



ICT,

knowledge and the economy

2016



Ministry of Economic Affairs

**ICT,
knowledge and
the economy
2016
Summary**

Explanation of symbols

.	Data not available
*	Provisional figure
**	Revised provisional figure (but not definite)
x	Publication prohibited (confidential figure)
-	Nil
-	(Between two figures) inclusive
0	(0.0) Less than half of unit concerned
empty cell	Not applicable
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2015/2016	Average for 2015 to 2016 inclusive
2015/'16	Crop year, financial year, school year, etc., beginning in 2015 and ending in 2016
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The publication 'ICT, kennis en economie' ('ICT, knowledge and the economy', available in Dutch only) comprises an introductory chapter, six statistically substantive chapters and several special contributions in a concluding chapter. This summary in English reviews the key facts from each chapter of the publication, item by item.

1 Introduction

This chapter reviews the national and European government policy for ICT and innovation.

ICT, R&D and innovation policy framework (1.1)

- In 2010, the European Commission (EC) launched the Europe 2020 Strategy. In this long-term vision, the EC describes its policy priorities for Europe. The Europe 2020 Strategy includes a prominent role for ICT, innovation, and research and development (R&D).
- The Commission's aim is for R&D expenditures in the EU to reach 3 percent of GDP by 2020. In addition, the Commission aims for the EU to be not only a political and economic union, but an innovative one as well.
- ICT is a means for realising innovative applications for new working and production processes, services and earning models. ICT is often seen as a breakthrough technology; a technology that can change markets with which entrepreneurs in any sector can generate new business.
- A key component of the Europe 2020 Strategy is 'A Digital Agenda for Europe', in which the European Commission describes its ICT policy. This policy focuses on exploiting the economic and social potential of ICT, and especially the internet, to the maximum extent possible, so that ICT can make the maximum possible contribution to economic growth.
- Dutch government policy in the area of ICT as set out in the Digital Agenda, among others, focuses on reducing regulatory pressure by means of digital services, fast and free internet access, digital security and reliability, and digitally skilled workers.

Purpose of this publication (1.2)

- 'ICT, knowledge and the economy' describes the economic and social role of knowledge and technology. The various chapters include frequent comparisons of developments in the Netherlands with those in other countries.
- This report is of a descriptive statistical character. The guideline for the structure of this publication is the availability of official statistics about the themes ICT, R&D and innovation. Descriptions of the interfaces between these themes are also provided extensively.

Structure of this publication (1.3)

- A current picture of the Dutch knowledge economy is crucial in terms of properly identifying developments. Telecommunications and the way in which households and companies use ICT constitute the core of the ICT theme in this publication. The rotation of subjects will result in a publication series in which the emphasis will be on knowledge development in odd years and on technology and application in even years.

2 ICT and the economy

ICT plays an important role in the Dutch economy. This chapter discusses the contribution of ICT to various macroeconomic indicators.

The ICT sector and the Dutch economy (2.1)

- At the end of 2015, 4.6 percent of Dutch companies were active in the ICT sector. The ICT sector's share of the economy has expanded consistently over the years. This is almost entirely due to the fact that the ICT services sector continues to expand.
- In 2015, almost 163 thousand companies were founded in the Netherlands. Of these, 5 percent were in the ICT sector: 7,800 companies. In 2015, almost 100 thousand Dutch companies were discontinued, of which 5 percent were active in the ICT sector.
- In 2014, Dutch ICT companies achieved 5.4 percent more turnover than in 2013. This growth is significantly stronger than in the overall economy (1.6 percent). In 2014, the gross value added of ICT companies also grew significantly stronger than the Dutch economy as a whole: 4.2 percent compared to 1.5 percent.
- In 2014, the ICT sector invested 14.9 percent more than in 2013. Investments in the overall economy grew far less: 2.3 percent.
- The volume of labour in the ICT sector rose by 3.5 percent in 2014. The total volume of labour in the Netherlands also increased somewhat: by 0.1 percent. The ICT services sector is the only component of the ICT sector with growth. Compared to 2013, fewer working years were devoted to the ICT manufacturing sector and the ICT wholesale sector in 2014.
- In 2013, ICT companies accounted for 4.4 percent of the total value added in the Netherlands. From an international perspective this is not a high proportion.
- The production of the Dutch telecom sector was over 16.4 billion euros in 2014. This is virtually the same as in 2013, but more than 13 percent lower than in 2005. The value added of the Dutch telecom sector was almost 8 billion euros. This represents 1.2 percent of the gross domestic product (GDP).

