Summary and conclusions

This part of the publication summarises the main issues per chapter. There is one introductory chapter, six statistical chapters and a Capita Selecta.

Introduction (chapter 1)

Technological innovations can lead to major economic and social changes. The invention of the steam engine is a classical example. People ascribe a similar role to ICT. With the publication of *The Digital Economy* Statistics Netherlands want to help quantify the role of ICT in the economy and society.

Dutch government policy focuses on promoting the expansion of ICT in the widest sense with the aim to push the Netherlands to the top in Europe. The Netherlands already occupies a top position in several domains, such as the use of broadband. High on the Dutch ICT agenda are e-skills and e-government.

This publication is based on a model emphasising the use and supply of ICT. The ICT sector and ICT infrastructure play a major role in this model.
The chapters in this publication deal with the relationship between ICT and the economy, the ICT sector itself and the use of ICT in society. The role knowledge plays is also discussed.

ICT and the economy (chapter 2)

In 2007 the Dutch economy saw a 3.5 percent growth rate, the highest Gross Domestic Product increase since 2000. In the first half of 2008 there was also some growth, albeit more modest. The ICT sector has been eager to benefit from the economic recovery since 2004, especially ICT services. Domestic ICT investments increased to nearly 15 billion euro in 2006.
The Dutch telecom sector has contributed about 2.4 percent to Gross Domestic Product in 2007. The contribution of mobile telephony to it increased, as well as non-speech services in mobile telephony.
The international trade in ICT goods and services boomed in the past decade, both imports and exports flourished in the Netherlands. The share of software in the trade of ICT goods increased.

Telecom (chapter 3)

The main development in telecom in recent years has undoubtedly been the convergence of services. While telephone, television and the internet used to be supplied by different providers and networks, they are now increasingly supplied in packages by one provider through one network. More and more consumers opt for this because of the ease and lower costs involved.

In terms of internet use, the Netherlands is among the European top, while the use is still increasing. The volume of internet traffic keeps expanding. This is stimulated by the increasing spread of broadband and more intensive internet use. The number of glass fibre cable connections is still quite limited.
Digital television has gained popularity in the Netherlands: by the end of 2007 over 3 million households used this application. There is a multitude of supply methods: terrestrial, satellite, cable and the internet. Digital radio is also gaining popularity, but not quite as much as digital television.

ICT use by companies (chapter 4)

ICT use by companies in the Netherlands is not among the absolute international top. In Denmark, Finland and Sweden companies use ICT even more intensively. In addition, Dutch companies were not exactly early adopters of the various ICT applications. Several years ago the use of broadband internet and online purchases and sales by Dutch companies was still average compared to the rest of the EU. In 2007 Dutch companies used these above average though. Companies in the Netherlands now commonly have broadband internet and their own website. This means there is a critical mass for advanced, large-scale ICT applications.
Using ICT to support business processes in Dutch manufacturing focuses more on the production and distribution chain. In the Dutch services, it focuses more on marketing and the customer.

One in five companies used open source operating software by December 2007. These were mainly major companies. This seems due to the difference in knowledge in how to work with open source.
Automated data exchange (ADE) has advantages in terms of efficiency and standardising services and products. Major companies have adopted this working method mostly: 43 percent of the companies with more than 500 employees applied ADE for, for example, sending purchase orders to suppliers.

Chain integration is mostly the domain of major companies in trade and industry. Almost a third of the largest companies applied some form of chain integration by the end of 2007.
Online purchasing and sales by companies is still increasing by the year. This is true for the number of companies using the facilities and for the volume of these transactions. Turnover of e-commerce in 1999 was just over 3 percent of total turnover by companies. In 2007 this had increased to nearly 15 percent.
Almost half of all companies in the Netherlands facilitate telework. It is common among the major companies: about 90 percent of companies with more than 250 employees has personnel teleworking. Compared to the group of benchmark countries, the number of Dutch companies with teleworkers is average.

ICT use by households and individuals (chapter 5)

In 2008, over six in seven households have internet access, three quarters with a broadband connection. More and more people use mobile devices such as wireless laptops, mobile phones, palmtops and game computers: mostly men. The Netherlands continues to be an international frontrunner where the availability of ICT in households is concerned.

