

IT AND SOCIAL INEQUALITY IN THE NETHERLANDS

JOS DE HAAN

ABSTRACT

In the Netherlands, access to IT is unevenly distributed among population groups. As in other countries, males, young people, the higher educated and higher income groups take the lead. This pattern also applies for the possession of a PC and for Internet access at home, as well as for the frequency and diversity of use and for digital skills. These differences coincide with old inequalities. However, the rise of IT also leads to new inequalities. Early adopters of a PC have gained an early advantage, and they have a lasting lead compared to laggards. Early adopters more often have Internet access at home, they have more digital skills, and they use the PC more often. These differences cut across existing social inequalities. This lead by early adopters also applies to differences between early and later adopters with regard to e-commerce and establishing new social contacts via the Web.

Jos de Haan (Ph. D., Utrecht University) is a Senior Research Sociologist at the Social and Cultural Planning Office (SCP) in The Hague, the Netherlands, where he conducts research on the diffusion and consequences of IT, on media use and on cultural participation.

INTRODUCTION: DISCUSSING THE DIGITAL DIVIDE

Patterns of both PC and Internet use show that more affluent and well-educated citizens are the first to acquire these ITs. Additional variables that reflect the digital divide among households include household size and type, age, gender, racial and linguistic backgrounds and location (OECD 2000). These differences are very consistent across countries. Although the rates of computer ownership and Internet access have increased rapidly in all OECD countries and among nearly all groups, several studies indicate that the diffusion of ITs has given rise to growing inequality among the populations in the countries studied (NTIA 1999, 2000; Perillieux et al. 2000; Van Dijk and Hacker 2002). The digital divide between the information-rich (such as whites, those with higher incomes, those more educated, and dual-parent households) and the information-poor (such as certain minorities, those with lower incomes and lower education levels, and single-parent households) is said to be growing.

Other studies assume that PC diffusion follows the usual logistic curve for the diffusion of new technologies, which implies that inequalities between population groups first increase and later inevitably decrease (Van Dijk et al. 2000). The spread of Internet access is more rapid, because the necessary complementary investments in PC equipment and the personal and business skill base have already been made (OECD 2000). PC use in households is increasing in all OECD countries, with the highest rates in Nordic countries (Denmark, Finland), the Netherlands and English-language countries (Australia, Canada, United States). Internet access from home shows similar patterns, with the Netherlands being among the leading countries in the world where the diffusion of IT is concerned.

Here it will be argued that social inequality is not primarily a matter of possessing a household PC or having access to the Internet. Now, and even moreso in the longer run, the use of IT and the level of digital skills influence who is ahead, who is getting by and who is left behind in the information society (cf. De Haan and Rijken 2003; De Haan en Huysmans 2002a). More precisely, it is the influence of IT use and of digital skills on various domains of social life that is at the heart of the matter. Increasing salience of IT in these domains will further contribute to the rising inequality and marginality of the excluded (Castells 2001). Such social exclusion reaches farther than direct social contacts with friends, family and acquaintances. It also affects, for example, obtaining better career and educational opportunities, greater personal advancement and fuller access to social networks, the connection to dominant patterns of behaviour and value orientation, and the use of public provisions (cf. Norris 2001).

The image of a digital divide suggests an absolute and lasting divide between population groups. Differences in use and skills, however, are gradual, rather than absolute. The absence of IT, its use and digital skills does not last either. Each of these aspects of digital access can be considered as part of a

diffusion process. Such processes are characterised by forerunners and followers. Especially the diffusion of possession can easily be traced. But the spread of use and skills also follows the logic of diffusion processes. One's position in the diffusion process will be an important aspect examined in these analyses. Before describing the influence of this position, differences in possession, use and digital skills will be set out. Subsequently, reasons for non-possession will be presented.

Here a description will be given of the access to IT (possession, use and skills) within Dutch households between 1998 and 2001. This focus on households implies that differences between companies, regions and countries are not dealt with in this research. Sometimes these differences are treated as important inequalities (OECD 2001). This importance is not denied here, but the emphasis is on changing differences between population groups within a country.

Data have been drawn from the "Use of New Communication Resources (UNCR) Survey," carried out in the Netherlands in the autumn of 1998. This nationally representative survey was based on a mail questionnaire with a response of 43% and 2538 completed questionnaires. In 2001 a new survey, employing this questionnaire, was conducted by Statistics Netherlands (CBS) and the Social and Cultural Planning Office (SCP). This nationally representative survey had a response of 67% with a participation of 3132 people. This questionnaire is supposed to be a pilot for the biannual collection of data on IT in Dutch households. Both data sets were weighted for a number of variables whose distribution differed from that of the population at large. In 1998 these variables were gender, age, voting behaviour, registration in the telephone directory, residence in one of the four largest cities, and marital status. In 2001 the variables were gender, age, household size and degree of urbanization.