ICT and employment (2.2)

- In 2015 there were 356 thousand employed ICT workers in various business sectors of the Dutch economy. That is considerably more than in 2014, when 336 thousand ICT workers were active. Since 2012, the number of employed ICT workers in the Netherlands has increased continuously.
- In 2014, ICT workers represented 4.1 percent of the total employed labour force in the Netherlands. The representation of ICT workers in the 'Information and communication' sector is much higher than this average. Furthermore, relatively many ICT workers are employed by energy companies and financial institutions.
- The average age of ICT workers increased considerably between 2005 and 2015. In 2005, 26 percent of all employed ICT workers were 45 years or older; in 2015 this figure was 39 percent.
- In the fourth quarter of 2015, there were almost 11 thousand job openings in the ICT sector. This is over 3 thousand more than the previous year. At the beginning of 2005, the ICT sector accounted for 5 percent of all job openings in the Netherlands. By the end of 2015, this number had grown to 8 percent.

ICT expenditure (2.3)

- In 2014, Dutch companies and government organisations collectively invested almost 123 billion euros. Of this amount, almost 23 billion euros were invested in ICT capital. ICT investments have been continuously increasing since 2010.
- In 2014, Dutch companies and government organisations collectively invested over 17 billion euros in software. The share of software has continued to grow in recent years.
- In 2014, Dutch companies and government organisations spent approximately 35 billion euros on ICT; consumers over 12 billion euros. Collectively this represents over 47 billion euros in goods and services. In 2013, this was approximately 46 billion euros.
- Expenditure on ICT goods amounted to 11.7 billion euros in 2014. This is 4 percent more than in 2013. Companies, government organisations, as well as households spent more on ICT goods in 2014 than a year earlier. Spending on ICT services grew by 3 percent; from 34.7 to 35.6 billion euros.

International trade in ICT (2.4)

- In 2014, the Netherlands imported over 50 billion euros in ICT goods and services. This is 4.2 percent more than in 2013.
- In 2014, the Netherlands exported over 28.5 billion euros worth of ICT. This is 4.2 percent higher than the year before. These figures do not include re-exports. Goods accounted for almost 18 billion euros in ICT exports; services for 10.5 billion euros.

- In 2014, the Netherlands re-exported 38.4 billion euros worth of ICT. This represents 57.4 percent of total ICT exports.
- In 2013, the Netherlands accounted for 3.5 percent of the global export value of ICT services. The corresponding figure for 2007 was 4.5 percent.
- The export value of ICT services from the Netherlands grew by an average of 5.3 percent per year between 2009 and 2013. Exports of ICT goods increased by an average of 2.7 percent per year.
- In the Netherlands, the value of imported ICT services in 2013 was virtually the same as in 2009. By contrast, imports of ICT goods in the Netherlands grew by an average of 5.5 percent per year between 2009 and 2013.
- At the end of 2015, 28 percent of the value of ICT goods imported by the Netherlands came from China. Germany too is a key and stable trading partner for the Netherlands. At the end of 2015, just under 20 percent of the Dutch export value of ICT goods went to Germany.

3 Telecommunications

The efficient use of information and communication resources requires a solid infrastructure. This ICT infrastructure is the key theme of this chapter.

Internet (3.1)

- The Amsterdam Internet Exchange (AMS-IX) recorded 863 thousand terabytes of data traffic in December 2015. This represents a 27 percent increase in comparison to the same period in the previous year.
- The Netherlands has a large number of fixed internet connections compared to other countries. In mid-2015 the Netherlands had 41 fixed broadband connections per 100 inhabitants.
- 96 percent of the addresses in the Netherlands had a fixed connection of at least 30 Mbps at their disposal at the beginning of 2015.
- In the Netherlands, 3 percent of households and 9 percent of business establishments do not have the possibility of acquiring an internet connection with a speed of at least 30 Mbps.
- Many Dutch households use cable for their internet connection (47 percent of fixed broadband connections) or DSL (42 percent).
- In June 2015, there were 75 mobile broadband connections per 100 inhabitants in the Netherlands.

