9 Conclusions and recommendations[16]

In the previous chapters, tailoring (also called personalisation or customisation) is explored as a technique that enables organisations to adapt communication, interactions, products and services to targeted groups of users or individual users, on the basis of user-related information that is stored in user profiles. Tailoring in this study is associated with user profiling, a continuous process of collecting data on or from users, storing them in user profiles and acting upon those profiles. Database technologies, faster and relatively inexpensive storage capacity and the increase in web services and applications have created the conditions in which user profiling can be applied by organisations. The user-related data in the user profile system can concern the user's individual characteristics, the user's (website) behaviour or usage, or the context in which the user communicates with the organisation. Section 9.1 describes in more detail the types of user-related information that define the effectiveness of communication and interaction between users and organisations, and hence would be good types of data for collection and storage in user profiles. Section 9.2 then describes three scenarios, which serve as examples of what could be achieved with the various types of user-related information.

User profiling is a costly process that has to be initiated and continued by two parties: the organisations and the users. User profiling will in the longer term only succeed if both parties experience clear, definable benefits. On the organisation's side, the benefits must be measurable returns on investment, which can be measured (depending on the nature of the organisation) as increased sales, better service or performance level, better compliance with laws or treatments, a larger number of crimes detected, more efficient and effective communication, etc. On the user's side, the benefits must be experienced as better communication from and with the organisation, a more relevant offer of information, services and products, and a more rewarding and effective relationship with the organisation. User profiling can only be beneficial in relationships that require extended and repeated contacts, communication and transactions between users and organisations. Sections 9.3.1–9.3.8 summarise the most important issues between organisations and users, thereby focusing on the possible aims of user profiling. Also, for each of these issues, a research agenda is presented.

The most important prerequisites for gaining the cooperation of the user in collecting user-related information in user profiles are access, trust and acceptance. These issues are addressed in sections 9.3.9–9.3.14. Access concerns the skills, abilities and resources of users, which can only to a limited extent be influenced by the organisations involved. For trust and acceptance, privacy concerns are of major importance. It has been demonstrated that privacy concerns are a primary barrier for users' willingness to buy online (Pavlou, 2003). Pavlou's study focused on purchase decisions in which no specific user data were used or collected. It can be safely assumed that privacy concerns are even stronger when users are aware that their personal information and usage data are collected for or associated with user profiles.

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Privacy concerns might be smaller when the user profiling systems are only collecting information to find patterns at group level rather than at individual level. They are also related to the type of organisation the user is dealing with and the trust the user has in that organisation and its goals. Some organisations are more trustworthy, or have a shared interest with the user, whereas others collect user-related information for their own profits and benefits. Personalisation of online interaction and communication can only succeed if the privacy concerns of users are addressed and the system strikes a good balance between the wish to collect personal information and the threat of privacy infringements. Sections 9.4.1–9.4.5 focus on the most important limitations and constraints of user profiling.

9.1 Types of user-related information

Chapter 1 offered a framework to describe and analyse user profiling from both an organisation and a user perspective. User profiling is an ongoing process between organisations and their citizens, clients and customers. It is not only influenced by the parties involved and the communication, interaction and transactions between them, but also by factors in the context, such as events that are covered by the media and experiences of users in situations other than the contacts with the organisations.

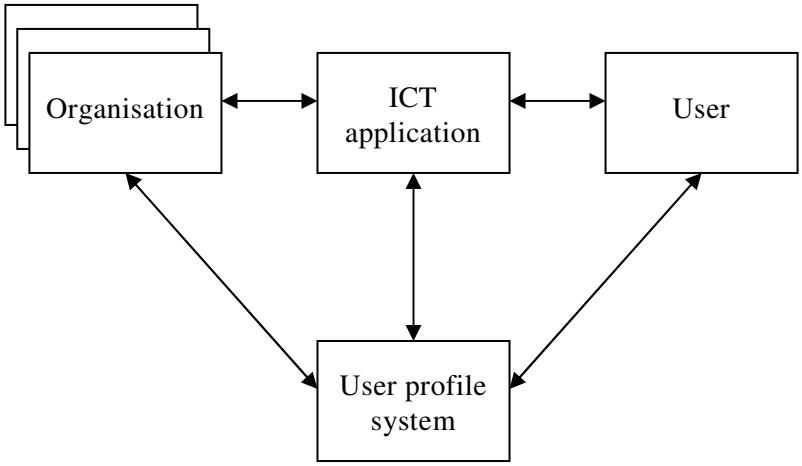

Figure 9.1: The Framework of user profiling

The definition of a user profile that has been used throughout this report is slightly different from the definition used in previous Alter Ego documents (Telematica Instituut & IBM, 2004b). This report used the following definition:

A user profile is a (structured) data record, containing user-related information including identifiers, characteristics, abilities, needs and interests, preferences, traits, and previous behaviour in contexts that are relevant to predicting and influencing future behaviour.

A user profile can contain various types of user-related information. On the basis of theories and studies of communication, interaction and transaction between users and organisations, as presented in the previous chapters, we consider the following types of user-related information to be relevant to user profiling (figure 9.2).

I Am	→	**ID**: name, date of birth, address, fiscal/social security number, …
I Am+	→	**Demographics**: gender, ethnicity, nationality, household, occupation, …
I Can	→	**Abilities**: strategic, informational, instrumental, digital, physical, linguistic skills, …
I Know	→	**Knowledge**: education, experience, ICT, topic, context, …
I Do	→	**Activities**: work, position, …
I Use	→	**Devices, media**: computer (usage), TV, newspaper, websites, surfing behaviour, ...
I Have	→	**Resources**: income, possessions, purchases, …
I Want to	→	**Usage goals**: specific information, products, services, entertainment, …
I Prefer	→	**Preferences**: taste, lifestyle, hobbies, interests, ratings, …
I Believe	→	**Attitudes**: beliefs, values, expectations, moral, ethical, political, …
I Am ++	→	**Traits (personality)**: analytic, motivational, trusting, risk-taking, …
…	→	…

Figure 9.2: User-related information for user profiles

At the top of the list in Figure 9.2 are the types of user-related information that are relatively easy to acquire or collect. They are relatively stable. More to the bottom of the list are the types of user information that can only be inferred from users' activities or that need to be provided by the users themselves. They can change relatively easily over time and can be strongly influenced by the users' experiences and events in the real world.