OWNERSHIP OF MOBILE PHONE, PC AND INTERNET

After a slow start in the early eighties, the use of PCs spread fast in the second half of the eighties and in the nineties. The possession of a PC in Dutch households increased from 18% in 1985 to 58% in 1998 to 72% in 2001 (De Haan and Huysmans 2002b). The percentage of Dutch people with Internet access at home increased from 21% to 59% between 1998 and 2001, a development partly due to previous investments in PC equipment and to the rise of free Internet providers. The diffusion of mobile phones also went very fast: within a few years a large majority of the population came to possess a mobile phone (84%).

The PC is by far the most often used device for Internet access: 56% of the Dutch population has desktop access. Furthermore, 6% has access via a laptop and 4% uses a mobile phone. Very few people access the Internet via a palmtop (0.4%) or via a television with a set-top box (0.2%). Those with Internet access other than via a PC can very often also use a PC for this purpose (three out of four).

Table 1 shows that socio-economic factors (such as income, level of education and labor market position) are related to IT adoption at home. On average, the higher one's educational level, the higher one's income and the lower one's age, the greater the chances that one has a mobile phone, a PC and Internet access. In addition, men, employed people and students more frequently possess these devices. (For a more detailed description and discussion of these differences, see De Haan and Huysmans 2002b). Through the possession of modern communication and information resources, the higher status groups and young people seem to benefit more from the opportunities the information society offers.

To a certain extent the presented background characteristics overlap. People with a higher education often also enjoy a high income. And, on average, the 18–34 year group earns less than the 35–49 year group. It is therefore possible that the differences we found regarding one characteristic can in fact be attributed to another (to another what?). To control for the influence of other variables and estimate the net effect of any variable, multivariate analyses have been conducted. These analyses have been conducted by using Multiple Classification Analysis (MCA) within the SPSS program ANOVA, developed by Andrews et al. (1973).

The results of the multivariate analyses in Table 2 show that differences between population groups for the three IT products are quite similar. For each product, age turns out to be the most important determinant of possession, followed by income. The influence of gender never reaches a significant level. Differences between products come to the fore only when the influence of education is taken into account. As regards the possession of a mobile phone there is no distinction between higher and lower educated people. On the other hand, the higher educated more often have a PC and Internet access than the lower educated. However, the influence of this factor is smaller than that of income.

REASONS FOR NON-POSSESSION

Elderly and low income groups lag behind in the information society. The reasons they give for non-adoption provide an initial insight into the causes. Those who do not have a PC or Internet access at home were asked if price, digital skills, interest or possibilities to use a PC or access the Internet elsewhere influence their decision. The data show that interest, price and skills are considered influential in the decision not to buy a PC.

Table 3 quantifies these reasons. More than half of the non-possessors say they are not interested in the possibilities of PC use. Disinterest is by far the biggest reason for non-possession. Digital skills are less often mentioned as a reason. Notwithstanding the strong relationship between income and PC possession, the price is only mentioned by 13%. In 1998, financial restrictions were deemed important by 50% (Van Dijk et al. 2000). Moreover, the absence of

TABLE 1: POSSESSION OF MOBILE PHONE, HOUSEHOLD PC AND INTERNET BY BACKGROUND CHARACTERISTICS, POPULATION AGED 18+, 1998-2001 (IN PERCENTAGES)

	mobile phone		personal computer		Internet access	
	1998	2001	1998	2001	1998	2001
Total Population aged 18+	32%	84%	58%	72%	21%	59%
Gender						
Male	39	86	65	75	28	64
Female	24	81	52	68	14	54
Age						
18–34 years	40	94	68	85	26	73
35–49 years	38	93	76	87	29	74
50–64 years	25	83	51	67	16	50
65 years and older	13	47	13	25	2	17
Education						
Primary education	20	67	21	41	3	31
Secondary education	28	82	47	67	15	52
Pre-university and senior vocational education	36	88	68	77	23	64
Higher professional and university education	37	89	76	89	34	78
Income						
1st quartile a	41	65	47	46	15	33
2nd quartile	54	81	59	66	18	51
3rd quartile	65	92	71	83	26	70
4th quartile	68	96	81	93	39	85
Labour market position						
Student	28	86	76	86	28	74
Working	40	93	72	84	28	73
Household	21	73	42	55	9	42
<i>Slightly different limits were used for 1998 and 2001, resulting in a somewhat larger group with the lowest incomes in 1998.</i>						
<i>Source: SCP (UNCR 1998); CBS/SCP (ICT pilot 2001)</i>						

Internet access is most often attributed to a lack of interest. Another important reason is the absence of a PC. Only a few consider the costs of Internet use and the required skills to be significant restrictions. Concern about privacy or security does not play a role at all.