Telephony (3.2)

- In 2015, the Netherlands had 6.9 million fixed telephone connections. This is significantly fewer than the peak of almost 10 million reached in 2000.

- The number of connections via the traditional PSTN or ISDN network structurally dropped over the 2007–2015 period, while the number of VoIP internet connections rose.
- At the end of 2015 there were over 23 million mobile telephone connections in the Netherlands.
- In the first half of 2015, almost twice as much data traffic over mobile telephone networks was recorded as the year before: 49 billion MB.
- The number of call minutes increased in 2015. A total of 14.0 billion call minutes was recorded in the first half of 2015. A year earlier this was 12.8 billion.
- SMS messaging has declined in popularity in recent years. There were 1.8 billion SMS messages in the first half of 2015.

Television and radio (3.3)

- In the third quarter of 2015, 756 thousand households in the Netherlands were watching television over fibre, compared to 616 thousand at the end of 2014.
- The number of cable TV subscriptions by contrast dropped from 4.6 million at the end of 2014 to 4.4 million in the third quarter of 2015.
- Many Dutch households purchase multiple telecom services from a single provider. In the third quarter of 2015, there were 6.1 million subscriptions with a combination of different telecom services in the Netherlands.
- In 2015, 26 percent of the Dutch population 12 years and older had ever heard of DAB+ (terrestrial digital audio broadcasting). In 2015, 6 percent of the Dutch population owned a DAB+ receiver.

4 ICT use by households and individuals

Virtually every Dutch citizen has access to the internet; at home via a fixed connection or elsewhere via a smartphone. This chapter describes the devices and internet connections used by the Dutch population, as well as the popular applications.

ICT facilities in households (4.1)

- In 2015, 89 percent of households had a desktop or laptop. This amounted to 6.8 million households, comprising 13.3 million individuals. In 2015, 91 percent of households had access to the internet. These figures have been stable for some years now. The Netherlands scores higher than many other European countries.
- In 2015, 73 percent of households had smartphones, while 72 percent had laptops. In addition, 58 percent of households had a tablet. The corresponding

figure for 2013 was 39 percent. Other devices were also more popular in 2015 than in previous years, with the exception of desktops.

- In 2015, 71 percent of the Dutch population used a mobile device to access the internet. The corresponding figure for 2012 was only 52 percent. In 2015, 67 percent used a smartphone to access the internet, compared to 40 percent in 2012. Tablets also have become more popular as a mobile device to access the internet.
- In 2015, 81 percent of the Dutch population accessed the internet daily or virtually every day. In recent years, there has been little growth; in 2013, 78 percent of the Dutch population went online every day.

Activities and services on the internet (4.2)

- In 2015, similar to previous years, 85 percent of the Dutch population used the internet for e-mail. In addition, the popularity of chatting online has not changed a great deal since 2012. By contrast, internet-based telephony increased significantly in recent years; from 23 percent in 2012 to 31 percent in 2015.
- In 2012, 72 percent engaged in online banking. The corresponding figure for 2015 was 77 percent. Internet banking is most popular among individuals between 25 and 45 years of age. In this age group, over nine in ten people engage in internet banking.
- In 2014, as well as 2015, one third of the Dutch population made use of cloud computing. This is higher than the EU average. One in ten cloud users pay for this service. Almost nine in ten cloud users store photos in the cloud. In addition, many users store text files, spreadsheets and presentations on the internet: 58 percent.
- Almost three-quarters of the Dutch population 12 years and older were active in a social network in 2015. Most popular is the exchange of messages using instant messaging, such as WhatsApp. Services such as Facebook and Twitter are also popular. More than half of the Dutch population is active on a network of this nature. Between 2012 and 2015, especially the number of older people using social networks increased.

Online shopping (4.3)

- In 2015, 70 percent of the Dutch population 12 years and older made an online purchase. The corresponding figure for 2012 was only 64 percent. This represents a proportion of 10.1 million people in 2015, compared to 2.2 million who did not shop online.
- The Netherlands has relatively more e-shoppers than many other EU countries. In 2015, 71 percent of people aged 16 to 75 in the Netherlands engaged in online shopping, while the EU average was 53 percent.