We do not claim that this list with types of user-related information is final. Organisations with specific goals might need very specific information about their audiences. In the next section we will describe what aims organisations can achieve with the various types of user-related information, in the form of three scenarios.

9.2 Aims and types of user profiling: Three examples

In chapter 1, we presented three aims that organisations could have to initiate, produce and maintain a user profile system.

Aim 1:
Making the communication between organisation and user more efficient (minimal option) and more effective.

Aim 2:
In addition to making the communication more efficient and effective, predicting the behaviour of users.

Aim 3:
In addition to making the communication more efficient and effective and on the basis of predicted user behaviour, influencing users in order to make them demonstrate desired behaviour (maximal option).

Aim 1 has the most obvious benefits for users; aim 3 seems the most profitable for organisations. The resistance from users towards aim 3 user profiling is most likely the strongest.

Because different definitions and interpretations of user profiles and user profiling abound, we will formulate three imaginary cases of user profiling. They are situated in more or less familiar Dutch organisations, which for the sake of this description we will assume to be applying user profiling. The cases are not based on real data or real user profiling efforts of the organisations. The three cases are linked to the three aims that have been formulated above. The type of user-related information used in the example is indicated between brackets [ ].

Case 1: the National Tax Department

The National Tax Department is an example of a public organisation with a strong administrative nature. It has identification data on almost all adult citizens of a country, such as their name, address, date of birth and fiscal identification number [*I am*]. It also has information about their occupation, income and marital status [*I do*]. From the data that citizens provide, it could relatively easily make inferences about (for example) household composition, chronic diseases and disabilities of family members, or private home purchase and ownership [*I am +, I have, I do*]. Also, the Tax Department is authorised by law to collect information about bank accounts and other financial dealings of citizens.

The Tax Department could use the provided and inferred user-related data to make their communication with individual citizens more efficient and effective, both for the addressee and for the organisation itself. For example, all data that citizens provided on earlier occasions and the information that the Tax Department received about bank accounts could be pre-filled in the tax forms. The role of the taxpayer would change from provider of data into checker of data provided by the Tax Department (an example of aim 1 of User profiling). But the Tax Department could go beyond that. If, for example, the user profile shows that a taxpayer recently bought a house and surfed the Tax Department's web pages for information about tax deductions [*I use, I want to*], the Department could target the individual with tax-related information about deductible aspects of mortgages. The information could be tailored on the basis of the income data of the taxpayer (an example of aim 2 profiling). The Tax Department could even go further and combine the information it has on an individual taxpayer with information it acquires from credit card companies and car dealers [*I prefer*]. If the expenses and purchases of the taxpayer do not match his income, the Tax Department could start an investigation. In the end, this could lead to better compliance with the tax laws (aim 3 profiling).

Case 2: the Big Retailer

The fictitious Big Retailer in our second case collects information about the individual shopper's purchasing behaviour through personal customer cards. Through that card the Retailer knows the purchases that a particular customer has made over the years or the services that have been used [*I have, I prefer*]. For at least a part of its customer base, the Big Retailer can link the behavioural information to identifying data of the individual customer, such as name, address, postal code, or bank account number [*I am+, I have*]. The Retailer asks its customer to provide user profile information on its website, such as language preferences, special needs because of disabilities, computer experience, lifestyle, etc [*I can, I use, I prefer*]. To fill the user profile even more, the Big Retailer buys information from specialised data mining companies. Those companies collect data on households and individuals, for example about household composition, educational level, positions, private home ownership, lifestyle, purchases, media use, etc. [*I am+, I know, I have, I use, I prefer*].

The Big Retailer can use the user-related information to communicate more effectively with its customers. For example, an electronic folder with the special offers of this month could be translated into several languages, which would improve the relationship with non-Dutch speaking customers. Also, users with vision problems can get the information in a larger and easier-to-read font type (aim 1 user profiling). The content and layout of the electronic folder is adapted and tailored to what is known about the customers' previous purchasing behaviour, indicated preferences and lifestyle. For one customer the special wines on sale this month are presented conspicuously, whereas for another customer most attention is drawn to the reduced price of napkins and baby food (aim 2 of user profiling). And of course, the effectiveness of the tailored special offers is assessed through the customer card, which must be swiped through a card reader to receive the special bonus or reduced price (aim 3 of user profiling). In another fictitious case, the Big Retailer is notified by its user profile system that a specific long-time customer has bought on-line tickets for a circus show and has bought food and drinks for a large group of people. The user profile also shows that the valued customer does not own a car. To stress the special relationship with that particular customer, the Retailer makes a personalised offer for a discount taxi service on the day of the show.

Case 3: the Healthcare Centre

Our third (fictitious) case describes a large healthcare centre with various medical and paramedical disciplines present, such as family doctors, dentists, psychologists and dieticians. The Centre has cross-sector business ties with health insurance companies and care institutions such as hospitals and nursery homes. The information that the various care providers have on a specific client is combined in a user profile system. The care provider also buys user data from the Big Retailer and specialised data mining companies (cross-domain exchange of information). In our scenario, the Care Centre wants to use the information not only to communicate efficiently and effectively with and about individual patients, but also to predict patient behaviour and increase compliance with treatments.