TABLE 2: POSSESSION OF MOBILE PHONE, HOUSEHOLD PC AND INTERNET BY BACKGROUND CHARACTERISTICS, POPULATION AGED 18+, 2001 (IN ETAS AND BETAS)

	mobile phone		personal computer		Internet access	
	eta	beta	eta	beta	eta	beta
Gender	.06	.01	.08	.01	.09	.03
Age	.44	.41**	.50	.39**	.43	.29**
Education	.19	.02	.34	.13**	.31	.10**
Income	.32	.21**	.39	.22**	.39	.25**
Labour market position	.27	.07*	.35	.07**	.35	.09**
Explained variance (R ²)	23.6%		32.6%		27.4%	

*Significant differences: ** at p<.01 level and * at p<.05 level*
Source: SCP (UNCR 1998); CBS/SCP (ICT pilot 2001)

TABLE 3: REASONS FOR NOT POSSESSING A PC OR FOR NOT HAVING INTERNET ACCESS AT HOME, NON-POSSESSORS AGED 18+, 2001 (IN PERCENTAGES)

	PC	Internet
Possibilities to use a PC or access the Internet elsewhere	5%	5%
Not interested, not useful in the household	59	37
Too expensive	13	6
Physically incapable	2	1
No knowledge / skills	12	5
No time	3	2
Feeling too old	11	2
Necessary device is too expensive		2
Language problems		0
Concern for privacy and/or security		0
No suitable PC or damaged PC		38
No special reason		4

Source: CBS/SCP (ICT pilot)

Reasons for non-possession of a PC differ to some degree between population groups. Among the relatively few young people without a PC, lack of interest is quite often given as a reason. Price is mentioned more often by the young and of course by those with lower incomes. The latter group also considers itself too old.

The reasons for not having Internet access are weakly related to different population groups. To some extent the elderly say they have no interest in it and that they are too old. The 34–49-year olds mention the high price and the

absence of a PC relatively often. Lower educated people quite often state that insufficient digital skills are of influence.

EXPECTATIONS ABOUT FUTURE DEVELOPMENTS

However plausible the stated reasons might be, they are not decisive, given that the diffusion of PC and Internet has continued since 1998. Reasons given in the present are no guarantee for non-possession in the future. At a certain point, the perceived advantages apparently outweigh the disadvantages. Some non-possessors indicate that they are thinking of buying a PC. In 2001, the non-possessors were asked the same questions as three years earlier: were they thinking of buying a PC within the next three years and did they have plans to connect to the Internet? This future outlook showed that 17% of the non-possessors thought they would surely buy a PC between 2001 and 2004, and another 11% said they would consider the idea. Of those without an Internet connection, 25% indicated that they would surely be connected between 2001 and 2004, and 15% said they might be.

If everyone who in 1998 indicated to “surely or maybe buy a PC in the next three years” realised this intention, the predicted percentage of PC ownership in 2001 would be 70%—close to the present 72%. This analysis does not even take the possible effect of cohort replacement into account. With this quite accurate prediction, we can be more confident about the prediction for 2004, based on the 2001 data. It should also be pointed out that for some groups—in particular the lower educated and the elderly—the predictions were not very accurate. Among these groups, PC possession rose much faster than predicted. The 2001 data lead to a prediction of 81% of the population owning a PC in the fall of 2004 and of 77% being connected to the Internet.

The intention to buy is related to the reasons given for non-possession. As shown in Table 4, people who indicate that a PC is too expensive more often plan to buy one than those who give other reasons. Almost a quarter of the non-owners who consider price an obstacle say they will surely buy a PC within the next three years, and another quarter say that they are thinking of doing so. For Internet access the price barrier does not seem to be very high, either: since 30% of those citing price as a barrier will surely connect to the Internet before the fall of 2004 and another 30% may connect. Persons considering themselves too old have very few plans to buy a PC or connect to the Internet. A position “in between” is taken by those who give lack of interest or skills as a reason.

TOWARDS FULL ACCESS

The forms of IT access (ownership, use, skills) are becoming less and less of a barrier for a growing number of Dutch people. The diffusion of computers and Internet access is on its way to reaching market saturation point. And with young people, males, the employed and better educated as the vanguard, the

TABLE 4: INTENTION TO ACQUIRE A PC OR GET INTERNET ACCESS AMONG NON-POSSESSORS, BY REASONS OF NON-POSSESSION, POPULATION AGED 18+, 2001 (IN PERCENTAGES)

	PC		Internet	
	Yes, surely	Yes, maybe	Yes, surely	Yes, maybe
Complete group of non-possessors	17.8	11.7	26.2	16.4
No interest	11.6	8.9	11.5	13.8
Too expensive	22.4	23.4	30.0	29.7
No knowledge / skills	4.6	10.7	15.6	12.2
Too old	0.8	4.2	0.0	0.0
No suitable PC			24.6	15.7

Source: CBS/SCP (ICT pilot)

Dutch may be increasingly characterised as digitally skilled citizens. Access thresholds will be a diminishing problem for participation in the electronic world. Norris (2001) makes a distinction between two diffusion models: the normalization model and the stratification model. The normalization model assumes that the laggard groups have only a time lag, and they will eventually catch up with the forerunners. According to the stratification model, however, the leading groups will maintain their edge in the information society. Within the laggard groups not all people are expected to acquire a PC and connect to the Internet.