- Especially individuals aged 25 to 45 like to make purchases over the internet. In 2015, 88 percent of this age group purchased goods or services online.
- Of the group of highly educated individuals, 88 percent made online purchases in 2015. This proportion was 50 percent among the group of less educated individuals.
- In 2015, 72 percent of men shopped online at one time or another. The corresponding proportion for women was 68 percent. On average, men also spent more money online than women.
- Clothing, sports items, trips and event tickets have been the most popular online purchases for years.
- In 2015, 93 percent of e-shoppers purchased products from Dutch webshops. Almost one in three (also) purchased goods or services from other EU countries (30 percent). One-fifth purchased products outside the EU.
- In 2015, four in ten e-shoppers experienced problems with their purchase. The most frequently cited problem was the late delivery of products; 23 percent of e-shoppers have experienced difficulty with this.
- Of the 15 percent of the Dutch population who in the twelve months prior to the survey did not shop online but did use the internet, 78 percent preferred going to a retail outlet, for example to view the product in real life. One quarter did not really know how online shopping works or had too little experience with it.

ICT skills (4.4)

- In 2015, 21 percent of the Dutch population had few skills in the use of ICT. In addition, 1 percent had no skills. Most people in the Netherlands have basic ICT skills at the very least. The largest proportion in fact has more than basic computer and internet skills.
- In 2015, over six in ten younger people aged 12 to 25 had better than basic skills in the use of ICT. This proportion was also high in the 25 to 45 age group. Older people score significantly lower.
- There is a wide gap not only between younger and older people, but also between highly educated and less educated people.
- Together with various other countries such as Denmark and Finland, the Netherlands is among the EU countries with the largest share of inhabitants who have more than basic ICT skills.
- In 2015, 79 percent of the Dutch population had more than basic skills in the area of 'information'. An ample majority has more than basic skills in the areas 'communications' and 'computers/online services'. In the 'software' area, slightly fewer than half have more than basic skills.

Internet security (4.5)

- In 2015, more than half of the Dutch population at one time or another decided not to engage in internet activities because of security-related concerns. This applies equally to men and women. Individuals aged 25 to 64 years are the most reticent.
- Due to security-related concerns, posting of personal information to social networks in particular is done less frequently. In 2015, four in ten people in the Netherlands at one time or another decided not to post any information because of security-related concerns.
- In 2015, 8 percent of the Dutch population experienced a security incident on the internet. Infection by a computer virus, causing data to be lost, was the most commonly occurring online incident. Six percent of the Dutch population experienced this problem in 2015.
- In 2015, 11.1 percent of the Dutch population aged 15 years and older was a victim of cybercrime. Hacking is the most common occurrence, followed by cyber-bullying and purchasing and sales fraud. Cyber-bullying in particular causes people to fall victim repeatedly.
- Sixty-one percent of the Dutch population at one time or another backed up their files in 2015. Men more often make backups than women (65 percent versus 56 percent). There is a high difference between highly educated and less educated individuals: 74 percent versus 47 percent.
- In the EU, one quarter of internet users aged 16 to 74 experienced internet security incidents in 2015. At 11 percent, the Netherlands is far below that average.

5 ICT use by companies

ICT is essential for companies. A large part of communications within and among companies is electronic, for example. This chapter describes how companies use ICT.

The workforce and ICT (5.1)

- In 2015, 66 percent of employees regularly used a computer with internet access to perform their work. In the Netherlands, a significantly larger proportion of employees works with the internet than the EU average. The EU-28 average was 49 percent in 2015.
- In 2015, 74 percent of companies provided support for teleworking.
- Over one quarter of all employees regularly teleworks: 26 percent.
- In 2014, 14 percent of companies provided their own ICT specialists with an opportunity to take professional courses. A somewhat smaller proportion of companies provided other workers with the option to take an ICT course, namely 10 percent.

- In 2014, 9 percent of companies had job openings for ICT specialists. Half of these companies had difficulty staffing their job openings.

