


Growth in gross value added is particularly dynamic in e-commerce, rising by an average of 29.3% each year.

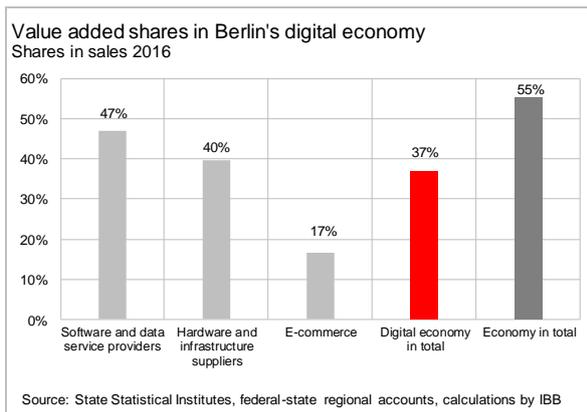


Transformation of the digital economy

In recent years, Berlin has become the most important centre for e-commerce in Germany. The capital city has hence demonstrated that it is not just a successful location for providers of software and data services as well as hardware and infrastructure suppliers, but that it is also a centre of digital transformation for other areas of the economy. In Berlin today, 16,520 people work in e-commerce, a sector in Berlin that employed just only 805 people when it kicked off in 2008 and which has now left Hamburg (7,688 jobs) far behind.



In addition to the considerable increases in employment and value added in e-commerce, it also makes sense to take a look at how much value added was actually generated in Berlin. The share of value added in sales is particularly interesting from the perspective of employees, entrepreneurs and investors.



Value added is, after all, what fuels wages, salaries, profit distributions and dividends. In Berlin, gross value added in the digital economy totals around 37% of sales generated. There are, however, enormous differences in the individual sub-sectors of Berlin's digital economy when it comes to their shares in value added. Providers of software and data services reach 47% and are almost on par with the value added share of Berlin's overall economy (55%). However, hardware and infrastructure suppliers (40%) along with e-commerce (17%) have only below-average value added shares because these sectors require a particularly high level of input from other regions.

Good prospects for the digital transformation

The three areas of the digital economy, i.e. software and data, hardware and infrastructure as well as e-commerce, are good examples of the opportunities and risks which the digital transformation holds for Berlin's economy as a whole.

In the field of hardware and infrastructure, it becomes apparent that the decline in jobs, resulting from digitalisation and automation, does not necessarily have negative consequences for a region. Thanks to higher productivity and a greater value added share, hardware and infrastructure suppliers are still able to make a significant contribution to regional economic growth. Rising gross value added is passed on to consumers and investors in the form of wages and profits. Higher demand for goods and labour indirectly creates new jobs in the region.

If e-commerce in Berlin is to make a lasting, strong contribution towards prosperity and employment in the region, the value added share and productivity will have to be increased. For this to happen, Berlin will not only have to become an important logistics hub for e-commerce in the region itself and for all of Germany, but will also have to permanently establish itself as a management and administrative centre for trans-regional and international markets. The e-commerce sector would also have to invest in the automated production of private labels created in the region and promote the integration of supply chains.

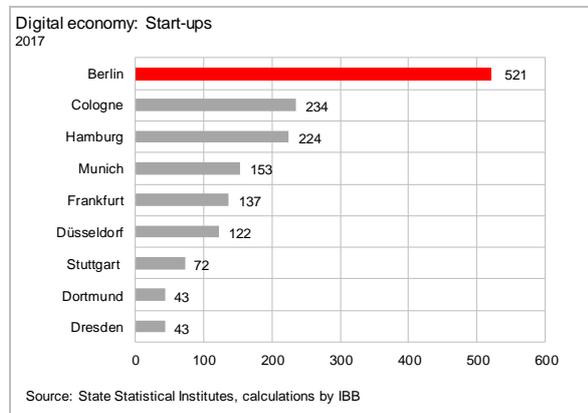
The shift from traditional mail order business to online mail order has been largely completed in Germany. That being said, this sector will undergo significant change in the future. Technical innovation will continue to reduce personnel requirements in logistics operations. The challenge now is the return rate which has risen again. On the other hand, the growing linking of e-commerce with stationary commerce together with much shorter delivery times, thanks to new storage space in the inner city, will lead to

new opportunities for the sector and job prospects in the region.

The software and data services sector is not just the backbone of Berlin’s digital economy, it has also become extremely important for many other sectors in Berlin. This is where the technological know-how of the much-publicised digital transformation can be found, a transformation that is moving ahead rapidly in many areas of the economy. In recent years, both employment and labour productivity have risen steeply in the software and data sector. Productivity will reach a much higher level in the future. Since this sector is extremely knowledge-based, it can be assumed that the value added share will continue to be above-average.