Above, it was concluded that age and income were the most important determinants of IT access. However, monetary restrictions were not considered to be a strong barrier to access. Many people lacking a PC or Internet access who say price is the main obstacle also indicate relatively often that they intend to buy a computer. Furthermore, age most strongly determines who is online and who is not. Among the young, almost everybody is connected, whereas the elderly most strongly resist connectivity. Although PC ownership and Internet access is low among the elderly, it is rising. In the longer run, the effect of cohort replacement will contribute to access saturation for everybody. Therefore, a diffusion process according to the normalisation model seems most likely.

This gradual diffusion of IT among households and its embedding in daily life has been aptly described as a domestication process (see Frissen 1999: 21). It may be safely assumed that we are heading towards a fully digitised society in which the non-possession and non-use of IT is a choice, rather than the result of underprivilege (Schnabel 2000). If access becomes less of a problem, it will become interesting to shift the attention from diffusion to the consequences of IT use.

USE OF PC AND INTERNET

In the discussion of the digital divide there has been much emphasis on possession. It seems plausible that diffusion will continue and that differences between population groups will diminish and eventually largely disappear, as happened with the diffusion of telephone and television (Huysmans en De Haan 2001). In an information society, social differences are more likely to be linked to use and skills rather than to the possession of advanced technologies. Here the use of PC and Internet at home will be described. A distinction is made between use for work and for private purposes. Use at home is compared with use elsewhere, for example at work or at school. Furthermore, a description is given of different kinds of offline and online use.

As shown in Table 5, in 2001 more than half of the population had a PC at home, with 26% using it daily, 27% using it at least once a week and another 4% using it at least once in the past four weeks. At home the PC is used primarily for private purposes, but a considerable group (20% of the population) uses the household PC for both work and leisure. The work place is the favourite location for PC use outside home, with 65% of the working population using a PC at work. Of the student groups—a far smaller group than the working population—50% use a PC at school, college or university. The difference in use between the working classes and students lies in the frequency of use. The former mostly use a PC on a daily basis, whereas the latter tend to use it once a week or several times a week.

Since the mid-1990s, Internet use has grown rapidly. In 2001, 45% of the population of 18 years and older used the Internet at home, primarily for private purposes, and 32% used it outside their home, mainly at work. Looking for specific information and email are the favourite Internet activities. In 2001, 62% of the Dutch said they had used the Internet, which places the Netherlands—together with the Scandinavian countries, Canada and the U.S.—among the forerunners in the world (NIPO Interactive 2002). In spite of this fact, in 2001 38% of the Dutch had never used Internet.

The data on IT use in 2001 are not comparable to those of 1998. However, data from the Dutch time use survey (TUS) are available from 1985 to 2000, in five-year periods (see De Haan and Huysmans 2002b for a detailed description). These data show an increase in the average number of hours the entire population spends in front of the PC during leisure time, i.e., from 0.1 hours a week in 1985 to 1.8 hours in 2000. In 2000, approximately half an hour was spent on the Internet. Among all population groups, PC time rose between 1985 and 2000, rising faster as of 1995. Substantial differences between population groups continue to exist, with young people 12–19 years being the most frequent PC users in 2000, spending on average 3.4 hours per week in front of their PCs. The groups that first possess IT products are the same that use their equipment more often and for a wider variety of purposes. Again, the groups lagging behind

TABLE 5: USE OF PC AND INTERNET, POPULATION AGED 18 +, 2001 (IN PERCENTAGES)

	PC population	PC owners	Internet population	Internet owners
Use of PC in past 4 weeks	56	79	45	88
Private	31	56	29	63
Work	4	8	2	4
Both	20	36	15	32
		persons using PC outside home		persons using Internet outside home
Use of PC in past 4 weeks outside home	47		32	
At work	39	83	25	77
At school, college, university	5	10	4	11
Commercial organisation, e.g., Internet café	1	1	1	2
Public building	1	1	0	1
At neighbours, friends or family	4	8	4	12
		persons using PC		
Offline use of PC in the past 4 weeks				
Text editing	46	71		
Spreadsheets	21	32		
Games	18	27		
Documentation on cd-rom	17	26		
Travel planner/ telephone directory	19	29		
Digital banking	18	28		
				persons using the Internet
Online use of PC in the past 4 weeks				
Email			40	74
Chatting			6	10
Search for specific information			43	79
Surfing			21	38
E-commerce			7	12

Source: CBS/SCP (ICT pilot)

in use are (single) women, the over-65s, people with a lower (secondary) educational level, and the unemployed. The differences appear to be widening, with the differences in IT use adding to the differences in possession. The continuing diffusion of PC ownership may gradually reduce differences between groups, but differences in time use and type of use are likely to remain. However, the constant average time use per user may indicate that some degree of saturation occurs once people have access to a PC at home (De Haan and Huysmans 2002b).