Internet access and use (5.2)

- Virtually all companies have internet access. In recent years, almost all companies with ten or more employees have a high-quality fixed or mobile connection such as optical fibre, cable, DSL or 3G/4G.
- In 2015, 74 percent of companies had a mobile connection. In 2009, only 28 percent of companies used mobile internet.
- In 2015, 49 percent of Dutch companies had an internet connection that was at least 30 Mbps. The corresponding average in the EU was 27 percent.
- In 2015, 73 percent of Dutch companies gave their employees laptops, tablets or smartphones for mobile access to the internet.
- In 2015, 90 percent of Dutch companies had their own website. As such, the Netherlands scores significantly higher than the EU average of 75 percent.

Companies and social media (5.3)

- In 2015, 63 percent of companies with 10 or more employees used at least one form of social media. Especially many companies in the 'Information and Communications' sector use social media: 85 percent.
- In the EU as a whole, 39 percent of companies make use of social media versus 63 percent in the Netherlands.
- Social networks are the most popular form of social media among companies.
- In 2015, 27 percent of Dutch companies used multi-media applications such as YouTube. This is more than twice as high as the EU average.

Electronic and digital invoices (5.4)

- In 2014, 54 percent of companies sent digital invoices to business partners: other companies and government organisations. The corresponding figure for 2012 was just 33 percent. In 2014, 79 percent of companies received digital invoices.
- In 2014, 15 percent of Dutch companies sent invoices that can be processed fully automatically: e-invoices.
- The transmission and receipt of digital invoices is most common in the ICT sector.
- For most companies, invoicing largely continues to be paper-based. This applies to the invoices sent as well as received. In 2014, the average company still sent out 70 percent of its invoices on paper. The other 29 percent was sent out digitally: 5 percent as e-invoices and 24 percent in a different digital form.

E-commerce (5.5)

- In 2014, 24 percent of Dutch companies sold products or services online. The number of companies selling online in 2014 was only slightly more than in 2012 and 2013.
- The tourism sector has the largest proportion of companies selling online.
- The average company realises 40 percent of its total web turnover from sales to Dutch consumers versus 4 percent from sales to consumers abroad. Sales to other companies and to government organisations represent 51 and 4 percent, respectively, of the total web turnover of an average Dutch company.
- In 2014, almost half of Dutch companies made purchases via e-commerce: 47 percent. This is higher than the EU average.

Company ICT security (5.6)

- In 2015, 31 percent of Dutch companies had a formally adopted ICT security policy.
- In the Netherlands, the number of companies with a formally adopted ICT security policy is slightly lower than the EU average.
- Most companies with a formal ICT security policy review it on a regular basis. Two-thirds of these companies had updated their policy less than one year prior to this survey. For one in six companies, this was more than two years ago.

6 Innovation

This chapter describes the status and development of innovation at Dutch companies; a key component of the Dutch knowledge economy. Innovation stimulates labour productivity and as such has the potential of contributing to the Netherlands' international competitive position.

Innovative companies (6.1)

- Slightly less than half of companies was innovative over the period 2012–2014: 48 percent. This percentage is calculated in accordance with the broad definition of innovation: technological and/or non-technological. According to the classical definition, 37 percent of companies was innovative.
- The proportion of innovative companies was considerably higher in 2012–2014 than in 2010–2012 when it was still 38 percent. The growth in the proportion of innovative companies is especially due to companies that innovate exclusively technologically. In addition, the proportion of companies that innovated exclusively non-technologically also grew.

Technological innovation (6.2)

- In the period 2012–2014, 37 percent of companies were technologically innovative. In those years, 34 percent of all companies completed a technological innovation; 4 percent was working on technological innovations, but had not completed these innovations.
- Many companies in the 'Electrical and mechanical engineering' industry are innovative. This is also true of the 'Information and communication' sector. Technological innovations are far less common in 'Financial institutions' and in the 'Hotels and restaurants' sectors, for example. In many sectors, more companies were technologically innovative in the years 2012–2014 than two years prior.
- In 2012–2014, 67 percent of ICT companies were technologically innovative. This percentage is much higher than for all companies combined. The ICT services sector in particular scores much higher than the services sector as a whole.
- Of all companies that had completed technological innovations in the years 2012–2014, 33 percent were exclusively engaged in product innovation; 32 percent were exclusively engaged in process innovation. The remaining 35 percent combined process innovation with product innovation.
- In 2014, new or significantly improved products represented 21 percent of the total turnover of product innovators. This is somewhat lower than in 2012, when this proportion was 23 percent.
- In 2014, product innovations represented 9 percent of the total turnover of all companies. The corresponding figure for 2012 was 8 percent. For industrial companies, new products represent a larger share of the total turnover than for companies in the services sector: 16 versus 8 percent in 2014.
- Companies spend more than half of their innovation-related expenditures on their own R&D: 60 percent in 2014. Expenditures on outsourced R&D rank second (26 percent), followed by the acquisition of machines, equipment and software (10 percent).
- In the period 2012–2014, 38 percent of technological innovators were working together with other companies or institutions in this area. Partnerships with suppliers in particular are gaining in popularity.