Communication is the top activity of internet users. Media use through the internet also expanded, like listening to internet radio or watching TV through the internet. Other kinds of communication, including chatting and online discussion forums, are losing popularity.

More and more consumers in the Netherlands order or buy goods online. By 2008 some 7.7 million people had bought products online at some point. This figure is more than double in six years time. The frequency of online shopping primarily correlates positively with education level.
In 2008, over half of the internet users indicated that they use the internet for government enquiries. Completing government business by downloading documents and returning them completed (tax returns, work applications) increased again in 2008.

The mobile phone was rapidly accepted by the majority: over nine in ten people in the Netherlands aged 12-74 sometimes use a mobile phone. Only 10 percent of the users use it to access the internet. Other applications, such as mailing photos, reading email

and placing films and photos made with the mobile phone on the internet are also still used sparingly.

ICT use in the public sector (chapter 6)

The Dutch government uses ICT in its services to citizens, companies and among its different layers on a large scale. One well-known development by the government is the introduction of DigiD. On 1 January 2008, almost 32 percent of the Dutch population had a DigiD. A year earlier, this was just 11 percent. People with an immigrant background rapidly closed the gap. Age-dependent legislations on pensions and study financing, together with income tax returns, hugely influenced DigiD ownership.
In education, there was a reduction of the number of students per computer and an increase in the number of teachers who use computers in class. Schools feel that ICT contributed a great deal to making education more attractive.

In the care sector, ICT tools are as widespread as elsewhere in the economy. Many more people working in health care regularly used a computer and the internet than in social work in 2007.
E-health is an up and coming area where medical informatics, health care and business-like actions come together. The best-known application is the electronic patient dossier.

ICT knowledge (chapter 7)

Information, communication and knowledge have converged because of ICT. Studying ICT contributes to new insights. R&D in ICT has grown worldwide. However, total R&D expenditure in the Netherlands is low when compared internationally. Moreover, R&D spending of the ICT sector has fluctuated greatly. Still the Netherlands applied for many patents, of which a third is ICT-related. The Netherlands also applied for relatively many high-tech patents. It may be that applying for patents has a strong cultural component.

ICT education is important in spreading and extending ICT knowledge and skills. However, the number of informatics graduates fell in 2006/'07, although from an international perspective the Netherlands is performing well in this area. The study of communication systems has greatly expanded. This development is in line with other developments described elsewhere in this publication, which shows that the C in ICT has most changed the economy and society.

Only a fraction of the population participates in ICT education so that specialist ICT knowledge is scarce. General computer and internet skills did increase among the Dutch population, probably as a direct consequence of growing computer and internet use rather than ICT education. Dutch people are just slightly more skilled in the use of computers than the average in Europe, internet skills are average. There is still a large group in the Netherlands without any or with very few ICT skills.

The use of mobile services (Capita Selecta)

The Delft University of Technology has been studying the use of mobile phone services since 2007. It shows that the use of mobile phones in the Netherlands is widely accepted. A very popular service is SMS. Other services are not yet as popular, such as downloading ringtones, email and looking up information. The use of mobile services depends on the sex, age and income of the user. The use of the various mobile services in the Netherlands is still in its early stages compared to Finland.

ICT labour market in perspective (Capita Selecta)

ICT~office has studied the future shortage on the ICT labour market. The inflow of students at the college and university studies in ICT is falling, so that the inflow into the labour market will also fall in several years time. The economic growth of the ICT sector exceeds the average economic growth, so demand for ICT professionals will grow rapidly. Various growth scenarios are discussed, which show that there will be a shortage of ICT professionals, especially at the university level.

On the C in ICT (Capita Selecta)

It is not easy to measure the effects of broadband use, because the C of ICT is intimately linked with investments in computer hardware (the IT of ICT). This makes it difficult to attribute effects to a specific ICT application or investment. Statistics Netherlands has participated in a joint international study of the micro data of companies in the Netherlands and the United Kingdom. An attempt was made to break down the total productivity effects of broadband use into direct and indirect contributions. That is the contribution of ICT use and the contribution led through capital deepening. Both effects turn out to be similar in the two countries. The direct effect on the Total Factor Productivity is higher than the indirect effect.