DIGITAL SKILLS

Because of the growing amount of information on the Internet and the increasing dependence of people on information, the importance of digital skills (the capacity to use IT) has also increased (cf. Steyaert 2000). These digital skills differ considerably among population groups (De Haan and Rijken 2003). A comparison of inequality in digital skills in 1998 and 2001 is based on users' self-reported command of the following 9 computer skills: word processor, spreadsheets, navigation programmes such as Windows, presentation programs such as PowerPoint, capacity to install programs, ability to find information on the Internet, and the three email skills of making distribution lists and folders and sending attachments. The formulation of the questions and the answer categories were not identical in the two years compared. Therefore the scores have been standardized, and the sum score has been transformed into percentiles. These scores are orders of ranking with a fixed average (50, the median) and a fixed standard deviation (26). Someone with a score of 10 belongs to the lowest 10% of the distribution, and someone scoring 91 or higher to the highest 10% of the distribution. This score is well-suited to illustrate inequality in the distribution between groups in different years. The items constitute a reliable scale with an alpha of .91 in 1998 and of .94 in 2001.

The groups taking the lead in IT possession are also at the forefront in acquiring digital skills, i.e., young people, males and those with higher education and higher incomes. Table 6 also shows that students and working people are more skilled than those responsible for household tasks. Between 1998 and 2001, the differences between groups remained quite stable.

Because of the overlap between the presented background characteristics, multivariate analyses were performed using Multiple Classification Analysis (MCA). Some results (betas and explained variance) are presented in Table 6. After controls, women still turn out to be less skilled than men, the lower educated less skilled than higher educated and students and working people less skilled than those responsible for the household. The largest differences can be found between age groups: the elderly lag behind young people. The large increase is found in the higher values of the explained

variance: from 42% in 1998 to 48% in 2001, point to increasing social differences.

DIFFUSION THEORY AND THE CONSEQUENCES OF IT USE

Successful technological products go through a process of development and diffusion among the population. Diffusion often follow a S-shaped pattern, as shown in Figure 1. During diffusion an increasing number of people come to possess that technology. The S-curve points to a relatively slow beginning, followed by an acceleration and finally a slowing down at the end, as market saturation occurs (Rogers 1995). It should be noted that not all products are successful enough to reach this acceleration stage during which the majority of the population acquires the product. Initially, the PC and Internet access penetrated the Dutch households only slowly. But after 1985 (PC) and 1995 (Internet) respectively, the diffusion picked up speed. It is expected that once the market is saturated, the diffusion will slow down. In this way, the curve of the PC and Internet diffusion pattern is S-shaped.

The S-curve not only informs us about the degree of diffusion of a product or an idea in society, but it also provides information about the moment of adoption of the product or idea by one individual relative to another. Technology-minded people are often among the first to adopt a new technology, while others prefer to wait. Dividing the curve into five stages provides a typology of adopter types. These five adopter types of Beal and Bohlen (1955) became widely known through the work of Rogers (1995). A small group of people who are the first to accept the innovation are called the *innovators*. The information, experiences and positive judgment of this group subsequently influences the adoption decision of the next group, the *early adopters*. This group is followed by the *early majority*. The *late majority* and especially the *laggards* are relatively late with their decision to adopt the new product/idea.

Many new adopters start using their products and learn as they go along. The exploration of opportunities for using PC and Internet applications also contributes to increasing skills, which might in turn lead to more frequent and more diverse use. The forerunners in the diffusion process thus gain an advantage as regards use and skills. Whereas differences in possession decrease over time, differences in use and skills may be of a more persistent nature. Comparing the use and skills of adopter groups can provide an initial insight into these differences.