The user profile of Ms X, an elderly single lady who recently developed diabetes, shows that her vision is rapidly deteriorating [*I am, I am+, I can*]. The Healthcare Centre sends her an electronic message to enquire whether she would like her information and bills printed or displayed in larger fonts (example of aim 1 user profiling). Also, the Care Centre brings to her attention that next month a non-profit organisation will be offering courses to people with deteriorating eyesight, aimed at learning how to use assistive technologies such as screen readers (example of aim 2 user profiling) [*I use*]. The data from the Big Retailer and the data mining company show that Ms X is a regular buyer of products that are particularly unhealthy for diabetes patients [*I have*]. Because it is unclear whether ms X is knowledgeable about the health risks of eating those products, her insurance company allows for two hours of consultation with a dietician [*I know*]. The Healthcare Centre proposes a meeting with the dietician at a time that ms X. has indicated as suitable for appointments, according to the information in her user profile [*I prefer*]. If she sticks to her risky eating habits after the dietary consultations, the insurance company will raise her premium because she has proven to belong to a specific risk group [*I believe, I am+++*] (aim 3 user profiling).

The three cases serve as an illustration of the application of user profiling and are based on the findings in this report. Therefore, we believe that these cases provide a realistic view on possible applications of user profiling.

9.3 A research agenda for user profiling

This section will discuss the most important findings of each of the previous chapters. Based on these findings, for each chapter the most relevant questions for future research will be presented. These research questions form the research agenda for user profiling from a behavioural and organisational perspective.

9.3.1 Organisations: motives and constraints for user profiling

We are in the early stages of user profiling. Until now, no specific theory on user profiling in organisations exists. It is known that user profiling might serve three aims (as mentioned in chapter 2). Although the three aims apply to both private and public organisations, there is a difference in the way various organisations can employ the technology. This is primarily due to the different conditions under which they have to operate. The public sector is bound by stricter rules of privacy and security than the private sector. Due to the heterogeneous composition of many public organisations, the application of user profiling in the public sector is more complex than in private companies. Public organisations face greater difficulties in linking the underlying data in a user profile. Moreover, the public sector cannot target a specific group through user profiling but has to give each citizen and business equal access. All these restrictions for governmental and public organisations result in the public sector lagging behind the private sector when it comes to employing user profiling.

Both the public and the private sector are confronted with a number of obstacles which impede the introduction of personalised electronic services and transactions:
- Financial and economical obstacles;
- Organisational obstacles;
- Technical obstacles;
- Legal obstacles.

9.3.2 Organisations: research agenda

Does user profiling lead to higher returns on investment?
Hardly any solid quantitative or qualitative evaluation of investments and returns of user profiling in the corporate sector has been found in this inventory. This calls for more descriptive surveys and empirical studies to measure the real effects of user profiling in the private sector.

Inventory of organisational goals and resources for using profiling
In the same vein as the study that the General Accounting Office conducted on the data mining practices of US federal agencies (GAO, 2004), we propose a bottom line study of user profiling goals and practices in Dutch private and public organisations. This study should answer the following questions:
- What specific goals do organisations try to achieve in communicating with their clients, customers and citizens?
- What type of user-related information do they need to achieve these goals (better)?
- Which types of user-related information are already available to them?
- How would the organisations assess and measure the effects of the application of user profiles?

On the basis of this inventory, a number of scenarios could be developed, i.e. ones that can be realised within a few years' time as well as more futuristic scenarios. These

scenarios can serve to investigate access, trust and acceptance issues both on the user's and on the organisation's side.

Barriers for cross-domain user profiling
It can be expected that cross-domain and cross-sector user profiling create more implementation problems than within-domain user profiling. A study should reveal which (technical, organisational and user acceptance) factors define the possibilities and limitations of cross-domain and cross-sector profiling.

Mutual shaping of organisations and users
User profiling is not a one-sided effort, carried out by organisations only. It is a continuing process and not an action at a fixed moment in time, in which organisations define their relations with their customers, clients and citizens. At the same time users are defining their relationship with the organisation. Users, as much as the organisations, define the success or failure of user profiling. User profiling systems and their effects develop over time. We propose to study this process of ongoing development, across sectors and domains, both on the user's and on the organisation's side.

9.3.3 Improving communication efficiency and effectiveness through user profiling

Taking the ISO usability concept as a starting point, chapter 3 gives an overview of the way user-related data can be applied to increase the effectiveness, efficiency and satisfaction of ICT applications.

Effectiveness – It is argued that user profiles can be helpful to designers of ICT applications to ensure the effectiveness of an application, i.e. that the application offers the right functionality and content for users. From a designer's perspective, user profiles offer the basis for personas and scenarios that reflect the user's needs, circumstances and methods of working. It is not clear to what extent a far-reaching adaptation of applications in this respect is possible, neither is it apparent that adaptation is always beneficial. Human beings are to a great extent capable of adapting themselves to the (rhetorical) personas and scenarios offered in ICT applications and, in some circumstances, they might even benefit from the process of *altercasting* and learn from the roles and scenarios that are imposed by the application (e.g. in educational environments).

Efficiency – User profiles have already been used to adapt the content, structure and interfaces of applications to the physical and cognitive abilities and the cognitive style of groups or individuals. User profiles are applied in particular to adapt the structure and navigation system of information (in electronic documents and websites), to pre-fill electronic forms, to facilitate information searching processes, and to adjust help information to the individual needs of a user. Compared to effectiveness and satisfaction, it seems that increasing efficiency by adapting interfaces will be the most promising use of user profiles in the near future.

Satisfaction – It is recognised more and more that ICT (and other) products should not only be effective and efficient, but they should also satisfy affective needs of users (cf. concepts such as designing for pleasure, experience economy, and designing for fun). In chapter 3, motivation and credibility were identified as the most important needs in professional and commercial settings (entertainment is not considered here). The ARCS Model of Motivational Design, explained in section 3.6, offers a framework showing that

motivation is related to particular user characteristics, and that attention, relevance, confidence and satisfaction-increasing strategies can be adaptively applied in interface and interaction design, as has been done in educational software, leading to increased motivation of learners. Credibility is related to user characteristics as well, and although there are no known examples of such applications, credibility can probably be increased by adapting messages on the basis of user-related data in user profiles.

