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Alter Ego: State of the art on user profiling

*An overview of the most relevant
organisational and behavioural aspects
regarding User Profiling.*



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Synopsis:

This report gives an overview of the most relevant organisational and behavioural aspects regarding user profiling. It discusses not only the most important aims of user profiling from both an organisation's as well as a user's perspective, it will also discuss organisational motives and barriers for user profiling and the most important conditions for the success of user profiling. Finally recommendations are made and suggestions for further research are given.

Main points of this report

1. 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.
2. User profiles are created, maintained and updated in a cooperative process between organisations and users of the organisational ICT applications, such as clients, customers and citizens.
3. User profiles can be used in order to realise three organisational aims:
 - a. Making the communication between organisation and user more efficient and effective;
 - b. In addition to making the communication more efficient and effective, predicting the behaviour of users;
 - c. 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.
4. User profiling must have a demonstrable, measurable return on investment for organisations. The organisation must be able to prove to itself that user profiling helps to achieve its goals better, or that it helps to communicate and interact with users in a more efficient and effective way.
5. Any discrepancy between organisational goals and user interests will reduce the users' acceptance of the user profile system. If the users perceive a good balance between their interests and the organisations' aims, they will accept user profiling more readily.
6. Private and commercial organisations have more and broader experience with applying user-related information for segmentation, tailoring and personalisation than public and governmental organisations.
7. User profiling is particularly beneficial to public and private organisations which distribute and process large amounts of administrative and form-based communication (such as the Belastingdienst, healthcare organisations, insurance companies and financial institutions). The benefits of user profiling for improving the efficiency of administrative communication are obvious both for the organisations and the users: the responsibility of users would shift from providing data about themselves towards checking and updating data provided by the ICT application.
8. Adapting communication to clients, customers and citizens fits within current strategies and policies of governmental organisations. User profiling implies a shift from a supply-side business model towards a user-centred, service-oriented business model.

9. User profiling is the most beneficial to organisations when they can share user-related information with other organisations or other departments within their own organisation. However, organisational, technical, administrative and legal obstacles make cross-domain, cross-sector data exchange between various organisations or departments problematic. Also, cross-domain user profiling will incite more privacy concerns and distrust than within-organisation user profiling.
10. Adopting and implementing user profiling is a continuous process. A developmental, incremental strategy for the implementation of user profiling should reflect the following dimensions:
 - a. the aims to be realised through user profiling;
 - b. the types of user-related information included in the user profile;
 - c. the functionality offered to users;
 - d. the groups of users targeted;
 - e. the creation and management of user expectations and trust.
11. Forms of trust that play a role in the acceptance of user profiling are:
 - a. The users' trust in the organisation they are dealing with;
 - b. The users' trust in the services or products the organisation is providing;
 - c. Trust in the systems that the organisation uses to interact and communicate with the user, including the user profiling system;
 - d. The communication (messages and interaction) that establish and reinforce trust;
 - e. The individual user's trust propensity in general; a personality trait.
12. The control over the user profile data should be in the hands of the users or a trusted third party who has a mandate to act on behalf of the users.
13. Users should be informed of the types and usage of the user-related information collected for the user profile. They should give informed consent for the collection and use of their information to the particular organisations which want to use parts of the user profile.
14. The success of user profiling is not only dependent on the actual systems and their application but also on the motivation and emotions of users and their perception of the reputation and objectives of the organisations involved. These factors need to be addressed and supported by carefully orchestrated public communication via various broadcast and targeted media.

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1 Introduction¹

In the science fiction movie Minority Report, director Steven Spielberg shows us Washington D.C. in the year 2054. By then, computing is ubiquitous. As the movie's hero, crime fighter John Anderton, moves through the streets of the city, he is continuously recognised on the basis of individual biometric data, such as iris scans. In the shopping mall, holographic shop assistants and interactive posters address John on a first-name basis, whispering irresistible offers based on his preferences and previous purchases. They are, in other words, using personal information about John that must be stored somewhere in a huge database. His user profile data are thus used to personalise the communication and target him as a 'group-of-one'.

By 2054, murder has been eliminated. Three genetically altered humans (called precogs) are able to prevent murders because they are clairvoyant. They foresee the assault and know the name of the victim and the time of the crime before it actually happens. Crime fighters then go out and prevent the crime happening. In this fictitious world, individual behaviour is not only monitored and influenced but even prevented before it has actually occurred.

The world described in Philip K. Dick's novel (1956) and Steven Spielberg's 2002 screen adaptation is in some regards unrealistic. However, it is realistic in the sense that organisations are currently collecting data on individuals with the aim of using this information, which is stored in a user profile, to adapt communication, and to predict and influence behaviour. This report examines the possibilities and restrictions of user profiling. It is one of the deliverables for the 'Alter Ego project'.

The 'Alter Ego Project' of the Telematica Institute addresses how cross-domain user profiles can simplify and optimise the benefits of 'intelligent' products and services. It answers, moreover, research questions from three different perspectives: the business perspective, the technical perspective and the usage perception perspective. The focus of this report is on the behavioural aspects of both the business² and the user perspective on user profiling.

The following is a state-of-the-art (SOTA) report. It contains an overview of the most relevant organisational and behavioural aspects regarding user profiling. According to the concept plan for the Alter Ego Project (Telematica Instituut & IBM, 2004a), this document can be marked as deliverable D1.9 containing the State of the Art of cross-domain user profiling from an organisational perspective.

First this chapter will define the terms 'User Profile' and 'User Profiling': what are they and what information can be stored inside such a profile? Next, three possible aims of user profiling are presented: what are the benefits of this Alter Ego project? And are these benefits equally important to both users and organisations? Next, the framework of

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² The original project plan uses the term 'business' perspective. This seems to suggest that only businesses and private organisations have an interest in cross-domain user profiling. However, non-profit and public organisations, such as government agencies, also have an interest in user profiling. Therefore the more general term 'organisation' has been used in this document.

analysis of this report will be presented. Finally, this chapter will give a preview of the remaining chapters of this state-of-the-art report.

1.1 User profiles

People use all kinds of ICT applications in order to support and execute the many activities that constitute their daily lives. In one of the Alter Ego work documents, this is described as follows: 'Increased connectivity, decreasing data storage capacity cost, improved multimodal interfaces, smart objects in heterogeneous environments, mean that technology is increasingly intertwined with activities in our daily life, be it work or leisure. But the complexity of services and their user interfaces also leads to an under-use of functionality. We could even say that daily life is becoming more and more complex *thanks to* and *despite* the increasing use of "intelligent" products and services.'

(Telematica Instituut & IBM, 2004b, p. 11)

Especially ICT applications that are aimed at providing or supporting electronic services require data on individual users to achieve their function. To give a few examples: an online store needs to have individual user data such as an address to deliver the goods that are purchased. The city administration, which is approached by an impaired citizen requesting a special parking permit near her house, must have at its disposal both data about her address and about the nature and severity of the impairment. Such data are often provided by the individual user but can be stored for re-use by the organisation.

In the past, the purchase or acquisition of services or products required that individuals were in contact with many different organisations, at different times and at different locations, providing each with the data they needed. Nowadays, since many of these services are offered electronically, the actual contact between the organisation and the person seeking a service or product is often realised via the individual's personal computer (be it a desktop computer or a more mobile application such as a phone or PDA). Personal communication devices act as single access point to a variety of organisations, services and products.

From the user's perspective, the potential benefit of a single access point is not realised when the organisations treat each contact as if it were a first-time contact, requiring individual data as if they were not already provided on earlier occasions. Also, from the user's perspective, single access is particularly efficient for contacts with sets of organisations or departments within organisations which in the user's opinion have a common goal or interest in the user. For example, for an impaired citizen who is moving to a new hometown, the request for a special parking permit is part of a 'scenario' of moving from one town to another. That scenario also includes activities such as registering with the municipality and finding out about waste collection times at the new address. Although these services might be offered by different departments or even by different organisations, the citizen will perceive them as part of one 'event' and might easily become frustrated if having to perform the entire scenario, and provide the specific data, over and over again. Re-use of data collected or provided on earlier occasions strengthens the relationship between user and organisation. A good user-experience during the contact will lead to (more) satisfaction about the application used, e.g. the e-commerce or the site, and more importantly, to a (more) positive image of the organisation behind the application.

When organisations have collected data about the individuals they are in contact with, they can make 'intelligent' use thereof for the planning and adaptation of further

messages, information or actions with or for the individual. In that case, the organisations use the data about current user characteristics or behaviour to adapt information and communication to the targeted individual and to predict future behaviour. For example, once the aforementioned citizen's new hometown 'knows' that she is impaired, the local administration might predict that she will also be interested in receiving information about the municipal support organisations for impaired citizens and provide her with it without her explicit request.

In earlier reports in the Alter Ego project, a user profile is defined as follows:

A user profile is a structured description of a user, containing an identifier and user-related information such as preferences (Telematica Instituut & IBM, 2004b, p. 14). In their definition of a user profile, Cremers, Lindenberg and Neerincx (2002, p. 2) mention some additional features of user profiles. They take the needs and previous behaviour of users (in the context of the ICT application) into account and define a user profile as:

A data record describing the user with his characteristics, abilities and needs and previous interaction experiences.

In this report, we will extend the definition even further and thus define the term user profile as follows:

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.