One new digital company every 17 hours

Berlin’s ecosystem of investors, banks, business angels and entrepreneurs has made a name for itself internationally, particularly with a view to start-ups. This is particularly true of the many start-ups in the digital economy.

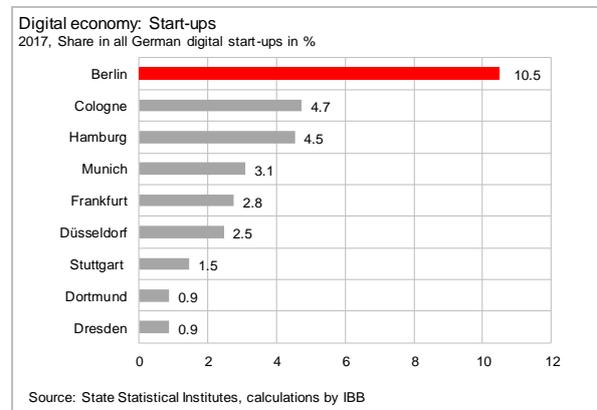


In 2017, 521 new digital companies were launched in Berlin. This means that on average one new digital company is set up every 17 hours in the German capital. These companies are so-called business start-ups, corporations, such as limited liability companies, stock corporations or limited partnerships that are registered in the commercial, association or cooperative register. Unlike simple business

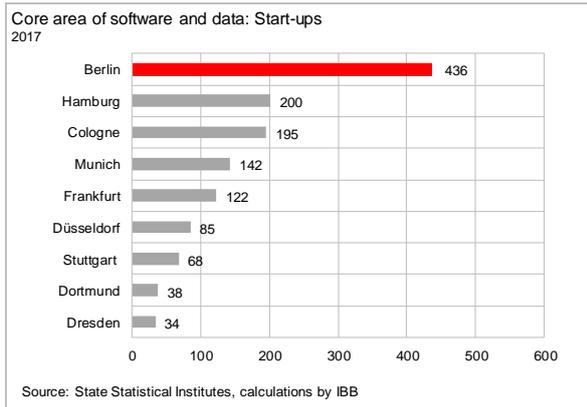
registrations, companies like these can be assumed to be of greater economic importance as soon as they are set up due to the high costs involved in their registration.

Most new start-ups in Berlin were registered by software and data service providers (436). However, new companies have also been set up in e-commerce (56) and in the hardware and infrastructure sector (29). The new companies being set up in Berlin’s digital economy are largely headquarters, just 17% of these are branches.

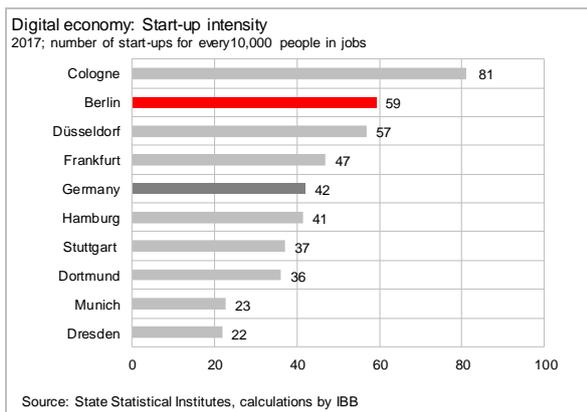
In a comparison of cities across Germany, digital start-ups in Berlin come out tops with every 10th digital start-up in Germany being launched in Berlin (10.5% of all start-ups). The number of new digital start-ups is much lower in Munich (155 start-ups; share: 4.7%), Cologne (234; 4.7%) and Hamburg (224; 2.8%). This means that more companies are set up in Berlin’s digital economy than in Munich, Hamburg and Frankfurt combined.



Accounting for a total of 10.9% (436 start-ups) of start-ups in Germany, Berlin is also the leading city in the technologically innovative core area of software and data services, far ahead of Hamburg (200 start-ups), Cologne (195) and Munich (142). Far fewer software and data service providers opened shop in Stuttgart (82), Düsseldorf (85) and Dresden (34).



However, when digital start-ups are related to employees in this sector, Berlin only comes second. In 2017, there were 59 start-ups for every 10,000 jobs in the digital economy. Only Cologne recorded more digital start-ups (81). The share for Germany as a whole totals 42 start-ups for every 10,000 jobs.