9.3.4 Adapting communication: research agenda

Efficient adaptive interaction and interface design variables
Many aspects of the efficiency of interface and human-computer interaction are influenced by user characteristics (chapter 6). Adaptive interfaces are to some extent investigated, but mostly in educational settings. A systematic variation of various kinds of interface and interaction variables could reveal which adaptations are the most effective in the communication between organisations and their 'users'.

Affective and motivational design
Rational and functional aspects indeed influence the effectiveness and efficiency of human-computer interaction, but it appears that in the end, affective factors such as motivation and credibility are crucial prerequisites for actual use. A study should be conducted to reveal the effectiveness of various motivational and credibility-increasing strategies, such as giving users the opportunity to learn more about what they already know or believe in, presenting relevant examples for specific users, or marking expertise and trustworthiness. The effects of those strategies should be studied both in initial use situations (first-time users, incidental users, inexperienced computer users) and in continued use situations (regular visitors, experienced computer users).

9.3.5 Inferring and predicting user behaviour on the basis of user profiles

Consumers and users may differ in a variety of aspects, ranging from level of education and income, to personal values, preferences and cognitive styles. In the world of marketing, segmentation is used to divide a market into sub-categories, each of which can be, subsequently, targeted by different strategies. An important goal behind segmenting is either selecting those consumers with a particular relevant characteristic, and, subsequently, adapting communication to this specific group, or creating different products that meet the different needs of a variety of consumer groups. Furthermore, in services marketing it is increasingly realised that understanding particular market segments is essential for relationship marketing. Unless careful market segmentation has taken place, customers' expectations, needs, and requirements may be defined too broadly, causing dissatisfaction of a large proportion of customers. Focusing predominantly on the needs and requirements of new customers, on the other hand, may cause current customers to become dissatisfied and seek their required services elsewhere (Zeithaml & Bitner, 1996). At a time when users of electronic services are being bombarded with information, and competing organisations are but a mouse-click away, the need to infer and predict user behaviour becomes ever more urgent, not only for attracting new users, but also to retain them in the longer term. The findings in the field of segmentation are, therefore, important for the creation and use of user profiles.

In chapter 4, an overview was given of the various ways segmentation is being conducted in marketing. Geographic, demographic, behavioural and psychographic bases for segmentation and their relevance to user profiling were discussed. Whereas geographic

and demographic segmentation can relatively easily be applied to user profiling, they often only correlate with certain types of consumer behaviour. As such, these bases for segmentation do not inform the marketer of the psychological mechanism that may account for the variations in purchasing behaviour. A drawback of behavioural and psychographic segmentation, on the other hand, is the lack of reliability and validity associated with the measurement of personality variables. Nevertheless, several researchers such as Loudon and Della Bitta (1988) and Foxall and Goldsmith (1988) have remained optimistic about the potential of behavioural and psychographic variables to infer and predict behaviour.

The field of user profiling would benefit greatly if new ways were to be found to measure psychographic variables in a manner that is reliable, valid, easy and unlikely to cause users to be reluctant to divulge information. In chapter 4, two variables, cultural orientation and birth order, were presented as examples of variables that meet these criteria.

9.3.6 Inferring and predicting behaviour: research agenda

How to measure psychographics?
Further research in the field of user profiling should be aimed at examining exactly which personality variables are covered when measuring psychographics and which effects these might have in terms of consumer cognition and behaviour. Self-regulation as a dominant consumer motive may be explored more fully in future research.

Furthermore, cultural orientation and birth order are just examples of variables that are promising in the context of user profiling. Future research should be devoted to finding additional variables, like the ones discussed in chapter 4. These should be easy to measure, especially in an online context (cultural orientation may be measured by asking such questions as what country the respondent has been living in, a question that is already part of regular online purchase procedures), should not lead to respondents displaying a reluctance to divulge such information (birth order and country of origin are both unlikely to invoke such reluctance), and should offer good predictive power in terms of behaviour and cognition.

9.3.7 Influencing behaviour on the basis of user profiles

Tailored printed messages on the specific characteristics of individuals have been shown to be a promising communication means to persuade people to change health behaviours, compared with generic non-tailored printed messages. It is thought that tailored messages are more effective because redundant information is omitted and remaining information is more relevant to the receiver. Tailoring also seems a promising strategy for web-based health communication but effectiveness has not yet been established. Web-based tailoring has a high potential to be effective because almost immediate feedback can be provided and additional resources or web links to other resources can be made available. Although many web-based tailored applications are being developed in patient health care, little is known about their effects.

It is not clear if tailoring can be easily generalised to other situations such as marketing. It is hard to collect reliable information about personal opinions, necessary for tailoring. Incomplete or inaccurate information might lead to tailored offers that do not match the expectations and preferences of the consumer, and hence can become counterproductive for user profiling.

9.3.8 Influencing behaviour: research agenda

To what level and on which variables should messages be tailored?
Most studies that have evaluated tailored health messages have compared these messages with generic messages. We do not know from these studies to what level (group, individual) messages should be tailored. Messages are often tailored to stages of change and personal knowledge and beliefs. From most studies it is not clear to what extent these variables have been used to tailor the messages. Perhaps the persuasiveness of messages can be improved if also personal emotions are taken into account. It is important to investigate in which situations, for which behaviours, which of these variables should be used for tailoring messages to persuade people to change their behaviour.

Can tailoring be generalised to other situations?
Tailoring has mainly been used in health communication. It has to be investigated to what extent tailoring can be used in other situations, such as marketing to influence the behaviour of consumers. Important questions are if and to what extent people are willing to provide organisations with the required information about their personal beliefs and preferences; and to what extent inaccurate information might lead to mismatched tailoring of communication and products, and what the consequences of mismatches are.