Some categories of user-related information concern stable, unalterable 'properties' of the user, such as name, age and gender. Other categories relate to properties that can easily alter over time (e.g. developing new preferences or abilities) and context (e.g. having a need for information during international travel, but not during national travel).

A simple manifestation of a user profile could contain information as shown in table 1 (below), which was derived from the Alter Ego Focus and Refinement document (Telematica Instituut & IBM, 2004a, p. 5). These types of information can be referred to as 'user-related information'.

I Am	→	ID: name, social security number, iris scan, ...
I Am+	→	Me: personality, religion, astrology, medical, ...
I Prefer	→	Preferences: music, art, news, food, travel, ...
I Like	→	Interests: painting, scuba diving, WW I, ...
I Have	→	Circumstances: children, a job, a car, mobile,
I Want	→	Goals: education, career, social life,
I Do	→	Behaviour: sports, work, music, ...
I Know	→	Expertises: quantum physics, flowers, ...
...	→	...

Figure 1.1: Information types in user profiles

The process of using user profiles, and the underlying activities of creating, maintaining and updating user profiles, is what we will refer to as user profiling.

In the literature related to user profiling, different terms are used, such as personalisation, adaptation, customisation, tailoring, targeting and segmentation. Various authors use the same term for different things, or use different terms for the same thing. In this report, we will work with the following definitions for terms related to user profiling.

Segmentation

Segmentation is the process of dividing a population into groups (segments) on the basis of similarities in user-related information of individuals.

Adaptation

Adaptation is the process of adapting the appearance and content of messages and media to segments or individuals.

Targeting

Targeting is the aiming at specific segments.

Tailoring (personalisation, customisation)

Tailoring is the aiming at individuals

In our opinion, tailoring, personalisation and customisation are the same. We prefer to use the term tailoring in this report, which has a background in health communication. It might, however, occur that the terms personalisation or customisation are used alternatively. In some domains, e.g. marketing communication, the terms personalisation and customisation are more common. In other fields, such as product and interface development, the term customisation is often used. Therefore we might use the terms personalisation and customisation as synonyms for tailoring when we describe research from these domains.

In our view, the concepts defined above are linked. Adaptation can be divided into targeting and tailoring, with targeting aiming at segments and tailoring aiming at individuals. Also between the segments and the individual there is a connection. An individual can be seen as a 'segment of one' and is the ultimate form of segmentation. On the other hand, there is the 'one segment'. We refer to the process of creating the segments as segmentation. The relationships between the concepts are shown in figure 1.2.

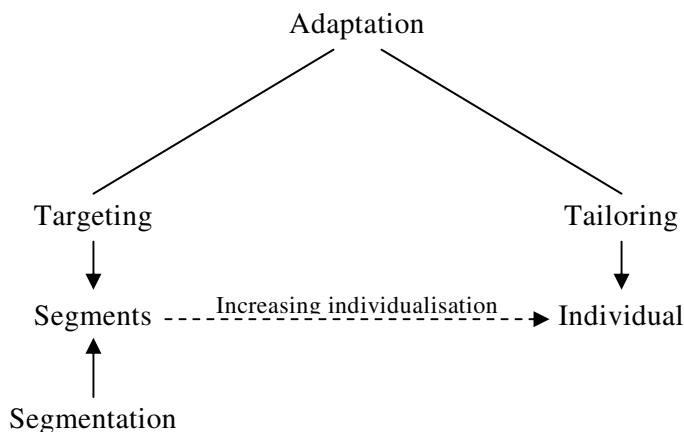


Figure 1.2; Relationships between adaptation and related concepts

1.2 Aims of user profiling

User profiling is a process that requires a long-term commitment from organisations and users. The kinds of user data collected and used imply that user profiles are regularly, if not continuously, updated with new user data. Why would organisations and users bother to make such a long-standing commitment?

On a general level, user profiling can serve three interrelated aims:

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).

Each successive aim requires more detailed information about the user and presupposes that more far-reaching and ‘intelligent’ conclusions can be drawn from the user data compiled in the user profile. This also means that each aim requires a greater level of adaptation. The adaptation level of aim 1 will mostly be on the level of interfaces and communication infrastructures. In the successive aims (2 and 3) the level of adaptation will shift increasingly towards the content. More detailed information is needed to change behaviour than to improve communications. To change behaviour, intentions and attitudes, information types concerning behaviour (I do) and beliefs (I believe) are needed.

From the organisation’s perspective, user profiling is a means to achieve organisational goals and/or to perform organisational activities in a more efficient and effective way. What kinds of organisational goals are to be achieved depends on the nature of the organisation. For a retail organisation, for example, user profiling would be a means to improve customer relationships, consequently sell more products and ultimately make more profit. For a healthcare organisation, user profiling would be a means to provide more effective health information, hence create better patient compliance with a treatment and ultimately offer better care.

When we combine the three aims of user profiling for organisational goals, the following potential benefits for organisations can be discerned:

Aim of user profiling	Potential benefits for organisation
Making communication 1a. more efficient 1b. more effective	Cheaper, better communication with users; improved relationship with users
Predicting user behaviour	Better match between organisational goals, products and services on the one hand and user needs, interests and preferences on the other
Influencing user behaviour	Changing individuals' behaviour to create a better match between organisational goals, products and services on the one hand and (future) user behaviour on the other (e.g. purchasing behaviour, compliance with a medical treatment, etc.)

Figure 1.4: Potential benefits of user profiling for organisations

However, user profiling can only be effective when the user allows organisations to collect user data and when the work involved with creating, using and maintaining the user profile is perceived as worth the effort. What are the potential benefits of user profiling from a user perspective?

Communication efficiency and effectiveness will most likely be an aim of users. When communication is made more efficient and effective, users may benefit from an easier, better and more pleasant communication with the organisation. Besides this, the relationship with the organisation might improve because people are recognised as individuals.

The second aim also has potential benefits to individual users. When an organisation gains insight into a user's behaviour, the user might benefit from the better match between his or her individual needs or interests and the products and services offered by the organisation.

The third and final aim has probably the least benefits to individual users. When an organisation tries to influence the behaviour of the user, most likely organisational goals and purposes are predominant. A commercial organisation might try to influence buying behaviour whereas a governmental organisation might try to influence compliance with the law. This might not always be in the interest of the user. Therefore, it is quite possible that this aim will evoke the most resistance among users.

From this general analysis, it may already have become evident that the benefits of user profiling to organisations are the greatest with the aim 3 type of profiling, whereas for users the benefits of aim 1 profiling are the most obvious. This discrepancy between user interests and organisation interests in user profiling is one of the main issues influencing acceptance.

1.3 Framework of analysis

User profiling is described as a means for realising organisational goals (such as selling products, delivering particular services or collecting taxes) with more success than when it is not applied.

The user profile data are stored and maintained in a system, for example a database, which we will call the user profile system. Data from the user profile system feeds into the ICT application through which the organisation communicates and transacts with its clients, citizens or customers. On the basis of the data collected in the user profile system, the application can either present adapted 'content' (such as information, products and services) to the user, or communicate the content in ways adapted to what is known about the user. The actual behaviour that the user displays while using the ICT application (e.g. visiting particular pages or making a specific purchase) can be collected and stored as user data in the user profile system.

The relationship between organisation, user, application and user profile system is depicted in figure 1.5, below.

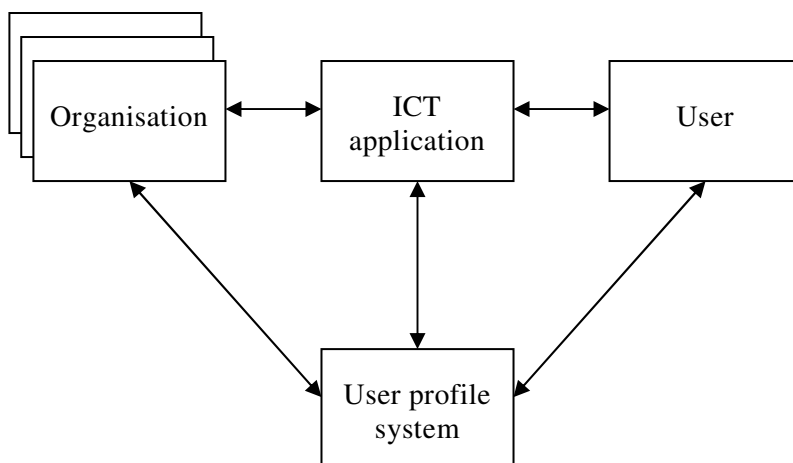


Figure 1.5: The framework of user profiling

Organisation

The first element in the model is the organisation, which here can also stand for a connected group of organisations or various departments within an organisation. The organisation is the party that takes the initiative to use a user profile system to achieve specific organisational goals in its contacts with an individual. The organisation might be a public or private sector organisation; groups of organisations might be exclusively public or exclusively private or mixed private/public (cross-sector), for example when welfare organisations (public) and insurance companies (private) both contribute to and make use of the user profile system. Groups of organisations might also be acting in the same domain (e.g. they are all healthcare organisations) or in different domains (cross-domain), for example when healthcare organisations and retailers both contribute to and make use of the user profile.

The organisation's character and goals greatly influence the possibilities and limitations of user profiling and user profiles. In chapter 2, user profiling will be described from an organisational perspective in more detail.