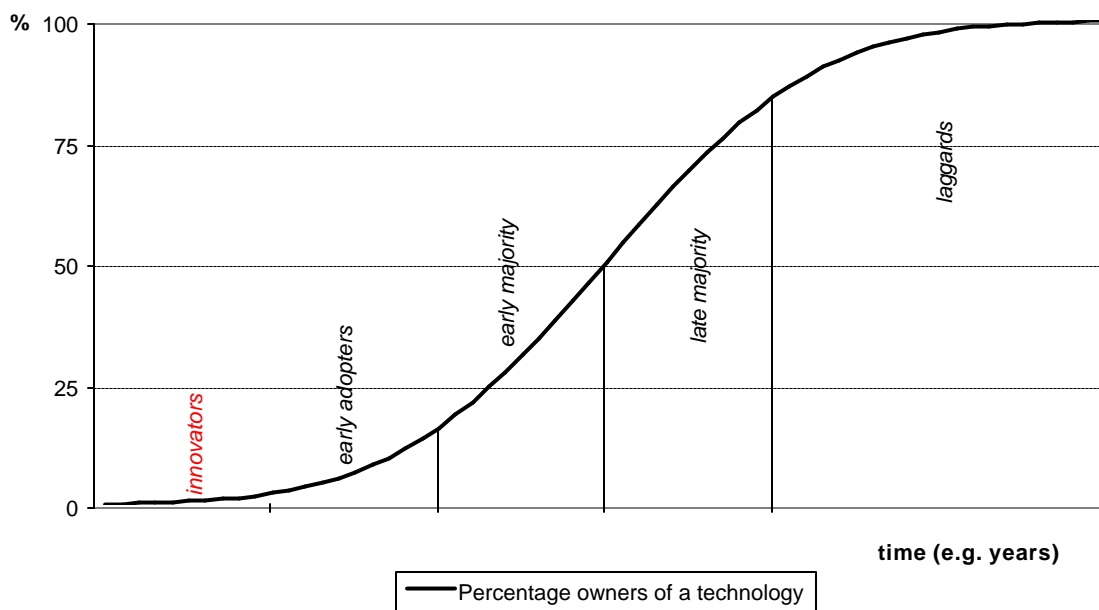
Based on the moment of adoption of the first PC, the Dutch population in Table 7 is classified into five adopter groups that follow the ideal-typical distribution of Rogers (1995: 262) as closely as possible. The 2% of the population that already had a PC in 1986 are considered innovators. Those who bought their first PC between 1986 and 1991 belong to the early adopters (17% of the population). The early majority (30%) acquired their first PC between 1992 and 1997 and the late majority (23%) between 1998 en 2001. A person who

TABLE 6: LEVEL OF DIGITAL SKILLS, POPULATION AGED 18+, 1998-2001 (IN PERCENTILES)

	1998	beta	2001	beta
Population	50		50	
Gender				
Male	56		58	
Female	44	.21	42	.18
Age				
18–34 years	64		66	
35–49 years	56		56	
50–64 years	42		40	
65 years and older	24	.29	22	.34
Education				
Primary education	27		28	
Secondary education	40		41	
Pre-university and senior vocational education	59		55	
Higher professional and university education	64	.23	66	.19
Income				
1st quartile a	48		37	
2nd quartile	49		44	
3rd quartile	56		56	
4th quartile	64	.24	66	.19
Labour market position				
Student	73		72	
Working	61		62	
Household	31	.16	32	.19
Explained Variance (R2)		42,7		48,2
a In 1998, a slightly different limit was used compared to 2001, resulting in a somewhat larger group with the lowest incomes in 1998. <i>Source: SCP (UNCR 1998); CBS/SCP (ICT pilot 2001)</i>				

did not have a PC by the end of 2001 is considered to be a laggard (29%). Based on this classification, it is investigated to what extent adopter groups differ in frequency of use and in digital skills. Differences in Internet access, in broadband access and in opinions about technology have also been explored.

Innovators and early adopters more often have Internet access at home than early adopters and the late majority. Having Internet access is as strongly influenced by the moment people bought their first PC as by their level of education or by the fact that they form part of the workforce or are enrolled in the educational system.

FIGURE 1: IDEAL-TYPICAL PRESENTATION OF AN S-SHAPED DIFFUSION CURVE**TABLE 7: IT ACCESS, FREQUENCY OF USE, DIGITAL SKILLS AND OPINIONS ON IT, BY ADOPTER TYPES, POPULATION AGED 18+, 2001.**

	Internet access at home (%)	Broad-band at home (%)	Freq. of PC use (avg. number of hours per week)	Freq. of Internet use (avg. number of hours per week)	Digital skills (avg.)	Opinions (avg.)
Innovators	99	21	22.5	7.6	6.2	0.88
Early adopters	90	24	17.5	5.0	6.3	0.77
Early majority	80	20	11.9	3.3	5.4	1.01
Late majority	78	17	10.1	2.4	4.9	1.17
Laggards	-	-	5.0	0.7	-	1.62
Eta	.17	.03	.39	.30	.24	.39
Beta 1	.14	.06	.28	.27	.16	.24
Explained variance (R ²)	8.8	6.8	32.4	17.6	38.7	26.6
1 Controlled for gender, age, education, income, family status and labour market position.						
Source: CBS/SCP (ICT pilot)						

The type of Internet connection—broadband (cable, ADSL and fibre optic) or narrowband (modem and ISDN)—is hardly influenced by the adopter types. Existing differences are related to the level of education, income and the labour market position. Students, the employed, people with higher incomes and higher education more often have broadband access.

The innovators and early adopters are more frequent users of PCs and the Internet than other adopter groups. Moreover, these forerunners in the diffusion process have more digital skills than the followers.

The set of mental barriers restricting people from adopting new technology has also been called mental accessibility (Van Dijk 2000). A favourable attitude towards technology also influences whether someone will buy new IT, such as a computer or mobile phone. Since there is no information available about their attitudes before the moment people bought their PC, the opinions gauged in 2001 may also be partly the result of their experiences.