How can web-based tailoring and user profiles be used in patient care?
Although many web-based tailored applications are being developed in patient health care, little is known about their effects. Combining medical data of patients with assessments of patients' knowledge, beliefs, emotions and health behaviours, such as compliance with treatment advice, coping and self-management in a user profile, can be used to provide patients with tailored feedback through, for instance, a secured personal webpage. It has to be studied what the benefits are for patients, which patients want to use these kinds of application, what kind of information should be included in the user profile, and to what extent other additional resources (web links, discussion forums, opportunities to ask questions by e-mail) should be offered.

9.3.9 Access as a condition for effective user profiling

User access to ICT is a primary condition for effective application of user profiling. It is not limited to the possession of ICT, access is also about the motivation and the skills to use ICT. Three groups of users can be distinguished, according to the intensity of usage and acceptance of applications that take advantage of user profiles. Probably, these groups do not differ significantly from those that use and accept ICT and new media in general. There are no reasons to suppose that the divide in use and acceptance of user profiles will differ from the existing 'generic' digital divide.
The first group is the **information elite**. The information elite consists of active information seekers and communicators, strongly motivated to use the digital media. They have complete and multi-channel physical access, and are experienced users who possess the required operational, information and strategic skills. They might be the ones most interested in user profile applications, but they are also the most critical users. They are able to judge their assets because they have the strategic skills that are necessary for a serious input to 'informed consent'. Several niche markets of user profiling applications can be explored for the information elite.

The second group is the **electronic middle class**. About 55 percent (the majority) of the population in developed high-tech societies has access to the digital media, usually

through only one or two channels (at home and at work). They use the digital media only for a few purposes, first of all for entertainment and secondly, for simple applications of information, communication and transaction. Only very basic, highly accessible, user friendly and trustworthy user profiling applications will attract their attention, which are consequently the only applications that are appropriate for a mass market. The mass market population will need consumer organisations and other intermediaries to support them in giving informed consent regarding user profiling.

The third and final group consists of the **digital illiterates**. The unconnected and the non-users form about one third (30%) of the population in developed high-tech societies. With no access to computers and the Internet, they only use digital media such as televisions, telephones and audio-visual equipment. Within this group, the elderly (over 65), unemployed women, people with little education, people with a low income, disabled people and migrants or members of ethnic minorities are over-represented. A large proportion of these groups lacks the motivation, the resources and the skills to use computers, the Internet and complicated other digital media. All the conditions for user profiling applications are simply absent among this part of the population. This is an important issue for government services in particular, as they are supposed to reach the entire population. Solving this problem requires additional effort in providing basic public access sites (of computers and the Internet) with service staff.

9.3.10 Access: research agenda

Identification of the different groups
It is likely that, given the differences between the groups, not all groups are equally eager to adopt user profiling and to make use of it. The information elite is likely to accept user profiling, but will most likely be critical concerning aspects like privacy and control. The digital illiterates might not even be able to engage in user profiling. For user profiling to be a success it is essential that the three groups are identified in detail. Research should address the factors that have led to the 'digital divide' in computer and Internet usage and test the applicability of those factors to user profiling.

How to create acceptance among the different groups?
Digital illiterates differ from the electronic middle class and the information elite. This might imply that different strategies are needed to persuade the various groups to engage in user profiling. A survey focusing on the factors that determine the acceptance of user profiling with both users and organisations might reveal the differences between the different groups. Results of this study might help in creating different persuasion strategies and thus enhance the success of user profiling. Besides this, the results might help to identify those groups that are certainly not willing to accept user profiling.

How to create informed consent?
Informed consent can be an important means to reduce the influence of factors impeding the acceptance of user profiling (trust, privacy concerns, control, etc.). Although it might seem easy to inform users and to gain their consent, this might not be the case. Not all people are able to interpret information and not everybody is able to come to a founded decision. Explorative research should address the factors influencing the effectiveness of informed consent and the importance of those factors for different users.

9.3.11 Trust as a condition for effective user profiling

Trust is generally considered to be a mechanism that reduces feelings of uncertainty or risk that customers, clients or citizens might experience, and, as such is a relevant issue especially in the service industry, both off- as well as online. A sufficient level of trust is necessary for transactions to run to a satisfactory completion, and for information to be duly accepted. Simlarly, trust is highly relevant to all actors who wish to construct user profiles in order to enhance the efficiency of online interactions. Requesting, collecting and storing user information is likely to cause uncertainty; users feel exposed to the risk that their personal data are out in the open, for everyone to take advantage of.

Of all types of trust that were discerned in chapter 7, organisational trust and system trust are of particular importance to the implementation and acceptance of user profiling. Online interaction with an organisation involves both the organisation itself, as well as a system which enables this interaction. Low trust in either the focal system or the organisation may well have important consequences for the user's willingness to divulge information that can be used to build a user profile.

Both organisational trust and system trust can, to a certain extent, be viewed as special cases of social or interpersonal trust. Whereas the application of such trust antecedents as value similarity and intentionality to organisations is an easy step to take, however, for trust in systems such attributions are less readily accepted by researchers. Nevertheless, as follows from the discussion of relevant literature in chapter 7, applying human-like concepts to systems is by no means far-fetched.

Several factors that are likely to influence trust in organisations and trust in systems were identified in chapter 7. As both types of trust are largely based on theories on interpersonal trust, quite a few of these factors apply to both system as well as organisational trust. One important antecedent shared by both types of trust is predictability or consistency. This is the very first step in the development of trust. The next step would be the inference of characteristics such as reliability, dependability, competence and capability. At a yet higher level, concepts such as value similarity, intentionality, benevolence and integrity may come into play. Organisations who want to increase user trust, either in the organisation itself or in the (online) systems utilised by them should consider these factors. Organisations would be wise to make information about their values, intentions, etc., explicit, to prevent users from engaging in uncontrollable and unpredictable inferential processes themselves.