User

The second element in the model is the user. We use the term 'user' throughout this report for any individual interacting with an organisation via an ICT application. However, it is important to note that these individuals will never see themselves as 'users' of the application. Use of the application is not an end in itself but for the users it is a means to achieve other goals which they are pursuing through their contact with the organisation. So, in their own perspective, they are for example customers of an online supermarket, or citizens who have to pay their taxes, or holiday guests trying to book an apartment, or patients in need of treatment. Users interact with organisations in many different roles and contexts of use.

Not every citizen, client or customer is willing and able to become and remain a user of the ICT application of the organisation. Chapter 6 will focus on the crucial conditions for the acceptance, initial and continued use of ICT applications and user profile systems.

ICT Application

The third element in the model is the ICT application that the organisation is using in its dealings with the individual. When groups of organisations (or departments within an organisation) are dealing with the user via one application, it often has the character of a portal site. For example, many online banking sites have recently started to present themselves as a portal through which the customers can manage both their savings and stock accounts (two different areas within the bank). For the users, being addressed through one portal rather than via many different applications is already beneficial and efficient. For the organisations, however, the possibilities to collaborate across departments, organisations, domains and sectors are often limited, and building up such a collaborative enterprise takes a lot of effort. The obstacles in the exchange of information and in the collaboration between various organisations or departments of organisations are described in chapter 2. In separate reports within the Alter Ego project, the technical, legal and ethical implications, limitations and conditions for exchanging (personal) information between systems are discussed.

User profile system

The fourth element is the user profile system, the system that contains the user data and offers facilities to collect, store, maintain and update user data (Pine II, Peppers, & Rogers, 1995). Most of this report is about what kinds of user data can be collected, and what goals can or cannot be achieved with user profile data.

In figure 1.5 (above), the four elements (organisation, ICT application, user, user profile system) are connected with arrows, showing the relationship between the elements.

Organisations ↔ ICT application

Organisations use ICT applications to achieve their organisational goals. Especially when different organisations, or different departments within an organisation, have to work together to communicate via one ICT application with the user, all kinds of obstacles have to be cleared. In a separate report, the technical problems that organisations meet when integrating their services in a portal will be described (Jansen, forthcoming). Chapter 2 of this report describes the aims and obstacles of organisations using portals from an organisational perspective.

ICT application ↔ user

Users communicate and interact with organisations via the ICT application that the organisation uses to achieve its organisational goals. They communicate with

organisations to fulfil their own goals and interests. The success of the communication and interaction not only depends on the user experience with the application itself (human computer interaction, system trust) but also on how the user perceives the organisation behind the application.

Although ICT is always involved in the interaction between user and organisation, it is important to realise that not all interaction between the user and the organisation goes directly via the ICT application. It is quite possible that the user profile system is used by organisations to improve the communication and interaction with their users via traditional communication means, such as telephone, traditional ‘snail’ mail or face-to-face contact. One example is a tailored direct mail. These direct mails *seem* personal because they address readers on an own-name basis. This is an example of a tailored message based on a user profile. In this case the ICT application is not directly involved (the organisation communicates on paper) but is used behind the scenes to generate the tailored letter.

User profile → ICT application, ICT application → User profile

The user profile system is a separate entity from the ICT application. The ICT application uses the user-related information stored in the user profile system for a tailored (re-)action directed at a specific user.

At the same time, the actual behaviour of users in the ICT application, or user-related information that is provided by the user in the ICT application can be fed into the user profile system to update or extend the user profile.

Organisation ↔ User profile

The organisation creates, maintains (or acquires) and uses user profiles in order to achieve organisational goals. Besides the user-related information that feeds into the user profile system through the ICT application, the organisation might also have other information at its disposal that can be added to the user profile. An important issue is who ‘owns’ and controls the user profile and the information it contains. We can safely assume that at least part of the user-related information is collected and provided by the organisation, which does not necessarily mean that the organisation is the *only* party that collects or controls it.

User ↔ User profile

Directly or indirectly, the user will provide the user-related information to be stored in the user profile. Again, the issue of who ‘owns’ and controls the user profile is essential.

1.4 User profiling in its context

User profiling is occurring in a context that to a large extent defines the effects that it can have, both on organisations and users. That context is merely indicated here and will be discussed in as far as it will affect the effectiveness for organisations and users.

From our point of view, the technology used or to be developed for realising user profiling is a context issue. It concerns numerous issues that we just indicate here, albeit a non-exhaustive list:

- the possibilities and limitations of creating, storing and maintaining large sets of information on virtually every individual;
- issues on combining snippets of user-related information that are collected and stored in various distributed systems;

- issues related to ‘intelligent’ reasoning with user-related information to predict future behaviour of use;
- issues of customising an application’s content or presentation to an individual user.

User profiling will also be subject to laws governing the use and protection of personal information (such as the *Wet Bescherming Persoonsgegevens* – the Dutch Data Protection Act) and the privacy rights of citizens, customers and clients. Hence part of the influential context of user profiling is the legal context.

Furthermore, a number of societal issues surround the development and use of user profiles, such as views held in society at large on, for example, security, advertising, ICT use and ethical issues in general. These views can differ broadly among individuals, are subject to change over time, and can be affected by events that are experienced by the individual user or that are extensively covered by the media.

1.5 Conditions for effectiveness of user profiling

The objective of each of the following chapters is to identify the factors that influence the feasibility and effectiveness of user profiling and user profiles. On a general level, there are a number of prerequisites for effectiveness.

On the organisation’s side, user profiling must have a demonstrable return on investment (ROI). The organisation must be able to prove to itself that user profiling helps to achieve its goals better, or that it helps to communicate and interact with users in a more efficient and effective way. If that return on investment cannot be demonstrated, the organisation will stop pursuing user profiling in the longer term.

From the users’ point of view, access, trust and acceptance are prerequisites for user profiling. First of all, users must be able and willing to access the ICT applications of organisations and the user profile system. Chapter 6 addresses these issues. Secondly, users must trust not only the user profile system and the ICT application but also the intentions and goals of the organisation using the user profile. Chapter 7 is devoted to the important issue of trust. Finally, once access and trust are ensured, the users must accept the use of the user profiles, both initially and in the longer term. Acceptance of user profiling is, among others, influenced by:

- Control: who controls the user-centred data?
- Presentation and interface of the ICT application and the user profile system: do both systems look credible and reliable?
- Motivation: what are the benefits and rewards for users?
- Context issues: is the system technically secure? Are privacy issues well taken care of by law?

If the user does not trust or accept user profiling, it will fail. Chapter 8 focuses on the issue of acceptance.

1.6 Preview

Chapter 2 of this report will discuss user profiling from the organisation’s perspective. Chapter 2 will focus on characteristics of the organisations and discuss motives for and obstacles to organisations to engage in user Profiling. Chapter 2 will moreover discuss the differences between organisations that have consequences for the applicability of user profiling.

Chapters 3, 4 and 5 all describe one of the three aims presented in chapter 1. Chapter 3 will discuss communication efficiency and effectiveness, thereby focussing on the question how communication can be adapted to individual users. Chapter 4 will focus on the inference and prediction of behaviour, paying special attention to techniques of segmentation of populations. Chapter 5 discusses the third aim of user profiling and theories of behavioural change and the tailoring of messages to change individual behaviour.

Chapters 6-8 of this report address conditions for the effectiveness of user profiling; access, trust and acceptance. Chapter 6 will discuss the first condition for effective use of user profiling: access. Its focus is on the user characteristics that determine whether or not an individual can and wants to make use of user profiles (access). As user profiling is closely related to ICT, attention is also paid to ICT access. Chapter 7 will discuss the factor trust - an important condition for the effectiveness of user profiling. If a user does not trust the organisation or the technology used, there is little chance that user profiling will become a success. Chapter 8 will discuss the acceptance of user profiling, which in order to be a success, must be accepted. This acceptance is threefold: the acceptance of the necessary technology, the acceptance of the fact a user profile is being developed, maintained and used, and the acceptance of the organisation.

Chapter 9, the final chapter, will summarise the most important findings of the SOTA, it gives recommendations to organizations engaging in user profiling that will help enhance the success of user profiling. Finally, chapter 9 gives suggestions for future research on the field of user profiling.

2 Organisational motives and barriers for user profiling³

2.1 Introduction

For organisations, user profiling is a means to restore the traditional personal relationship of e.g. shop owners with their neighbourhood customers, in contemporary social and technological forms. Building personal relationships occurs in the last stage of the evolving marketing, retail and governance approaches after the industrial revolution (Beniger, 1986). This evolution has shown three stages:

1. The stage of *mass marketing, mass communication and mass advertising*, starting at the end of the 19th century, in which customers and citizens were approached as an undivided mass;
2. The stage of *group segmentation, group tailoring and group customisation*, starting after the Second World War, in which target groups of consumers and citizens were approached with direct marketing and persuasion techniques;
3. The stage of *individual or one-to-one relationship marketing, tailoring and customisation* of market and government products and services, starting in the 1980s, enabled by new social and technical infrastructures and ICT.

Despite the increase in personalisation and individualisation, mass communication and mass advertising and group segmentation are still widespread. Our mail boxes are flooded with mailings on the basis of postal code segmentation, not on the basis of information about us as individuals.