Internet in the used car market (Capita Selecta)

A study by BOVAG and Marktplaats.nl looked at the role the internet plays in the Dutch market for used cars, both from a car dealer and from a consumer perspective. Used cars are increasingly sold from one consumer to another thanks to the internet. Car dealers face a great deal of competition from the internet. Both car dealers and consumers frequently use the internet in advertising and looking for used cars. The extent to which consumers use the internet when looking for a used car differs greatly per consumer and per type of used car.

Key indicators of the digital economy, national, 2003–2008

	2003	2004	2005	2006*	2007*	2008*
	% volume change on previous year					
ICT and the economy						
ICT investments	–0.3	6.0	9.2	11.1	.	.
Intermediate consumption of ICT goods and services	0.9	1.8	3.0	4.4	4.5	.
Consumption of ICT goods and services	4.2	3.5	6.6	7.2	7.6	.
Gross value added ICT sector	4.2	2.9	5.1	5.0	4.8	.
of which ICT industry sector	0.9	6.9	5.9	2.0	6.1	.
ICT services sector	4.5	2.5	5.0	5.3	4.7	.
	number					
Companies in the ICT sector						
Total	23,920	25,220	24,235	27,825	27,470	.
New companies	2,455	2,730	3,450	3,360	3,485	.
Bankruptcies	383	289	270	201	173	.
	x million euro					
R&D expenditure in the ICT sector[1)]	1,693	1,574	1,610	1,801	.	.
	number (x 1,000)					
ICT and employment						
Employed labour force working in an ICT profession	271	273	266	248	.	.
Vacancies in the ICT sector	2.4	6.0	8.9	12.5	12.7	.
Informatics graduates from higher education[2)]	3.40	3.83	4.72	5.29	5.19	.
	number (x million)					
Telecommunication infrastructure						
Fixed telephone lines: PSTN	6.1	5.9	5.5	4.5	3.4	.
Fixed telephone lines: ISDN[3)]	1.6	1.5	1.4	1.3	1.2	.
Telephone connections via rtv cable	0.2	0.3	0.5	0.8	1.2	.
Mobile telephone connections	13.3	15.9	16.3	17.1	18.5	.
Broadband connections: cable	1.0	1.3	1.6	2.0	2.2	.
Broadband connections: ADSL	0.9	1.8	2.5	3.0	3.3	.
	% of total					
ICT use by households and individuals						
PC ownership, households[4)]	76	80	83	84	86	88
Internet access, households[4)]	65	71	78	80	83	86
Broadband access, households[4)]	22	34	54	66	74	74
Shopping online, individuals[5)]	45	52	55	61	66	67
	% of total number of companies					
ICT use by companies[6)]						
Companies with computers	94	94	100	100	100	.
Companies with an internal network	77	83	86	83	86	.
Companies with internet access	87	90	97	99	99	.
Companies with broadband internet	55	70	81	87	86	.
Companies with a website	65	72	79	80	83	.
Companies ordering goods/services electronically[7)]	29	36	45	42	44	.
Companies receiving orders electronically[7)]	20	23	27	28	31	.

1) R&D carried out by own staff. For 2004 and 2005, revised figures are shown.
2) Vocational college and university bachelor exams, university masters; 2002 = study year 2001/2002 etc.
3) The number of ISDN connections. One ISDN connection may consist of 2 or more lines.
4) Private households with at least one person aged 12–74 years.
5) Percentage of people with an internet connection.
6) Companies with 10 or more employees.
7) Because of changes in the questions, the figures are not completely comparable over the years.

Source: Statistics Netherlands; TNO (telecommunication infrastructure).