Other factors, specifically aimed at countering low initial trust in e-commerce settings, are such aids as recommendations, endorsements and perceived website quality. Although these factors are mentioned in system trust literature, and not in that of organisational trust, it is not unlikely they apply to the latter as well.

9.3.12 Trust: research agenda

How to measure accurate levels of trust?
Perhaps most importantly in the context of user profiling, future research should aim at developing ways in which a user's level of trust can be estimated with a reasonable degree of accuracy. One could simply supply a rating scale once a site is opened by a user, but this approach is both too obtrusive as well as cumbersome. Such an estimation should, ideally, take place unobtrusively, so as to not interfere with the ongoing interaction, and to prevent the user from becoming aware of what is being measured.

This could perhaps be done by recognising the signalling function of some elements of the user's interaction with the application. For instance, checking the privacy policy or refusal to leave an e-mail address could well be indications of low user trust. Extensive research should address which online behaviours provide valid signals for low user trust, whereas great care should be taken to avoid the possibility of misinterpretation of such signals; a low-trust individual mistakenly categorised as a high trust user is almost sure to exit the online interaction.

What factors determine trust?
Research on what influences trust and how one can intervene when user trust is low should take place both at the level of the application (system trust) as well as at the organisational level. One could, for instance, examine the role of users' perceptions of company values or interests in relation to their own. Possibly, this causes differences in the effect on trust of communication by profit organisations on the one hand, and non-profit organisations on the other. The profit-maximising impression consumers may have of companies may provide a weak basis for trust to grow on as consumers have entirely different interests, i.e. getting value for money. Companies or organisations that are not perceived to have profit as their top priority might be given much more credence.

Trust and computer-mediated communication
Further research should also try to unravel whether users engaged in computer-mediated communication perceive the application merely as an intermediary between them and the company, or as an isolated object to which trust and human-like characteristics can be attributed. If applications are treated as if they are more or less stand-alone systems, interventions aimed at increasing trust in the organisation rather than the application could reasonably be expected to be less effective than interventions targeting an increase in system trust. When an application is regarded simply as a means to interact with the organisation, i.e. as a mere extension of the latter, however, it seems worthwhile to invest in the organisational image.

Does trust carry over?
A related topic concerns the possible carry-over effects of trust. Possibly, if a user trusts an organisation to live up to its promises, this trust may cause the user to have more trust in the application as well (e.g. see Doney et al., 1998). Perhaps, this carry-over effect might also work in the other direction: trustworthiness of an application could also reflect positively on the organisation that created it. Sitkin and Roth (1993) have argued, however, that trust may not simply generalise across different tasks or situations. It would be useful to investigate under what circumstances trust is transferred from organisation to application and vice versa, and how.

The impact of system failures on trust
Another line of potentially fruitful research concerns the possibilities to mitigate the impact of system failures. The occurrence of system failures, such as transaction mishaps or supplying users with inaccurate information, cannot be fully prevented. However small, such failures may reverberate disproportionately in the user's subsequent judgements regarding that system. Users expect automated systems to be near perfect, i.e. they have a schema in which automation produces virtually no failures. Failures that do occur, however, conflict with that schema, and, consequently, are highly conspicuous. The decrease in trust and discarding of system advice that may thus occur might be prevented, however, by a sense of understanding. In other words, if users come to understand the system, they may have more trust in its capabilities, which may make

their trust levels less susceptible to occurring failures. Research should address the question how such understanding can be brought about.

9.3.13 Acceptance as a condition for effective user profiling

Chapter 8 discussed acceptance issues concerning user profiling. Acceptance is a complex issue that transpires through the whole user profiling framework. Users and organisations have to accept each other, ICT has to be accepted and finally the user profile has to be accepted. Acceptance is a continuous process that does not stop when the decision is made to adopt user profiling. People are unstable in their preferences and behaviour, so it might well be possible that an individual accepts the use of his user-related information at a certain point in time, for example because it offers direct benefits, but is not willing to accept it at another time. Organisations should therefore pay attention to user acceptance throughout the creation, implementation and use of user profiles.

Acceptance is determined by numerous factors. Theories focusing on acceptance suggest factors that possibly play a role, such as perceived relative advantage, uncertainty and perceived usefulness. The most current studies on acceptance point to factors such as perceived risk, the need to be in control or the level of computer experience that might influence the acceptance of new technologies in general and user profiling in particular.

A few factors are especially relevant to acceptance. These are the factors that should be addressed in research before the initiation of the user profiling process.

The first factor is **trust**, which has been extensively discussed in chapter 7. Trust is an essential (perhaps the most essential) prerequisite for acceptance of user profiling. A second factor is **control**. Users want to be in control of the data that are being stored in the profile, or at least have the perception of control. The third factor, which is closely related to both trust and control, is **privacy concern**. Violation of user privacy is one of the most common fears of users of the Internet, continuously fed by privacy invasions of commercial parties in particular. A vast majority of the users want their privacy to be guaranteed. The fourth factor is **motivation**. User profiling requires a certain amount of input from the users, not only in order to provide data, but also to accept user profiling. The fifth and final factor is **emotions**. One of the main constraints of the traditional behavioural and acceptance theories is that they assume rationality (see section 9.4.4). More recent research has brought to the fore that behavioural processes are not completely rational, but are at the same time to a large extent determined by emotions.

Chapter 8 also discussed **Informed consent** as a condition for effective and hence successful user profiling. Informed consent should be seen as a solution to overcome the obstacles that various factors create for the acceptance of user profiling. Organisations should aim at obtaining informed consent from users regarding the use of their data for user profiling systems. This will not only increase acceptance, but will also smoothen the user profiling process, because there is mutual consent about this process.

9.3.14 Acceptance: research questions

What is acceptable, what is not?
Many different factors and variables influence the acceptability of user profiling. In a series of simulations, representatives of future users of user profiling (both organisations

and customers, clients or citizens) would be confronted with each of these factors and variables and asked to indicate what is still acceptable to them, and what is not.