The last stage is a result of several social, economic and technological developments combined:

- The *individualisation* of (post)modern society, turning individuals into core units of society;
- Accompanying individual and highly *selective tastes and preferences* of customers, clients and citizens;
- Increasing *economic competition*, created by overproduction and sales problems necessitating the 'hunt' for each customer;
- Division of products, services and their creation in *components or fragments*, enabling more opportunities of choice and re-combination;
- The technological innovation of *interactive channels* of communication and commerce, enabling one-to-one relationships between suppliers and customers;
- The resulting opportunity of a *reversal of the value chain* (the shift from supply to demand);

It is important to note that these three stages are neither completely separate nor successive. In an integrated communication strategy, they all have their own value and effect in approaching customers and citizens. User profiling will not become accepted without mass information campaigns and advertising or without favourable reviews of the use of profiles in the mass media. It does not work without group segmentation or direct marketing either: the step between the mass of consumers and citizens on the one hand and the individual on the other is simply too big. Hence a focused (target) group approach is a necessary stage of the implementation process of user profiling.

³ Authors: W.E. Ebbers, J.A.G.M. van Dijk & W.J. Pieterse

2.2 Research questions, main concepts and theories

There is simply no specific theory available about user profiling in organisations. Each onset of such a theory departs from the general stages and societal or economic trends as summarised in the introduction of this chapter. At present, we are in the stage of concept formation, conceptual model building and creating the first specific statements concerning user profiling. These statements deal with the basic objectives of profiling, the differences between types of organisations and with initial opportunities and obstacles of user profiling.

The following research questions will be addressed in this chapter:

- *What are the main objectives of organisations, both private and public, for engaging in user profiling?*
- *What are the differences and similarities between public and private organisations in this respect?*
- *Which obstacles can be distinguished that impede the adoption and implementation of user profiles by organisations, both public and private?*
- *What opportunities of user profiling can be listed that emerge from current trends of user profiling?*

2.2.1 Objectives of public and private organisations

The description in the introduction of this chapter suggests that the evolution of marketing, retail and governance applies to both public and private organisations. Their aims with regard to user profiling are more similar than they are different. The three basic aims of user profiling discussed in Chapter 1 are:

- Making communication more efficient and effective (for both consumers and citizens);
- Predicting user behaviour (both the purchases of consumers and the claims to rights of citizens);
- Influencing behaviour (both persuading consumers to purchase and citizens to comply with the law).

Both private and public organisations must build up a sound, longstanding relationship with their customers and citizens. That relationship is created and maintained by efficient and effective communication. With regards to private organisations, clients will not return if their service expectations are not met. This will eventually lead to decreasing sales. Basically, the same also applies to governments: the Weberian principle teaches us that governments wield power over subjects, but that power is only theirs for as long as subjects allow it (Weber, 1970).

User profiling has additional objectives. It gives those organisations offering electronic services the possibility to gain insight into the behaviour of individual users and influence them at the same time. This is the second and third objective that organisations can have for user profiling. If organisations have sufficient knowledge about their customers or citizens and are able to apply the knowledge in persuasive strategies, then they stand a better chance of organisational success. Customers will continue buying or using products and services, and citizens will be inclined more to comply with the law and only lay claim to those resources to which they are truly entitled.

2.2.2 Different conditions for user profiling in the private and public sector

Although private and public organisations may have similar aims with user profiling, their conditions for employing user profiling are fundamentally different (J.A.G.M. van Dijk, 2002, pp. 218-220).

1. Public organisations are guided by *political regulation*, leading to equal rights for citizens, whereas businesses are guided by *market regulation* and differentiate between valued and less-valued customers. Businesses can afford to simply ignore less-valued customers. Public organisations have to offer their services to each citizen on an equal basis. Businesses can concentrate on the best customers that have access to technology and are motivated to use opportunities, such as those offered by user profiling. Moreover, though the private sector is restricted by consumer laws and self-regulation when applying user profiling, the public sector is much more regulated. For example, in many countries privacy regulations are much stricter for government agencies than for businesses. These two factors, (in-)equality in treating customers or citizens and the different status of regulations, will give the private sector an advantage in the innovative use of user profiling.
2. The government is a *referee on its own playing field* of policy, management and services. It controls its own behaviour in its approach to citizens. This also means that it can enforce new laws and regulations relatively easily and quickly. This also goes for the applications of user profiling that are highly sensitive with regard to privacy and security. For example, after September 11, 2001, the American government was able to adopt the Patriot Act in only a few months. This led to highly advanced uses of data mining and user profiling of potential suspects of terrorism, thereby passing every government privacy rule and using the latest techniques developed in the corporate sector where fewer such rules exist (see for example GAO, 2004).
3. Unlike most businesses, the government is not a simple or straightforward organisation but a *gigantic complex of organisations* on all levels and of all kinds. This means that the databases in the public sector steering each application of user profiling are more complicated (highly regulated), encompassing (every citizen) and fragmented (a collection of basic registrations with own standards, techniques, rules, supervisions and managements) than those in the private sector. Although the integration of databases also poses problems to the private sector, the extent of these problems is incomparable to the problems envisaged in the public sector. At present, all kinds of official citizen and business registrations are being standardised and linked in networks. However, the linkage of all databases is a huge operation that will require decades. The effect of this different state of affairs is that - at least for the time being - the public sector is much more preoccupied with issues concerning organisation, regulation and standardisation whereas the business sector is able to go ahead with innovative use of user profiling on a limited though more advanced scale.

4. The final difference of interest here is - to a certain extent - the government's need for *citizen participation and political supervision* in new media development, whereas the private sector has no need for this at all. This is related to the first difference, though it has important consequences in its own right. On the one hand it offers the private sector the opportunity to go ahead with innovation without any concern or consultation. On the other hand it means that the opportunities of informed consent, considered to be one of the potential solutions or compromises with regard to the introduction of user profiling in this report, are much better in the public than in the private sector.

In comparison with the public sector, the private sector made considerable progress with the tailoring of products and services in the course of the 20th century. The drive to reach individual consumers was simply much stronger than the drive for governments to communicate with individual citizens. Customers can choose where to buy products and services and businesses need to sell their products and shall therefore always compete with their competitors for the favour of the customer. Conversely, governments can expect citizens to abide by the law (or find and punish those who don't). Therefore, market research, bookkeeping and records of buying and selling have dominated corporate activities for the past 150 years. Considerable experience in database management and marketing has thus been acquired. Every innovation in the stages described in the introduction of this chapter originates from the corporate sector. The corporate sector has invented technologies of group segmentation, direct marketing, market research, individual customer relationship marketing etc. In contrast, the government lacks the experience with those innovations but has on the other hand accumulated considerable experience with compiling and maintaining enormous registrations of citizens, real estates, enterprises etc. It has therefore become an expert in using personal information on an enormous scale, for example in printed and electronic forms.

In the course of the 1990s, public opinion, political pressure and competition (e.g. losing services through privatisation) forced government departments to become more user-oriented towards their citizens or clients, to integrate their fragmented service counters, to save on the administrative costs imposed on citizens and corporations and to supply all kinds of user-driven electronic applications. Suddenly, government departments adopted all kinds of customisation technologies from the commercial sectors in order to become more service-oriented and user-centred (see for example Bekkers, 2000). In the first decade of the 21st century, however, attention and priorities have again shifted to law enforcement and security issues. Nowadays, both objectives, i.e. user-driven electronic services and screening or surveillance applications, fuel the need for government user profiling.

In the diverse areas of the corporate sector, the need to follow the three-stage evolution towards individual customisation has differed greatly from the start. The service sector underwent considerable growth during the 20th century and has an 'innate' need for individual tailoring and evaluation. This applies to physical services, such as health care but even more to immaterial services such as information and communication. Production sectors, in comparison, have been satisfied for a long time with group segmentation of customers solely to be able to react more flexibly to product demand. The rise of personal computing and the Internet, leading to electronic commerce (e-commerce) has enabled all companies in all sectors to develop more tailored services. This led to consumers demanding an individual service level on top of the basic service requirements concerning the distribution of material goods. A perfect example are the

electronic individual services of Amazon.com offers 'on top of' the traditional (material) book distribution process.

2.2.3 Specific objectives of user profiling

The United States General Accounting Office (2004a) listed the objectives of data mining and user profiling of *government agencies* in 2004 in the following six categories:

1. improving service or performance
2. detecting fraud, waste, and abuse
3. analysing scientific and research information
4. managing human resources (employee information)
5. detecting criminal activities or patterns
6. analysing intelligence and detecting terrorist activities.

Categories 1-4 are also specific objectives of the private sector. The first is by far the most important. It originates from the tradition of market research and has been developed in detailed methods of retail and supply chain analyses for the sectors of production and distribution and methods of customer relationship marketing for the consumption sector. Individual user profiles have been developed mostly for customer relationship marketing (see chapter 4).

2.2.3.1 Improving the relationship with the client

Considering the increase in the number of web pages, the Internet is an enormous success. However, the immeasurable number of internet pages and the increasing number of electronic services linked to web pages also have their drawback. Flooded as they are with electronic services, users suffer information overload and meet huge selection problems (Pierrakos, Paliouras, Papatheodorou, & Spyropoulos, 2003).

Issues such as information overload and selectivity are certainly a problem for private organisations that are strongly focussed on the finding and retaining of clients (see e.g. van Duivenboden & Lips, 2002). Therefore, they will have to make a considerable effort to appeal to (potential) clients who visit their websites. After all, these visitors are only a mouse click away from their competitors.

A successful way of appealing to website users is the development of e-services in which the focus of attention is on the user and the supply of customised or personalised services (see e.g. Mobasher, Cooley, & Srivastava, 1999). The idea behind this is not new. Addressing the specific requests of customers was already familiar as the 'outside-in' approach in marketing. Underlying this attention to customer satisfaction is the motive to create and maintain a long-term relationship (see e.g. Kotler & Armstrong, 2001). This applies even more to direct marketing and customer relationship management (CRM) because of the individual's prominent role in these fields.