The attitude towards IT was measured by asking people whether they agreed or disagreed with the six opinion statements shown in Table 8. Many people in the Netherlands associate new technology with progress: 44% of the population think the world has become a better place as a result of Internet and mobile phones. Yet 45% believe that knowledge of computers is overrated, and a majority (63%) disagree with the statement that people today count only if they know something about computers. Some 22% are afraid they will lag behind in the future, because they will not be able to keep up with these new technologies.

The last four statements in Table 8 were used to construct a scale. The first two items were not related to background characteristics. The scale—with an alpha of .65—was used to investigate the differences between adopter groups. Table 7 shows that on average innovators and early adopters are less afraid of being socially excluded at present or in the future as a result of new technologies and digital skills than laggards. This is partly due to the fact that innovators and early adopters are on average younger, higher educated, employed and better paid than laggards. But even after controls, adopter types continue to have significant influence, which is even stronger than that of separate background characteristics. The fact that laggards are more frightened of new technology is not really surprising, since they are unfamiliar or barely familiar with it. But there is also a big difference in attitude between those who have only a few years of PC experience (late majority) and the forerunners (innovators and early adopters). This means that these differences did not disappear with the adoption and subsequent use of the PC.

The rise of IT has consequences for everyday activities. An increasing amount of time is spent on new IT at the expense of other matters. This shift in priorities can be seen in the changes occurring in leisure activities. A growing number of Dutch people recognise the convenience, enjoyment and benefits of IT and probably also use it to their advantage. Everyday activities are more and

TABLE 8: OPINIONS ABOUT NEW TECHNOLOGY, POPULATION AGED 18+, 2001 (IN PERCENTAGES)

	2001		
	agree	neutral	disagree
New technology such as Internet and mobile phones have made the world a better place	44	31	25
Knowledge of computers is overrated in our society	45	22	33
Today, you only count in society if you know something about computers	27	10	63
I feel an outsider whenever I get involved in a conversation about computers	26	9	64
I have no difficulty joining a conversation about computers	38	19	44
I am afraid I will be lagging behind in the future because I will not be able to keep up with all these developments in the field of computer technology	22	9	69

Source: SCP (GNC 1998); CBS/SCP (Pilot ICT 2001)

more often carried out in a different and digital way. IT offers opportunities to influence even the smallest activities. We have explored the effects of IT on daily life in three fields: the use of other media, social interaction and electronic shopping. Do the forerunners spend less time in front of the television, do they read fewer newspapers, do they make more new friends through the Internet and do they buy more on line?

As shown in Table 9, the innovators and the early majority spend fewer hours watching television than the early and late majority but especially the laggards. Approximately half of the differences can be attributed to background characteristics. The relationship between adopter types and subscription to a newspaper is weak.

Previous experience with new technology also influences social life, not so much in making close friends as in building social contacts with people who share certain interests.

The use of new opportunities to spend money also varies among adopter types. Innovators and early adopters shop electronically more often than other adopters. The longer a PC has been in a household, the higher the chance that the occupants will buy products on line.

TABLE 9: MEDIA USE, SOCIAL CONTACTS AND E-COMMERCE, BY DIFFERENT ADOPTER TYPES, POPULATION AGED 18+, 2001.

	Watching television (in hours per week)	Subscription to newspaper (%)	New friends via e-mail or chatting	New social contacts with the same interests via the Internet	Occasional electronic shopping	Electronic shopping in the past month
Innovators	14.8	60	6	13	38	31
Early adopters	14.7	65	6	13	40	17
Early majority	15.6	64	5	10	30	11
Late majority	15.6	57	6	8	27	11
Laggards	18.3	58	1	1	3	1
Eta	.25	.17	.11	.16	.33	.23
Beta 1	.12	.07	.12	.16	.21	.18
Explained variance (R ²)	12.8	22.0	6.9	8.1	19.4	9.3

1 Controlled for gender, age, education, income, family status and labour market position.
Source: CBS/SCP (ICT pilot)

SUMMARY AND CONCLUSIONS

Between 1998 and 2001, changes occurred in the different aspects of IT access (possession, use and digital skills) in the Netherlands. As one of the leading countries in the world in this field, the Netherlands illustrates what might happen elsewhere. The diffusion of mobile phones, PCs and Internet access continued, contributing to the digitisation of a majority of households. In 2001, 84% of the Dutch population of 18 years and older had a mobile phone, 72% a household PC and 59% had Internet access at home. The diffusion of the mobile phone and the PC has progressed far enough for the inequality between population groups to decrease. The differences between age groups form an exception in this respect: relatively speaking, the digital deprivation of the elderly increased. In this three-year period differences in Internet access between age groups, education groups and income groups widened. As diffusion progresses, these differences may be expected to decline again, even those between the young and the old.