The factors and variables could be placed on dimensions that are to be manipulated to find out the limits of acceptance. Examples of those dimensions are:

- Type of user-related information that the system is working with; at one end of the spectrum we would place user profiling systems (for example) just using Identifying information [*I am*], at the other end systems using information about the user's personality [*I am++*].
- Source of user-related information: at one end we would find user profiles that are explicitly provided by the users themselves, against profile information inferred from previous user behaviour.
- Application domain: at one end the user-related information is applied by an organisation for the public good (such as a health or welfare organisation), at the other end the information is used for commercial purposes.
- Aim of application: at one end of the spectrum the user profile is used to improve communication between organisations and users, at the other end the user profile is used to monitor and change user behaviour (e.g. for surveillance or compliance with the law).
- Control over the user profile: at one end the user profiling system is filled, maintained and controlled by the users themselves, at the other end the control would be located within an organisation (trustworthy third party - commercial enterprise).

Exploring the dimensions of informed consent

Informed consent is a term that has its origin in the health domain. We need to investigate its applicability for the use of personal information. Which factors determine informed consent as an effective means to create acceptance of user profiling? Do people understand consent? When do we call someone 'informed'? Do people weigh the consequences of the information and their consent? Both qualitative and quantitative research methods might be used to explore the dimensions of informed consent.

Emotional factors influencing acceptance.

More and more, researchers have come to know the importance of emotions in behavioural processes. People behave all but rationally and processes of behavioural change are not as straightforward as assumed. Research should address the emotional factors that influence acceptance. Although it might be difficult to simulate emotions in a series of experiments, scenarios and cases might be useful ways to confront people with emotions and test their reactions.

Acceptance and trust as processes, but what process?

As shown in both chapters 7 and 8, the creation of trust and acceptance are not limited to a single moment in time. Trust and acceptance establishment can be considered processes that do not stop when user profiling is initially implemented. During the use of profiles, trust might increase or decrease and the same also applies to acceptance. How do these processes work? What stages do these processes consist of? These questions should be addressed in longitudinal research projects, measuring trust and acceptance levels and their determining factors.

9.4 Constraints and limitations of User Profiling

Although user profiling has potential benefits to both users and organisations, success for organisations and benefits to users are by no means guaranteed. The next paragraphs will discuss some drawbacks and limitations of user profiling and the user profiling process.

9.4.1 Concerns about privacy violation

As shown in chapters 7 and 8, privacy is an important topic in user profiling. Violation of privacy is one of the most important concerns of internet users. As much as 70-84% of all participants in various surveys indicated that privacy concerns made them reluctant to divulge personal data. They are especially aware of privacy issues concerning personal data such as name, address and income. Also, 24-34% of people in the surveys indicated to have provided false or fictitious information when asked to register (Culnan & Milne, 2001; Fox et al., 2000), because of concerns about privacy violation. In commercial contacts (online shopping) those privacy concerns play an even more important role than in other systems for tailoring information or communication. As much of 91% of respondents indicated that they were concerned about businesses sharing user data for purposes other than the original purpose for collecting the data (UMR, 2001). Although many internet users are not well-informed about the means of collecting usage data (web surfing behaviour data), such as spyware and cookies, almost everybody (91%) indicates feeling uncomfortable about being tracked across websites (Harris Interactive, 2000).

All these figures indicate that privacy and personal data security are of the utmost importance to almost all Internet users. However, this does not mean that they understand the implications of their concerns and act upon it. Only 10% of respondents in a survey had their browsers installed in such a way that it rejected cookies (Fox et al., 2000). In a study of Spiekermann et al (2001) even users with self-reported strong privacy concerns readily disclosed personal and sensitive information on a website. Although people express concern about privacy, they easily relinquish privacy because of convenience, discounts and other incentives, or through a lack of understanding of the consequences. Obviously there is a difference between concerns and attitudes on the one hand and actual secure behaviour on the other.

The privacy concerns of users imply that organisations should approach the process of user profiling with extreme caution. Effective user profiling depends on the correctness of information and on the willingness of users to provide the organisation with data. Creating trust, giving users control and requesting informed consent might solve the privacy issue to some extent. Also technical solutions, such as good privilege regulations, could help to secure privacy and thus to reduce privacy concerns. The organisation, as the initiator of collecting user data and user profiling, should take the initiative to protect and secure the users' privacy.

9.4.2 The risk of stereotyping

Although most user-related data are collected at the individual level, the goals of organisations are often better served when users are treated as groups (market or customer segments) which share a number of characteristics. Grouping (segmentation) easily leads to annoying stereotyping, because it is based on inferences. Let us, for example, assume that most women over fifty have limited computer skills and experience computer anxiety. Even if that is a solid fact, it is very annoying for those women over 50 who *are* experienced computer users and do not experience computer anxiety at all to

be addressed as if they do. The underlying stereotype ("As you are a woman over fifty, you probably don't know much about computers and are pretty unsure about it") will have a negative and adverse effect on the relation between organisation and the individual user. The negative effects of stereotyping can be attenuated by subtle formulations and by explanations of the inference pattern ("We have noticed that many women of your age don't feel too confident with computers. If that's the case for you, then you might be interested in…').

9.4.3 Inconsistency in user preferences and behaviour

Collecting user preferences and behaviour in user profiles and then applying them in new situations is based on the assumption that users are consistent and predictable in their characteristics and behaviour, and hence that future behaviour can be inferred from data on current behaviour. But behaviour and preferences are unstable, and often influenced by all kinds of external variables. The user that in the morning logs in as a scientist, who searches the online book store catalogue for the newest engineering publications, might in the evening use the same catalogue for finding cult horror DVDs or poetry for children. One and the same consumer can prefer extreme sports activities one day and laid-back leisure the next. Preferences, attitudes and values expressed when prompted (for example, when creating a user profile) are not necessarily the attitudes and values that govern actual user behaviour. That makes predicting preferences and behaviour on the basis of implicit or explicit information about other preferences or previous behaviour a risky business. Even if we can distinguish different factors explaining behaviour which correlate highly, those factors often do not explain or cause one another.