At first sight, governments are not engaged in free competition (van Duivenboden & Lips, 2002). Therefore their clients are not able to go to a competitor. One might expect that governments need not worry about service quality levels, since citizens cannot leave; however, this proves not to be true. Increasingly, customers of commercial services will compare these to the quality of public services and will expect the same service levels from both public and private organisations. So, it is no coincidence that in many

countries (see section 2.2.4) governments are pursuing a more client-oriented approach of their electronic services. In many cases this occurs on the basis of two motives:

1. Political pressure enforces better access to the multitude of government e-services in the shape of integrated virtual counters combining services that formerly had to be provided by separate departments.
2. Political pressure also demands a strong decrease in administrative costs and red tape for citizens and businesses as well as for governments themselves. To this end, the number of questions and the delivery of data of citizens and businesses to the government must be strongly reduced. The underlying thought is that this is possible by (electronic) fine-tuning of all data interchange processes of citizens or businesses on the one hand and governments on the other.

2.2.3.2 Insight and influence

As has been argued above, user profiling is not only about improving the relationship with the client. There are two more aims of user profiling, namely to give organisations the opportunity to gain insight into the behaviour of individual users and influence them at the same time.

For the organisation offering a service, user profiling has the advantage that it enables the organisation to track the user 'from behind the scenes'. Thus, the organisation is able, with or without the user's permission, to see which information the user reads, how long it takes him to do this, in which order he visits sections of a website, which functions he uses, and which services or products he purchases (see e.g. Privacy International, 2004). Using the collected and already known user-related information, clients' behaviour is made much more visible and might even be influenced. User profiling enables private organisations to offer a much more tailored approach, offering a client products and service that are addressed to his personal needs. This increases the chances of a client actually accepting what he is offered. A well-known and often praised example is Amazon, which - after a customer has bought a book - will draw his attention to other books purchased by buyers of that same book in the hope that he will also buy them. Another way of direct influencing is by stimulating users to surf to certain websites by addressing them personally in advertisements, often via so-called pop-ups or banners. This is happening more and more frequently via spyware, software that analyses the online behaviour of individual users and sends these analyses to advertising agencies (see e.g. www.spywareinfo.com or www.staysafeonline.info).

For governments, it is just as important to gain insight into the behaviour of citizens and businesses as for private organisations. As has been explained above, the types of behaviour that are being inferred and influenced differ from those in private organisations. Whereas private organisations are sales- or profit oriented, for governments it is much more about upholding and enforcing rules and regulations, during which they will also be confronted with citizens and businesses not wanting or being unable to abide by the law. Some people or companies, after all, make illicit use of certain provisions such as subsidies and benefits. The more accurate the insight into who uses what, why and on which grounds, the greater the chances of preventing or controlling abuse.

That the government has a growing need for these facts and figures can unmistakably be concluded from the fact that in many countries the privacy rules are being increasingly 'stretched', whereby it must be noted that this *seems* to be motivated by the fight against terrorism. Think for example of the American Patriot Act. The word 'seems' is used here

on purpose, because combating terrorism is certainly not the only motive to stretch privacy regulations. This becomes apparent from the lobbying taking place in Europe for the further harmonisation of investigative practices. The 'Draft Framework Decision on retention of data, etc.' of the French, British, Swedish and Irish governments, addressed to the EU, advocates the use of data of, for example, internet providers for 'prevention, investigation, detection and prosecution of crime or criminal offence including terrorism' (Council of the European Union, 2004, p.8).

Citizens who make (too) little or no use of their rights and corresponding government services are being increasingly approached with pro-active services. Examples of this are unsolicited information about the possibility of rent subsidy for citizens with low incomes and - since 2004 - the filling in of the provisional tax rebate by the Dutch Tax Administration itself. This demands even more adequate and properly linked files with personal details. User profiling could greatly advance pro-active services, namely by notifying the citizens of their potential rights and transforming the administrative load of filling in forms into simply checking, adding or updating information.

User profiling for governments thus not only supports the prevention of a crime such as fraud. Governments can also employ it, albeit in a controlled and enforced manner, to draw citizens' and businesses' individual attention to their legal duties and rights. A good example of this is the electronic income tax return software of the Dutch Tax Administration. This programme is context sensitive, which is to say that some data are no longer requested when it is obvious, from earlier questions, that they are not relevant. This not only makes things easier for the tax payer, but it also makes a huge difference in the number of mistakes made whilst filling in the tax form.

2.3 Organisational obstacles to user profiling

In this chapter, the objectives and motives behind the interests of organisations in offering individuals electronic services with the aid of user profiling are being discussed. What follows is a list of potential obstacles that impede user profiling in organisations. There are four groups of obstacles: financial obstacles; organisational obstacles; technical obstacles and legal obstacles. Both the technical and legal obstacles fall beyond the scope of this report and shall therefore not be discussed (legal obstacles) or just briefly (technical).

2.3.1 Financial/commercial obstacles

The first obstacle is about the investment needed. Although off-the-shelf e-commerce software offering customisation is already on the market, the available software is often too expensive for small- and medium-sized enterprises (Schubert & Leimstoll, 2004). Return on investment may be too low to adopt and implement user profiling, although it needs to be stressed that many innovations were only adopted after being initially rejected because of low or even negative return on investment predictions. Adopting an innovation after initial rejection occurs, for example, in reaction to the pressure caused by the number of adopters amongst competitors (Abrahamson & Rosenkopf, 1993), or because of fear of losing stakeholder support (Meyer & Rowan, 1977).

This observation seems to imply that the returns on investment in segmentation, customisation and personalisation technologies and operations are exactly predicted and calculated and that effects such as higher performance are measured. But this is certainly not the case. The introduction of these technologies and operations is a matter of trial and

error. Failures are simply forgotten and covered in the budget; successes are hailed and continued without knowing exactly why and how they achieved this success. In our State of the Art investigation of user profiling we have barely encountered any solid quantitative or qualitative evaluation of returns on investment of personalisation technologies. On the contrary, we did find a source where doubts are pronounced about the returns in terms of more sales and higher consumer satisfaction (<http://www.marketingonline.nl/nieuws/index2005-6.html>). This calls for the need of descriptive surveys and empirical studies of the financial and commercial effects of user profiling and its preceding technologies.

The second financial obstacle is the large amount of wrong, irrelevant and worthless data that user profiling can yield. This can render the entire approach unprofitable. Moreover, in retaliation to the endless registration (whether or not with one's permission) and the concurrent violation of one's privacy, users are increasingly surfing anonymously or under a pseudonym (see Chapter 8).

A final possible financial obstacle, not for profiling but for *cross-domain* profiling, may be whether or not organisations are willing to share or sell information of their consumer database with other organisations, since in the information age this kind of strategic information is very valuable and a key component to 'outsmart' competitors.

2.3.2 Organisational obstacles

Offering tailored services might imply that the user is given an important role in the way the business process is designed and implemented. It is even possible to give customers access to all kinds of back-office systems, for example to place an order directly in the organisation's back-office or to enable the users to control and maintain the user profile themselves, instead of the organisation (James, 2000). This means that an organisation's production and logistical processes must be able to cope with it. If that is not the case, the information systems (see below) and the processes will have to be redesigned. In general, redesign processes and reorganisations are complicated and they cost (at least) time and money (see for instance Accountancy, 1996; Silverman & Weinstein, 1997). In one way or another, these costs will have to be considered in the investment proposal

Another organisational obstacle, in cross-domain user profiling is the question who is responsible for what. Who will keep the user profile up-to-date? Who is entitled to make changes? In these circumstances it is necessary that there are clear procedures and processes to indicate which department and which officials (and how) have access and are responsible for an electronic file. The painstaking introduction of the Electronic Patient Record is proof that it is not always easy to agree on standards and processes etc., (Berg, 2001).

2.3.3 Technical obstacles

This report does not focus on the technical issues involved in user profiling; these will be addressed in other deliverables within the Alter Ego project. Nevertheless, given the fact that technology and behaviour are closely related in user profiling, some technical obstacles (from a behavioural perspective) shall be discussed here.

Wieringa, Blanken, Fokkinga, and Grefen (2003) divide the total sum of information systems into three different service layers: an application systems layer, an implementation platform layer, and a physical network layer. The application systems

layer supports or fully performs parts of the services and business processes. The implementation platform layer supports the application systems layer. It is software that assists in running the application software, ranging from operating systems, middleware and network software to database management software. The physical network layer contains the physical infrastructures that support the implementation platform layer and the application systems layer. As mentioned above, the application systems layer supports or performs parts of the services. Consequently, the implementation of tailored services or the transformation of existing services into tailored services demands that a particular application is added to or changed within the application systems layer. From time to time, as it supports the application layer, this causes changes within the implementation platform layer too. And occasionally, changes in the physical network structure are also required.

Nowadays, many organisations have so-called legacy information systems (Tapscott & Caston, 1993). Legacy information systems have been inherited from computer languages, platforms and techniques contained in older generations of hardware and software (www.search390.com). Many legacy information systems are not, or not sufficiently, interoperable, which means that applications in the application systems layer are unable to work with one another or with the supporting implementation and/or network layer (Tapscott & Caston, 1993). This might create great obstacles to the implementation of tailored services.