Social inequality between population groups in the future will be linked to frequency and diversity of use and to digital skills. With the increase in PC use in the 1990s, the time-use differences between population groups also increased, with the young devoting most time to this new medium. Differences in digital skills reflect the early differences in possession of IT. The early adopters are now also the most skilful. Between 1998 and 2001, the differences in digital skills between population groups hardly changed.

To some extent the inequalities in IT access coincide with existing social inequalities. The elite—the highly educated with high incomes—also take the lead in accepting and skilfully using new technology. This might give them another competitive advantage in society. They may benefit from this technology in their search for better jobs, higher rewards and interesting social networks. However, there is more to it than an elite gradually changing into an elite capable of handling new technologies.

New inequalities related to the position of individuals in the adoption process arise, and they cut across existing social hierarchies. Especially the innovators and early adopters of a household PC seem to take advantage of the new opportunities, giving them an early and possibly lasting lead in the information society. These forerunners in technological innovation have realized early Internet access, they are more frequent users of offline and online computer applications, and they have more digital skills. This advantage in skills is used as a new form of capital that can bring them new friends, monetary and other benefits from on-line shopping, and stronger feelings of inclusion in a rapidly changing society.

These are inequalities that are related to the consequences of IT use, and the differences in these outcomes are and may increasingly lead to greater real inequalities in the information society.

REFERENCES

- Andrews, F., Morgan, J. and Sonquist, J. 1973. *Multiple Classification Analysis*. Ann Arbor, MI : Institute for Social Research.
- Beal, G.M. and Bohlen J.M. 1955. *How Farm People Accept New Ideas*. Ames: Iowa Co-operative Extension Service Report 15.
- Castells. M. 2001. *The Internet Galaxy; Reflections on the Internet, Business and Society*. Oxford: Oxford University Press.
- de Haan, J. and Huysmans, F. 2002a. *E-cultuur, een Empirische Verkenning*. Den Haag: SCP.
- de Haan, J. and Huysmans, F. 2002b. Differences in Time Use between Internet Users and Nonusers in the Netherlands, *IT and Society*, 1(2), p.67-85.
- de Haan, J. and Rijken, S. 2003. The Digital Divide in the Netherlands: The Influence of Material, Cognitive and Social Resources on the Possession and Use of ICTs, *Electronic Journal of Communication*, Vol 12. (1).
- Frissen, V. 1999. *ICT en Arbeid in het Dagelijks Leven*. Den Haag: Rathenau Instituut, werkdocument 71.
- Huysmans, F. and Haan, J. de. 2001. Media en ict: Omgaan met een Overvloedig Aanbod. In Breedveld, K. and van den Broek, A. (eds.), *Trends in de Tijd. Een Schets van Recente Ontwikkelingen in Tijdsbesteding en Tijdsordering*, p. 75-95. Den Haag: SCP.

- NIPO Interactieve 2002. *Wereldwijd eCommerce Onderzoek 2002*. Amsterdam: NIPO.
- Norris, P. 2001. *Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide*. Cambridge: Cambridge University Press.
- NTIA 1999. US Department of Commerce. *Falling through the Net: Defining the Digital Divide, a Report on the Telecommunications and Information Technology Gap in America*.
Available at: <http://www.ntia.doc.gov/>: US Department of Commerce.
- NTIA 2000. US Department of Commerce. *Falling through the Net: towards Digital Inclusion*.
Available at: <http://www.ntia.doc.gov/>: US Department of Commerce.
- OECD 2000. *The Digital Divide: Diffusion and Use of ICT's*. Paris: OECD DSTI/ICCP/IE.
- OECD 2001. *Understanding the Digital Divide*. Paris: OECD.
- Perillieux, R. Bernnat, R. and Bauer, M. 2000. *Digitale Spaltung in Deutschland*. Berlijn: Booz, Allen and Hamilton.
- Rogers, E.M. 1995. *Diffusion of Innovations*. Fourth Edition. New York: The Free Press. Eerste editie 1962.
- Schnabel, P. 2000. Een Sociale en Culturele Verkenning voor de Langere Termijn. In *CPB en SCP, Trends, Dilemma's en Beleid; Essays over de Ontwikkeling op Langere Termijn*. Den Haag: CPB/SCP.
- Steyaert, J. 2000. *Digitale Vaardigheden; Geletterdheid in de Informatiesamenleving*. Den Haag: Rathenau Instituut.
- van Dijk, J. 2000. Widening Information Gaps and Policies of Prevention. In Hacker, K. and Van Dijk, J. (eds). *Digital Democracy, Issues of Theory and Practice*, p. 166-183. London, Thousand Oaks and New Delhi: Sage.
- van Dijk, J. and Hacker, K. 2002. *The Digital Divide; as a Complex and Dynamic Phenomenon*. The Information Society.
- van Dijk, L., de Haan, J. and Rijken, S. 2000. *Digitalisering van de Leefwereld; een Onderzoek naar Informatie- en Communicatietechnologie en Sociale Ongelijkheid; Eindrapport*. Den Haag: SCP.