Berlin is benefiting from the digital transformation

Berlin is a winner when it comes to economic transformation as a result of digitalisation. Jobs in Berlin's e-commerce sector have risen steeply, while traditional mail-order business in other regions has failed to adapt to customer requirements. Over the next 15 years, Berlin's strong digital economy will promote the digital transformation process in related areas of the economy. Companies working in the development of artificial intelligence (AI) will play a major role in this. According to a study by Technologie Stiftung Berlin, 223 companies in the capital region with 4,900 employees are already involved in

this subject. This means that around 28% of all German AI companies are located in the Berlin-Brandenburg region. Berlin's technology-orientated key sectors, such as transport, mobility and logistics, as well as energy and the health sector, are likely to benefit in the medium term from this development.

The boost in productivity brought about by the digital transformation along with the growing digital proximity to other international business centres will fundamentally transform the face of work in many sectors. Since these changes in the working world will come about even faster than in the past, life-long learning will have to be promoted both within and outside of companies.

The digital transformation will lead to a loss of jobs in Berlin too. This will be felt particularly in sectors where the automation of simple tasks will lead to greater efficiency and cost savings. But even if simple jobs are lost, new, high-quality jobs will be created to steer digitised processes. What's more, a growing number of jobs will be created in the digital economy. If the higher company profits that result from cost savings remain in Berlin in the form of investment expenditure, this will improve Berlin's economic situation as a business centre. Ultimately, this will benefit private consumers and the government's coffers, and public investment and public services will be stepped up, once again creating new jobs, especially in the services sector.

In a future scenario for Berlin, the economic dividend of the digital transformation will be divided among the future industries, i.e. energy, health, transport, ICT and the creative industries. These industries alone will record economic growth of up to 5.2% p.a. if automation and digitalisation effects are fully implemented and take effect. However, other sectors of the economy, especially those related to business services, offer potential for additional growth. All in all, the model scenario shows that by the end of the next decade, Berlin's gross

value added is likely to rise by an average of 2.5% p.a.

If the digital transformation is implemented with determination, IBB's economic experts calculated in 2015 that Berlin will be among the leading cities with a global digital economy. By 2030, this could lead to around 270,000 new jobs in Berlin's future industries. Due to the rapid rate at which jobs have been created over the past two years in these industries, it is likely that the target will be reached much sooner, by 2025 according to the latest calculations. At the beginning, the digital transformation of mail-order business made Berlin one of the most important places in Germany for e-commerce (B2C). When it comes to the digitisation of production too, Berlin simply cannot be ignored. A trend towards B2B is now emerging. Setting up and operating B2B online solutions as well as services to digitise business processes are in demand in the finance sector. At present, strong growth is currently being seen in the field of fintechs; their productivity-boosting impacts are spreading to banks throughout Germany even though this is likely to lead to positive employment effects, especially in the capital city.

Conclusion

Berlin is and will continue to be Germany's most important centre of the digital economy. The city has gained this position thanks to its unique start-up ecosystem that is also drawing VC investors and the innovation departments of large corporations to this major city on the banks of the river Spree. The importance of Berlin as a scientific hub forms the basis for this start-up scene. That's because more than half of all founders set up shop close to their former university.

The digital economy in Germany's capital city now provides jobs for more than 88,000 people. The core area of software and data services – which currently employs close to 63,000 people – will continue to be the heart of Berlin's digital economy in the future. Based on this know-how, many new companies will be established in other

sectors. Up to now, Berlin has benefited considerably from growth in e-commerce. And other sectors have already embarked into the world of digitalisation.

All in all, Berlin is in a good position to assume a leading role as a location for the digital transformation of the economy in the years and decades to come.

- In the capital city, the digital economy is more important than anywhere else in Germany and is now regarded by international investors as an important start-up hub.
- Besides the digital economy and creative industries, Berlin's future industries, i.e. energy, transport and health, are in an excellent position. But in the years and decades to come, the companies in these industries will also have to find solutions to some of the most urgent social challenges, such as the shortage of finite resources, environmentally friendly mobility and an ageing society.
- Berlin is an important scientific hub with a multitude of universities and research institutes, which are home to clever minds and know-how for the future.
- According to Technologie Stiftung Berlin, there are already 50 to 65 professors in the capital region who are researching and teaching AI-relevant subjects.
- Berlin is an important location for the development of artificial intelligence systems in Germany.
- Berlin is also an attractive city, not just for tourists. The city is also popular among job seekers and this makes it easier for companies in Berlin to recruit skilled international personnel than for companies at less attractive locations.
- As a major centre for services, both customer and business services, Berlin is already prepared for the transformation of the economy from a product to a service society because Berlin was quick to understand the structural change taking place in traditional industry.

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