Key indicators of the digital economy, international, 2004–2007

	EU-15	EU-27	Belgium	Denmark	Germany	Finland	France	Ireland	Netherlands	United Kingdom	Sweden	United States
	%											
ICT and economy												
ICT expenditure as % of GDP, 2006	5,6	5,7	5,9	6,0	5,7	6,0	5,4	3,8	6,3	6,5	7,3	5,4
Contribution of ICT capital to GDP growth, 2001–2006 [1]	.	.	0,4	0,5	0,2	0,4	0,3	0,2	0,3	0,5	0,3	0,3
Share of ICT employees (narrow definition), 2007 [2]	3,1	.	2,9	4,0	3,1	4,4	2,6	2,4	3,9	3,2	4,9	3,7
Share of ICTsector in R&D-expenditure business sector, 2005 [3]	.	.	27	35	25	67	32	61	31	25	35	35
	number per million inhabitants											
European ICT patent applications, 2004	–	25	31	32	53	139	33	18	76	25	74	35
	%											
ICT and education												
Share of ICT diplomas in higher education diplomas, 2006 [4]	.	4,0	3,5	3,3	4,0	4,5	4,0	.	4,5	5,3	3,6	3,7
	1 = very limited, 7 = extensive											
Internet access in schools, 2007	.	.	5,1	6,2	4,8	6,4	4,7	4,2	5,8	5,7	6,4	5,9
	number per 100 inhabitants											
Telecommunication infrastructure												
Fixed telephone connections, 2006 [5]	.	58	.	61	67	39	52	.	43	54	.	57
Mobile telephone connections, 2006 [6]	.	99	.	106	103	102	76	.	105	112	.	75
Broadband connections, 2007 [7]	.	13	.	34	21	29	23	.	33	24	.	21
	%											
Household use of multiplay, 2006 [8]	.	20	.	38	22	8	20	14	32	24	21	.
ICT and government												
Online public services for business, 2007 [9]	.	85	94	87	94	77	93	86	86	90	89	.
Use of online public services for business, 2006 [9]	.	63	59	87	49	93	66	84	70	52	80	.
Online public services for citizens, 2007 [10]	.	71	71	76	76	85	84	72	81	89	86	.
Use of online public services for citizens, 2006 [10]	.	24	30	43	32	47	26	26	52	.	.	.
ICT use by companies, 2006 [11]												
Companies with a broadband internet connection	81	78	86	80	80	91	.	66	87	78	87	.
Companies with electronic sales [12]	18	15	18	33	24	15	.	31	26	29	27	.
Companies with electronic purchasing [13]	34	29	43	36	52	19	.	54	36	49	48	.
Percentage of turnover generated by orders received electronically	12	11	11	22	11	15	.	19	11	19	14	.
ICT use of households and individuals, 2007												
Households with an internet connection	59	54	60	78	71	69	49	57	83	67	79	.
Households with a broadband internet connection	46	42	56	70	50	60	43	31	74	57	67	.
Persons with advanced internet skills [14]	13	13	7	30	8	35	17	5	15	10	9	.
Persons with electronic purchases [15]	35	30	21	56	52	48	35	33	66	53	53	.

[1] Average annual contribution in percentage points.
[2] Share of the employed labour force.
[3] Denmark, United States and United Kingdom: 2004 instead of 2005.
[4] EU-25 instead of EU-27, Eurostat estimates.
[5] Including ISDN and VoIP connections.
[6] EU-25 instead of EU-27, and data on EU-25 is 2005 instead of 2006.
[7] Excluding mobile connections.
[8] Percentage of households with a package of at least two services from one provider, November/December.
[9] Supply and use of eight public services.
[10] Supply and use of twelve public services.
[11] Companies with 10 and more employees.
[12] Electronic sales contributing for one percent or more of the total turnover of the company.
[13] Electronic purchases contributing for one percent or more of the total turnover of the company.
[14] People aged 16–74 using 5 or 6 internet activities in the three months preceding the survey.
[15] People aged 16–74 with online purchases in the twelve months preceding the survey.

Source: Eurostat; OECD for ICT capital contribution to growth, ICT employees, R&D and broadband connections; TNO for telephone connections; European Commission for multiplay; Capgemini / Eurostat for ICT and government; World Economic Forum, Global Competitiveness Report 2008–2009.