Non-technological innovation (6.3)

- In the period 2012–2014, 29 percent of companies completed a non-technological innovation. Two years before, the corresponding figure was 26 percent.
- Organisational innovations are just as popular as marketing innovations. In 2012–2014, 19 percent of companies was engaged in both forms of non-technological innovation.

- In terms of organisational innovations, new business procedures are the most popular. In 2012–2014, 14 percent of companies realised an innovation of this nature. The most popular marketing innovation is the use of new media: 14 percent of companies introduced the use of new media or new advertising techniques.
- In 2012–2014, 49 percent of ICT companies was non-technologically innovative. This percentage is much higher than for all companies combined. The ICT services sector in particular scored higher than average in terms of technological innovation; while the ICT manufacturing sector stands out in terms of non-technological innovation. ICT companies are highly innovative across the entire line; in a technological and in a non-technological sense.

7 R&D and patents

Research and development (R&D) are important to an economy that primarily competes on knowledge. An indication of the potential value of new knowledge is the number of patents filed by a company, sector or country to commercially protect its inventions.

R&D in the Netherlands (7.1)

- In 2014, total R&D spending in the Netherlands using in-house personnel was 13.3 billion euros. This is 522 million euros more than in 2013: a growth of 4.1 percent.
- R&D spending by the business sector increased at a higher rate than that of public research institutions and higher education: 4.8 percent compared to 0.8 and 4.2 percent, respectively.
- In 2014, the R&D intensity in the Netherlands was 2.00 percent of GDP. A year earlier this was 1.96 percent. In 2014, the R&D intensity in the EU as a whole was 1.94 percent of GDP. The average of all OECD countries was 2.37 percent.
- In 2014, Dutch companies and institutions together devoted over 124 thousand working years to R&D. This is 900 working years more than in 2013: a growth of 0.7 percent.
- Companies account for the largest share of the R&D working years. In 2014, they accounted for 62 percent of the total number of FTEs in the Netherlands, versus 27 percent in higher education and 11 percent in public research institutions.
- In 2014, Dutch companies accounted for 56 percent of total R&D spending. In the European Union as a whole, this proportion was 63 percent, while in OECD countries the average was 68 percent.
- The manufacturing industry accounted for the largest share of R&D spending by the business sector: 59 percent in 2014. By contrast, only a quarter of all

companies performing R&D are part of the manufacturing industry. As such, the average R&D expenditure per company in manufacturing is over four times as high as it is in the services sector.

- Large companies are characterised by high R&D expenditures per company and per working year. Of all companies that conducted R&D in 2014, 3 percent had 250 or more employees. Collectively these companies accounted for 60 percent of total R&D spending and 44 percent of R&D employment in the business sector.
- Of all companies that conducted R&D in 2014, 18 percent were ICT companies. In the services sector, the ICT sector accounts for as much as 25 percent.
- In 2014, the ICT manufacturing sector accounted for 344 million euros in R&D expenditures: 8 percent of total R&D spending by the manufacturing industry. The ICT services sector spent 820 million euros on R&D: 31 percent of the total R&D spending by the Dutch services sector.
- In 2014, Dutch companies and institutions spent 13.3 billion euros on R&D. Of this, the business sector financed over 6.8 billion euros: 51 percent. In addition, 33 percent directly originated from government institutions, while 13 percent originated from abroad.