2.4 Trends and examples of user profiling in private and public organisations

In the following paragraphs some trends and examples of public and private organisations using personalised e-services based on user profiles will be presented.

2.4.1 Trends and examples in the private sector

The most well-known and widespread form of tailoring in the private sector is **website personalisation**. Examples of this type of tailoring are everywhere. When you log in on sites like Amazon.com or eBay, you will be personally welcomed. Although website personalisation has existed for quite some time, the really advanced applications of personalisation are not yet that widespread, although they are being developed rapidly. Two examples can illustrate the use of website personalisation.

Example 1: MyYahoo!

Yahoo! was one of the first sites on the Web to use personalisation on a large scale, most notably with its My Yahoo! Application, introduced in July 1996. My Yahoo! (my.yahoo.com) is a customised personal copy of Yahoo!. Users can select from hundreds of modules, such as news, stock process, weather and sport scores, and have them presented on their Yahoo! portal. The actual content for each module is then updated automatically, so users can see what they want to see in the order they want to see it. This provides users with the latest information on every subject, but only those specific items they want to know about.

On the basis of the user profile, some of the content of My Yahoo! is personalised automatically. An example is a sports module that lists the teams in the user's area after obtaining that information from the user profile.

Example 2: American Airlines

American Airlines' website (AA.com) can be adapted in a split second, so that each of the 1.5 million registered users is offered a unique personal experience.

After logging in, you are offered personalised services that are based on your user profile, like news, tailored information and offerings. The site will even offer you a special holiday in the period your children are free from school.

(derived from: Peppers and Rogers, 2000)

The second trend is **Recommender systems**. A growing number of commercial websites are using recommender systems to help their customers identify products that appear to suit their taste. A recommender system learns from a customer and recommends products that (s)he will find the most valuable among the available products (Huang, Chung, & Chen, 2003; Schafer, Konstan, & Riedl, 1999; Zeng, Xing, Zhou, & Zheng, 2004). The forms of recommendation include suggesting products to the consumer, providing personalized product information, summarising community opinion, and providing community critiques (Schafer, Konstan, & Riedl, 2001). Examples of organisations that use recommender systems are Amazon, CDNow, eBay, Levis, moviefinder.com and reel.com. Such systems might help to convert browsers to buyers, increasing cross-selling and building customer loyalty (Schafer et al., 2001).

From browsers to buyers: Visitors to a website often browse without ever buying anything. Recommender systems can help customers find products they wish to purchase. *Increasing cross-selling:* Recommender systems improve cross-selling by suggesting additional products for the customer to purchase. If the recommendations are good, the average order size should increase. For instance, a site might recommend additional products in the checkout process based on products already in the shopping cart. *Building customer loyalty:* In a world where a business' competitors are only a click or two away, gaining customer loyalty is an essential business strategy. Recommender systems enhance loyalty by adding value to the relationship between the business and its customer. Organisations that invest in learning about their users, use recommender systems to improve that learning, and present custom interfaces that match customer needs. Customers reward these sites by returning to the ones that best match their needs. Example 3 shows Amazon's use of recommender systems. Example 4 shows how SkiEurope, a successful online travel broker, uses personalised data to make holiday recommendations.

Example 3: Amazon.com

When you search for a book and purchase it on Amazon, the company recommends you other books. Amazon uses an advanced system that analyses your buying history, your preferences and your user-related data, to offer books you might desire. Besides, Amazon compares you to others that have a user profile that is similar or comparable to yours and recommends books that those similar others have bought, or searched for. This feature is called the "customers who bought" feature. This feature has been implemented by many other businesses following Amazon's example. (see: Blackwell, Miniard and Engel, 2001; Sterne, 2001; Schafer et al. 1999)

Example 4: SkiEurope (www.ski-europe.com)

SkiEurope, an online travel agency uses recommendation technology to guide online customers through the decision-making process without human assistance. To give good recommendations to users, SkiEurope uses three levels of user data:

- preferences explicitly stated by the visitor (such as fine dining or night skiing)
- behaviour (e.g. the pages the visitor visits and what actions (s)he takes after entering her/his profile)
- context (like travel times)

The recommendation strategy has proven to be very profitable for SkiEurope: Site visitors using the matching engine are 70 percent more likely to purchase vacation packages than those that do not. And customer feedback has been overwhelmingly favourable.

(see: Rogers, 2001)

The integrated web portal. An increasing number of private organisations offer web portals that are personal, where customers can find information and communicate with the organisation and where transactions can be completed. The portal is a single point of access for communication and transactions with the organisations. The most well-known examples are web portals of banks such as 'mijn Rabobank' and 'mijn Postbank'⁴. These full web portals not only allow users to do transactions, but also to check statuses (like bank balances), create and delete accounts. Portals as single point of access imply that not only front-offices of organisations have to be integrated, but back-offices as well. Especially when various organisations or departments of organisations work together in one portal, the integration of back-offices can be very problematic.

Example 5: MijnPostbank.nl

MijnPostbank.nl is a personalized website, with personal access on the basis of a user-id/password combination that is chosen by the users. Any transaction requires the use of a Transaction Authorisation Number. Whereas these used to be distributed in lists of 100 (via snail-mail), Postbank now offers to send these via SMS, at the moment of the transaction.

The MijnPostbank.nl portal offers users a full overview of all Postbank products and allows the user to reverse transactions and to view one year of transaction history. (see: www.mijnpostbank.nl)

Spyware. The fourth and final trend refers to a form of personalisation that is not wanted by most people, i.e. spyware, cookies and other software that collect personal information. There are several large media companies that offer software companies to place banner ads in their products in exchange for a portion of the revenue from banner sales. This way, software, often called adware, can be offered for free or for a lower price. The downside is that the advertising companies also install additional tracking software on a user's system, which continuously 'calls home' using one's internet connection and reports usage data to the media company (www.spychecker.com/spyware.html). Spyware has surpassed viruses as the number one threat facing one's computer today. Most estimates report that over 90 percent of computers have already been infiltrated by spyware (eMediaWire, 2004; Naraine, 2004).

⁴ See: www.mijnrabobank.nl and www.mijnpostbank.nl

Spyware not only uses adware to infect computers, but also via file-sharing programs or peer-to-peer networking programs such as Kazaa (Lliet, 2004). Spyware is a major trend in getting customised information from users. However, most of the time the collection of customised information occurs without the consent of the user, hence the name spyware.

2.4.2 Trends and examples in the public sector

While private sector companies have already embraced some of its components, tailoring is a relatively new technological innovation with regard to the public sector (Hinnant & O'looney, 2003). The actions of the European e-government program (eEurope 2005), for instance, merely focus on the implementation of transaction services. eEurope 2005 does not mention personalisation or customisation of electronic government services. With regard to the eEurope program, personalisation did not make an appearance until September 2004, and then only in an indirect and barely formal way, namely as a result of a conference chaired by the Dutch in which the recommendation was made (Information Society, 2004) for the further improvement and continuance of the eEurope 2005 program. The recommendation suggested opting for a more user-centred approach; it also pleaded for administrative burden relief (Information Society). This latter issue is politically sensitive and is therefore no longer mentioned in official e-government plans for Europe. In a 'Communication on Challenges for the European Information Society beyond 2005' dating from November 2004, administrative burden relief is only mentioned as (still) being a priority, as is the one-stop shop e-government for citizens (European Commission, 2004).

Some departments of the American government go further than the European Union when it comes to *not* adopting user profiling. The general American e-government portal blatantly refuses to practise user profiling and is not secretive about it. The privacy and security statute on [firstgov.gov](http://www.firstgov.gov) explicitly states: "Our privacy policy is plain and simple. We collect NO personal information like names or addresses when you visit our website... We never create individual profiles." (http://www.firstgov.gov/About/Privacy_Security.html). That is not to say that American governmental agencies completely ignore user profiling. On the contrary, since 9-11-2001 many security services are collecting user-related data and are building user profiles (see section 2.2.1).

Several other national governments and states have started to offer personalised electronic services by means of user profiling, not for security reasons but to improve service quality. Examples of actually implemented customised services can be found for instance in Belgium, where citizens can securely access a wide range of e-government applications through a single sign-on on the federal e-government portal (www.belgium.be) and are able to create a personal profile. Another example is the government portal in Dubai, which citizens can access via a single log-in facility. At the end of 2004, the portal of Dubai offers more than 600 informative and transactional services (www.dubai.nl). Canada also enables customisation. The Canadian government portal www.canada.gc.ca allows all individuals (not only Canadian citizens) to create their own customised page according to their own individual interests and needs.

Other customisation features can be found on e-government portals of:

- Catalonia (www.cat365.net);
- the Czech Republic (portal.gov.cz);
- Denmark (www.virk.dk);
- Singapore (my.ecitizen.gov.sg).

Although the American national government refuses to collect personal data, individual American states are developing user profiling applications. The State of New Jersey, in cooperation with the Rutgers University for example, is developing an e-government portal based on user profiles (see for information, demo's etc: <http://cimic.rutgers.edu/dgov/index.html>).

In the Netherlands steps are being taken by various public organisations to realise personalised electronic government services. In some cases they have already been implemented, albeit in a limited way. The Dutch developments in the area of personalised electronic government services can be divided in three main areas:

- A. Infrastructural facilities;
- B. Organisation-specific personalised electronic services;
- C. Government-encompassing personalised electronic services.