9.4.4 Limitations of behavioural theories: Bounded rationality

In the chapters of this report various theories have been discussed, such as the Elaboration Likelihood Model and the Theory of Planned Behaviour (chapter 5), and the Diffusion of Innovations theory and the Technology Acceptance Model (chapter 8). These theories share one important limitation: they are all based on the assumption that behaviour is a repertory of rational and intentional actions. In most behavioural and social science studies it is implicitly assumed that people are rational beings and that their behaviour can be explained by intentions, which are formed by knowledge, arguments, understanding of the situation, thoroughly processed experiences, and comprehensive views of the world. But we know this is not the case. Much of our behaviour is irrational, formed on the spur of the moment, caused by emotion rather than cognition, aimed at avoiding mental effort, and influenced by processes or events that remain hidden from our consciousness. The very nature of those factors influencing behaviour makes them very hard to investigate. This report, and the research on the attitudinal aspects such as trust and acceptance in general, is biased towards factors that we feel we can explain, predict and manipulate in experimental studies. But the rationality of behaviour is bounded, and we risk overlooking all those non-rational, unintentional factors that cause us to behave in certain ways.

Bounded rationality has already been investigated in the context of economical (purchase) decisions, for example by Noble Prizewinners Simon (1957) and Kahneman (2002). Research has shown that, for example, norm-conforming behaviour does not fall within the confines of rational behaviour (Elster, 1989). Research on user profiling should not only focus on identifying and predicting rational and intentional behaviour, but also on the role of emotions and irrationality.

9.4.5 Limitations of acceptance theories: Adoption is not a moment but a process

In chapter 8 (acceptance) two theories have been discussed that focus primarily on the acceptance of new technologies: the Diffusion of Innovations Theory and the Technology Acceptance Model. These theories are useful in studying the process of acceptance of innovations (new technologies) and provide a useful tool for identifying the factors that influence these processes. The two theories, however, share an important limitation. They both focus on the moment of adoption of the new technology, and pay less attention to other acceptance issues, such as the implementation of the innovation or its use over time. Although the Diffusion of Innovations theory describes the entire Innovation-Decision process, the focus of the theory is on the (initial) Knowledge and Persuasion stage of the model. Most previous studies that focused on technology acceptance from the perspective of the Diffusion of Innovations Theory, only investigated the moment of adoption and the motives of users to adopt an innovation. The Technology Acceptance model focuses entirely on the moment of adoption. That means that the model is useful when answering the question which behavioural determinants influence the decision to adopt (accept) a new technology. However, the problem with user profiling is that it is not just about adopting one single technology. Acceptance involves the entire user profiling process. The user and the organisation have to accept each other, user profiling as a phenomenon has to be accepted, the technology has to be accepted, and finally the use of the profile has to be accepted, both initially and for a longer period of time. Using the existing theories to explore the acceptance of user profiling is in many ways promising, but studies must accommodate for the limitations thereof.

9.5 Preliminary recommendations for organisations

Based on the state of the art in behavioural and organisational research on user profiling, a number of preliminary recommendations can be made. These recommendations are intended for any organisation that is considering to apply or is already applying user profiling. This section will discuss the five most important recommendations.

Our first recommendation is to **place users' interests at the heart of the decision process**. User profiling is a process that affects both the users and the organisations involved. It is not only the organisation that has an interest in user profiling. The use of a user profile must be motivating for users, as well as relevant and rewarding. Smoother communication, better (tailored) information, customised services and products are some of the benefits that users might experience. Paying explicit attention to users' interests rather than only to the organisational goals might be beneficial to the organisation. When users are involved in the decision and design process and are taken seriously, their motivation, trust and acceptance regarding user profiling might increase. If organisations cannot devise user benefits that can be clearly assessed and clearly communicated to the users, we advise against the application of user profiling in business processes.

Our second recommendation is to **create and manage trust**. Trust is the most important prerequisite for the effectiveness of user profiling. Trust may be established and maintained when organisations apply an open and honest information and communication strategy about their ambitions and plans regarding user profiling. Closely related to trust are **control** and **privacy** issues. However, trust is not only created and fortified by direct interaction with the ICT application and the user profiling system, but also by all other contacts with and information about the organisation. Creating and managing trust must occur within and outside the context of user profiling.

The third recommendation is to **solve the control issue**. For organisations it seems attractive to host and maintain the profile. However, for users this might be a reason to reject user profiling. Users have stated in various studies that they want to be in control. They want to know what organisations do with the information they provide and share, and they want to feel they are the ones that decide what happens to their personal data. We recommend that organisations give users access to their data, to make sure that they can verify, correct, update and delete their personal user-related information.

Research has shown that a majority of users is more likely to trust an organisation that has a privacy policy. Our fourth recommendation for organisations is that they **develop solid privacy policies** and the appropriate privacy preservation mechanisms in the ICT applications and the user profiling systems. Policies should not depend on the self-regulatory capacities of the organisations, nor should the responsibility for auditing the policies and their execution reside with commercial organisations. Governments and trusted third parties such as consumer interest organisations should guard the interests of internet users. There is still much work to be done to build users' trust by mollifying their privacy concerns and giving them control of their own data.

Our fifth and final preliminary recommendation to organisations is to **ask for informed, explicit consent** from users. Organisations should communicate clearly to the user what information is being requested, the purpose of its collection, its use and storage, the benefits to the user, as well as informing them of any other organisation that will have access to the data. This information will enable users to decide whether they want to provide the personal data or not. They must be able to state their decision explicitly. We strongly recommend organisations to develop sound informed user consent procedures, but actually expect that relatively few users in the end will be reading the information thoroughly and returning to the consent procedure regularly.