Patents (7.2)

- In 2011, Dutch parties (companies, institutions and private individuals) filed 280 patent applications with the European Patent Office (EPO) for every one billion euros spent on R&D. For the Netherlands, this number is much higher than the EU-28 average of 220 patent applications.
- Of all patent applications filed with the EPO by Dutch parties in 2011, 32 percent concerned ICT.
- In 2011, the Netherlands filed a relatively large number of patent applications in the area of nanotechnology: 1.8 per million inhabitants. This number is significantly higher than the 0.7 EU average. The Netherlands was also strong in the area of biotechnology.

8 Special contributions

The final chapter of this publication contains three contributions that broaden and deepen the theme of this publication. These contributions are available in Dutch only. The following summaries give a brief impression of their contents.

Museums and internet data (8.1)

Statistics Netherlands (CBS) has linked its own Museum Statistics database to a file with information about all websites in the Dutch internet domain. CBS wanted

to use this as an experimental means of acquiring information about museum websites: do the websites refer to social media, are they smartphone-friendly, do they offer online payment facilities and does the museum use the website to recruit personnel? This article describes the findings of this research.

The evolution of e-commerce (8.2)

This article describes the emergence of e-commerce. First, the article describes the search for a clear definition of e-commerce. In addition, the article broaches the nature and scope of a number of e-commerce markets. Finally, the article notes that the internet has tremendously simplified the opportunities available for bringing supply and demand together. This has broken down the traditional division of roles between the actors in an economy. This means that e-commerce is not only about the 'e' in electronic, but is also tinkering with the boundaries of the 'c' in commerce.

Software in use: the silent engine behind economic growth (8.3)

Long-term economic growth is driven by technological revolutions. At the present time, ICT has already generated four times more economic growth than the steam engine during the Industrial Revolution. And the end of this growth is not yet in sight by any means. In fact, we stand on the eve of a new growth spurt. Active end-users and software companies that emerged outside the ICT sector itself play a key role in this respect. In this article, the Dialogic research agency explores this area in-depth.

Key Indicators, National

	2008	2009	2010	2011	2012	2013	2014	2015
ICT and the economy	% changes in volume compared to the previous year							
ICT investments	5.2	-2.9	3.4	6.4	2.3	0.7	6.6	.
ICT sector production value	3.7	-3.2	0.2	6.9	1.5	3.6	5.4	.
ICT sector employed persons volume of labour ¹⁾	4.1	-1.0	-1.9	1.9	0.8	0.2	3.5	.
ICT sector gross value added	4.3	-4.4	0.5	3.3	1.7	4.4	4.2	.
of which								
ICT manufacturing sector	11.4	-12.3	-3.5	6.0	8.1	16.1	11.2	.
wholesale of ICT equipment	-2.2	-8.3	3.3	4.4	-2.5	2.0	1.1	.
ICT services sector	4.4	-2.6	0.5	2.7	1.7	3.4	4.0	.
	Number (x 1,000)							
Companies in the ICT sector ²⁾	49	53	56	59	61	63	67	70
ICT and labour								
Job openings in the ICT sector ³⁾	12.2	5.3	7.0	7.9	7.0	6.5	7.8	9.8
Employed labour force with an ICT position	269	262	269	267	274	329	336	356
Telecommunications infrastructure⁴⁾	Number (x 1 million)							
Fixed telephone connections: PSTN/ISDN	4.4	3.9	3.4	2.9	2.5	2.0	1.7	1.4
Fixed telephone connections: VoIP/VoB	2.9	3.4	3.8	4.2	4.6	5.1	5.3	5.5
Mobile telephone connections	20.6	20.7	20.6	21.8	21.7	21.7	22.6	23.3
Broadband connections: Cable	2.2	2.4	2.6	2.8	3.0	3.0	3.0	3.2
Broadband connections: DSL	3.6	3.6	3.6	3.4	3.3	3.2	3.2	2.9
Broadband connections: Fibre (Ftth)	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.8
ICT use by households and individuals	% of households⁵⁾							
PC (desktop/laptop)	.	.	.	.	89	89	89	89
Access to internet at home	.	.	.	.	88	89	90	91
	% of individuals aged 12 and older							
Frequent e-shopper ⁶⁾ ⁷⁾	46	50	53	54
Infrequent e-shopper ⁸⁾	18	18	16	16
ICT use by companies⁹⁾¹⁰⁾	% of companies							
Companies with internet access	96	98	100	.	100	100	100	100
Companies with a website	84	82	83	.	84	84	90	90
Companies that allow telework	56	56	62	.	59	64	69	74
	% of employed individuals							
Employees who use a computer	66	66	67	.	66	68	70	71
Employees who use the internet	57	61	60	.	60	61	65	66
Teleworkers	18	19	21	.	22	25	27	26

Source: Statistics Netherlands (CBS); ACM; OECD.