Infrastructural facilities

Infrastructural facilities are those supporting facilities that specific governmental organisations employ to offer their services in a personalised way. At the moment these include identification and authentication facilities on the one hand, and the so-called basic registrations (such as addresses) for people and businesses on the other.

- An identification and authentication facility is being constructed under the title DiGID. This is a central identification and authentication facility for the internet services of the government. From 1 January 2005, citizens will be able to log in to the websites of various governmental organisations by means of a user name and password supplied by DiGID (www.digid.nl).
- The governmental information is at the moment distributed over thirty thousand national, provincial and municipal databases. The Dutch national government considers six of these authentic registrations as being so important that they have been categorised as the so-called basic registrations. They contain the basic registration of citizens and the register of businesses.

For these basic registrations, a large-scale reorganisation is taking place with the objective of collecting information on a once-only basis. The collected citizen and business information can then be used in various locations within the government, e.g. for delivering a personalised electronic service (see e.g. www.stroomlijningbasisgegevens.nl and Adviescommissie Modernisering GBA, 2001). The distribution of DiGID codes depends on the basic registration of citizens.

Organisation-specific personalised electronic services

A number of specific public organisations are already offering personalised services, such as the municipality of Enschede (loket.enschede.nl), de municipality of Doorn and the Informatie Beheergroep (www.ibgroep.nl). Also the Dutch Tax Administration offers an electronic personalised service to entrepreneurs for filling in (part of) their tax forms, and allowing them to follow the taxation procedure (see <http://www.belastingdienst.nl/home/actueel/2004112601.htm>). However, these are all still quite elementary forms of electronic services. They serve to check one's personal data or to see the current status of transactions.

Government-encompassing personalised electronic services

The developments in the field of inter-organisational or government-encompassing electronic services are still budding. In 2001, in a recommendation for the improvement of municipal basic registration, the Snellen Committee advised supplying citizens with a Digital Safe for their personal data (Adviescommissie Modernisering GBA, 2001). At the time, much criticism was given at this proposal by both the Commission for the Protection of Personal Data and opposition parties (Netkwesties, 2001). At the end of 2004, however, there existed less opposition among members of Parliament. At a general meeting on 3 November 2004, MPs indicated being in favour of a Digital Safe and said to be disappointed if this would be deleted from the plans.

At this moment, it is particularly in the government-to-business domain that work is underway to install government-encompassing personalised electronic services. Most of the initiatives are driven by the need to reduce administrative burdens, such as with the business portal (www.bedrijvenloket.nl), a digital information medium that can be accessed via all government websites, where it will also be possible to carry out transactions (i.e. via electronic forms) and the Government Transaction Portal, the so-called 'digital post office of the government', where businesses can send all compulsory data under government regulations. The Government Transaction Portal will carry out large-scale processing of data traffic and then pass the data on to all the relevant government organisations (see <http://www.ictal.nl/>, and Burg, Biesheuvel, Jansen, & Winne, 2004).

2.5 Conclusions

1) We are in the early stages of user profiling. Until now, there exists no specific theory on user profiling in organisations. Nevertheless there are three main reasons why organisations might want to engage in user profiling:

- Make communication more efficient and effective;
- Predict user behaviour (both the number of purchases by consumers and the claims to rights by citizens);
- Influence behaviour (both persuading consumers to buy and citizens to comply and to behave in a lawful, proper or healthy manner).

2) Although the objectives for user profiling apply to both private and public organisations, there is a difference in the way various organisations employ it. This is primarily due to the different conditions under which they have to operate. The public sector is bound by much stricter rules of privacy and security than the private sector. Due to the heterogeneous composition of many organisations, the public sector is much more complex than private companies. Therefore, public organisations face far greater difficulties in linking/combining the underlying data into 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 agencies result in governments lagging behind the private sector when it comes to employing user profiling.

3) Both the public and the private sector are confronted with a number of obstacles which impede the introduction of personalising electronic services:

- Financial and economical obstacles;
- Organisational obstacles;
- Technical obstacles;
- Legal obstacles.

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

3 Aim 1: Adapting communication to individual users⁵

3.1 Introduction

One of the central aims of user profiling is to make the communication between an organisation and its public more usable by adapting the messages and the interfaces of applications to user segments or even to individual users (cf. chapter 1). This chapter provides an overview of the user characteristics relevant to usability. The aim of the chapter is to answer two related questions:

- *Which features of content, messages and interfaces can be adapted on the basis of user-related information that is stored in user profiles?*
- *Which kinds of user-related information are needed to effectively adapt content, messages and interfaces?*

3.2 Main concepts

Adaptation of applications to users can best be framed within the concept of *usability*. ISO standard 9241 describes usability as a overall concept with three components. *Usability* is the effectiveness, efficiency, and satisfaction with which specified users achieve specified goals in particular environments (Table 3.1).

Effectiveness	The accuracy and completeness with which specified users can achieve specified goals in particular environments.
Efficiency	The resources expended in relation to the accuracy and completeness of goals achieved.
Satisfaction	The comfort and acceptability of the work system to its users and other people affected by its use.

Table 3.1: Usability; effectiveness, efficiency and satisfaction

There are many features of applications that affect usability and there is a extensive body of literature (advisory works and empirical research) about their effectiveness. The features can be summarised in the following clusters:

- *Content* of information, e.g. in websites or direct e-mails. Many applications use a kind of building block system or data-based content elements. Only those elements that are relevant to a particular individual or group are presented.
- *Functions* of the application. In many applications the functions that are offered can be adapted to particular users or groups. Well-known examples are administrative systems that allocate particular functions (e.g. data entry, approval, report generation) to different employees or officials in an organisation.
- *Structure* of information or interfaces. For instance, the grouping and sequential order of menu options in an application can be adjusted to the frequency with which they are used by particular groups or individuals on the basis of their specific needs or their previous use of these options.

⁵ Authors: N.R. Loorbach, T.M. van der Geest & M.F. Stehouder

- *Presentation* of information in text, tables, graphics or animations. For instance, numerical data can be presented in tables for users who need to study details (e.g. accountants and controllers) or as graphics for users who need to see trends (e.g. managers).
- *Interaction*, e.g. the way the user gets access to information or enters information in a system. For instance, the use of selection menus, hyperlinks, radio buttons, selection boxes or free response can be adapted to the cognitive style or the (dis)abilities of users.

The relationship between user-related data (user profiles) and the adoption of applications for increased usability is represented in the model of figure 5.1. This model shows how the interaction between a user and an application is influenced by the usability of the application, with effectiveness, efficiency and satisfaction as usability criteria. These criteria can be influenced by adaptation of content, functions, structure, presentation and interaction.

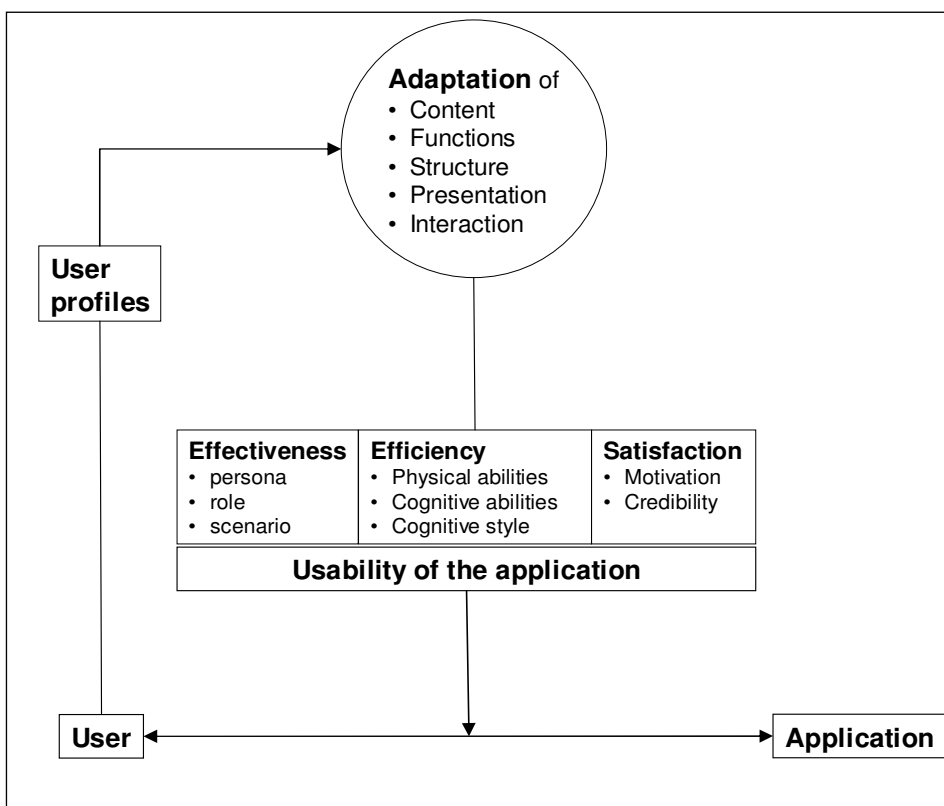


Figure 3.1: Usability influenced by adaptations influences the interaction between user and application

3.3 Preview of this chapter

Sections 3.3 to 3.6 will give an overview of what is known from the literature in the field of communication design about the relationship between user characteristics and effectiveness, efficiency and satisfaction respectively, and how these criteria can be enhanced by adapting certain aspects of the application on the basis of user characteristics.