¹⁾ 2014 figures are provisional.

²⁾ Status in fourth quarter; 2015 figures are provisional.

³⁾ Average of four quarters.

⁴⁾ 2015 figures are up to and including the 3rd quarter 2015, remaining years are up to and including the 4th quarter.
Broadband connections: June 2015.

⁵⁾ Private households with at least one person aged 12 years or older.

⁶⁾ Frequent e-shoppers made an online purchase in the three months prior to the survey.

⁷⁾ Infrequent e-shoppers only made an online purchase up to three months prior to the survey.

⁸⁾ Due to the changed methodology, the 2014 and 2015 figures are no longer comparable to the figures for previous years.

⁹⁾ Companies with 10 or more employed persons.

¹⁰⁾ For the period 2008-2010 this concerns the situation in December of the relevant year. The 2012 figure pertains to January 2012; the figures for 2013, 2014 and 2015 pertain to June.

Key Indicators, International

	EU-28	Belgium	Denmark	Germany	Finland	France	Ireland	The Netherlands	United Kingdom	Sweden	United States
ICT and the economy	%										
ICT sector share of total economy, 2013 ¹⁾	.	3.7	4.1	4.8	5.6	4.3	7.0	4.4	5.5	6.8	6.1
Share of ICT specialists, 2014	.	3.8	4.2	3.5	6.0	2.8	4.4	4.3	4.7	5.3	4.1
Telecommunications infrastructure	Per 100 inhabitants										
Fixed broadband connections, June 2015	.	36	42	37	32	40	28	41	37	34	32
Mobile broadband connections, June 2015	.	62	113	65	139	68	87	75	85	118	111
Fibre connections, June 2015 ²⁾	.	0.1	9.4	0.5	1.2	1.7	0.1	4.7	.	15.8	3.0
ICT use by households and individuals, 2015	% of households ³⁾										
Households with internet access	83	82	92	90	90	83	85	96	91	91	.
	% of internet users ⁴⁾										
Use of cloud computing ⁵⁾	25	29	43	23	35	19	35	36	43	41	.
Internet security incidents ⁶⁾	25	29	29	18	18	33	14	11	24	28	.
ICT use by companies, 2015	% of companies ⁷⁾										
Companies with internet speeds of at least 30 Mbit/sec	27	45	55	30	39	21	34	49	25	49	.
Companies with e-commerce sales ⁸⁾	19	26	27	27	19	21	32	25	23	28	.
Companies making e-commerce purchases	40	43	.	54	51	43	47	47	51	44	.
Research & development (R&D)	% of GDP										
R&D intensity, 2014 ⁹⁾ ¹⁰⁾	1.94	2.46	3.05	2.84	3.17	2.26	1.52	2.00	1.70	3.16	2.74

Source: Statistics Netherlands (CBS), OECD, Eurostat.

¹⁾ Ireland, United Kingdom, Sweden and Germany: 2012 instead of 2013.

²⁾ Fibre to the Home (FttH).

³⁾ Private households with at least one person aged 16 up to and including 74 years.

⁴⁾ Individuals aged 16 up to and including 74 years who used the internet in the three months prior to the survey.

⁵⁾ Files stored on the internet in the three months prior to the survey.

⁶⁾ People who experienced at least one the following incidents in the twelve months prior to the survey: computer virus, misuse of personal data, phishing or pharming, credit card fraud and access by children to inappropriate websites.

⁷⁾ Companies with 10 or more employed persons, limited number of NACE sectors.

⁸⁾ E-commerce sales of 1 percent or more of the company's total sales value (turnover).

⁹⁾ Provisional figures.

¹⁰⁾ United States: 2013 instead of 2014.