In section 3.7 to 3.9, the possibilities of adaptation will be sketched in four functions that are frequent and important in applications used for communication between an organisation and its public: data entry (particularly in electronic forms), information seeking, and online help.

3.4 Effectiveness

Effectiveness is defined as the accuracy and completeness with which specified users can achieve specified goals in particular environments. The essential components of the definition are the specification of the users, their goals and the environment in which the application is used.

It is obvious that a good fit between the goals and environment of the users and the features of the applications is essential for success. However, it is not easy to create a good fit between the two, particularly if the application is intended for external users of an organisation. The goals of both parties are often compatible, e.g. a customer wants to buy a product and the organisation is willing to sell it, or the IRS wants to obtain essential information about a taxpayer, and that taxpayer is not unwilling to provide it. However, on a lower level of abstraction, goals, needs, preferences and ideas of users may be considerably different from those of the organisation.

Concepts such as *user role*, *user persona*, and *scenario* are often used in the literature to 'build the bridge' between application designers and users (e.g. Cooper, 1999). However, there is no uniform approach to user modelling. Terms such as *audience*, *user roles*, *scenarios* and *user personas* are often used loosely, without clear definitions. The following is an attempt to synthesise the existing literature and to clarify the most important concepts used.

3.4.1 User roles

User roles are defined by categories of real-life tasks that (groups of) users have to perform with the application. These categories of tasks are generally defined by the position of these particular users in the organisation. For instance, the University of Twente's home page offers a set of roles as a basis for navigation in a menu: prospective students, visitors, students, employees, press, alumni and entrepreneurs. A clear and complete definition of user roles is important as they define the purposes for which the application is designed. In other words: they define what (different groups of) users can do with the application.

In most cases, a set of user roles of an application is not defined by means of collecting empirical data among (possible) users of the applications, but by an analysis of the structure of an organisation, and by defining priorities in the organisation's policy. Taking the UT's website as an example, the user roles of (prospective) students, employees and alumni are intrinsic to a university. They are 'awarded' by the very nature of the organisation. The decision to address the website also to user roles such as the press and entrepreneurs is in following with the policy of the university. The choice to address the website to all these user roles is not dictated by analysing the user characteristics of the website's visitors, but by the organisational goals and policies.

3.4.2 User personas

In the literature on usability design, it is suggested to 'create' a (limited) number of user personas as prototypical users of an application. A user persona is a description of a typical user of an application, with as many relevant qualities as a designer can think of. User personas are usually created on the basis of available statistical data on the prospective users of an application, but they are seen as imaginary individuals who (will) use the application. User personas can be defined abstractly by summing up their

characteristics, but in user-centred design it has become common to create concrete *narrative* descriptions of user personas that can serve as a guide to the application developers (e.g. Cooper, 1999).

Within the same user *role*, users can often be distinguished in different *personas*, each defined by a number of relevant characteristics. For instance, within the generic role of customer in a grocery application, users may differ in age, income, family situation, preferences for certain categories of products and shopping frequency, but also in computer skills, motivation and trust.

Although user personas may be created by ‘intuitive’ techniques such as brainstorming, an empirical approach may be more reliable. User profiles can be very helpful to describe and analyse characteristics that lead to the creation of user personas.

3.4.3 Scenarios

A scenario is a description of a goal-oriented group of interactions between a user persona and the application. A scenario can be formulated as an answer to the classic 5W-questions: *who does what, when, where and why?* Just like a user persona, a scenario is a prototype: it reflects a ‘typical’ way of using the application for a ‘typical’ goal. The collection of different scenarios guides the functionality (what the application can do) and the structure of the interface. Just like user personas, scenarios are thought to be concrete and narrative. Central to a scenario is a textual description or narrative of a use episode. The scenario is described from the user’s point of view and may include social background, resource constraints (e.g. disk space, time) and background information. The scenario may describe existing practices or it may model new ones.

Although general user *roles* can serve as a useful starting point to define scenarios, it is generally advised to use the more concrete user *personas* as they reflect the diversity of the possible users better than roles do. However, in practice it is impossible to take the full diversity of user personas into account. Generally, a limited number of ‘prototypical user personas’ will serve as the key to the design of the scenarios.

By using a narrative it is possible to capture more information about the user's goals and the context the user is operating in. This context might include details about the workplace or social situation, and information about resource constraints. This provides more help in understanding why users do what they do.

Just as user profiles can help to create useful and realistic personas, they can also help to create realistic scenarios.

3.4.4 Using personas, roles and scenarios in design: the rhetoric of messages and interfaces

Although in the design process of an application many different roles, personas and scenarios may be discussed, only a limited number of them can be implemented in the final application in terms of available functions, menu structures, forms of interaction, text, graphics, etc. From a communication perspective, the choices that designers make can be characterised as rhetorical in the sense that they relate to the way information is presented to the audience.

The consequence of choosing only one or a limited number of personas is that the actual user of an application has to accommodate him-/herself to the role(s) and persona(s) that are created in the application. Although this ‘rhetorical role playing’ (Coney & Steehouder, 2000) is important for a successful use of the application, it has barely been studied.

In their focusing on websites, Coney and Steehouder (2000), make a distinction between:

- The *real visitors* to a website: the persons that actually visit the website and, for whatever reason, read the information it contains;
- The *target visitors* or *target audience*: those people the website is aiming at;
- The *user persona*: the role that is ‘created’ in the website.

Within this framework, a website is not directed at an individual visitor or at a group of visitors but at an imaginary or fictitious person: the user persona. The real visitor to a website is expected to adapt him-/herself to that persona, or to ‘play the role’ of the persona. For example, if parents of prospective students visit the UT’s website to find information about the future learning environment of their children, they will not find a section that is directed at them. Nevertheless they can decide to act (‘play’) as if they were prospective students (like their children), and access the information from their point of view (including their interests, values, preferences and taste). In fact, most people are quite capable of ‘playing a role’ to find, access and process the information offered by communication means such as a website.

This rhetorical theory suggests that it is not always necessary to adapt an application to the individual user. Human beings have a high capacity to adapt themselves to the personas and roles that are presumed in the design of an application. In some cases, it can even be advantageous not to adapt an application to users but to ‘force’ them to play a role that the application imposes. The theory of *altercasting* provides a framework for this viewpoint.

3.4.5 Altercasting

Altercasting means that we can ‘force’ an audience to accept a particular role that makes them behave in the way we want them to. This psychological process is caused by social pressure; the social environment expects individuals to behave in a manner that is consistent with their social role. This role also provides the person with selective exposure to information consistent with that role.

Pratkanis (2000) distinguishes two basic forms of altercasting:

- *Manded altercasting* means that we ‘tell’ people who they are (or are supposed to be) by:
 - making an existing role salient (e.g. remind someone of being a alumnus of a university to persuade him/her to donate to the university foundation);
 - placing others in a particular role (e.g. address someone as an expert in a particular field to persuade him to join an advisory committee);
 - asking people to *play* a role (cf. the famous Harvard experiment where students were asked to play guards and prisoners. The participants adopted these roles so strongly that the experiment had to be cancelled because the participants became too violent towards one another).
- *Tact altercasting* means that we put ourselves as senders in a role that ‘evokes’ a natural counter-role for the other. Some common role sets are for instance expert–unknowing public, helper–dependent, etc.

Taking into account the theory of altercasting, it can be questioned if it is always an advantage to fully adapt applications to the individual user. For many purposes, it may be more advantageous to let the user ‘play a role’ that encourages him/her to behave in a particular way. Some examples:

- Advertisers know very well that a stylish setting in a commercial will ‘sell’ products better than a commonplace setting will, even though the latter is more real to the majority of the customers. By ‘altercasting’ the customer in the role of an elegant and wealthy persona, the corresponding behaviour (buying the product) is encouraged more effectively;
- In an educational setting, role playing has proven to be a very effective means of training certain behaviours and promoting attitudes that the learner does not (yet) have.

3.4.6 User profiles, effectiveness and role playing

The previous subsections suggest that user data can contribute to the effectiveness of an application because it helps designers to construct a reliable user model. However, there are some caveats with regard to a drastic adaptation of messages and interfaces to individual users or target groups.

- In the design process of applications, user roles, user personas and scenarios are created to ensure that applications indeed have the functionality that users need, and hence can be effective.
- User roles are generally not created on the basis of user data but on the basis of an analysis of organisational goals and functions.
- User personas and users scenarios are not directed at individual users but are a narrative description of prototype users and their tasks. User profiles can contain data that are useful to create realistic and adequate user personas and scenarios.
- From a rhetorical viewpoint, it is not always necessary to adapt applications fully to individual users or groups as human beings are very capable of accommodating themselves, or ‘playing the role’ that is imposed on them by the application. Sometimes, it might even be more effective to use the strategy of altercasting to elicit a particular behaviour of the user.

3.5 Efficiency

After effectiveness, the second component of the ISO usability concept is effectiveness, which primarily refers to the ease of using an application and to the accuracy and completeness of its use.

Ergonomics, Human factors research, and Human Computer Interaction (HCI) are fields that focus on the characteristics that human beings bring to bear when using ICT systems or devices. Human factors research is often concerned with the physical characteristics of users, particularly when using hardware (such as their abilities to read displays or push levers), whereas HCI focuses more on the software design and particularly on the cognitive characteristics of users that influence effective and efficient use both of the software, and of the information or transactions that are mediated through it. These cognitive characteristics can be used to adapt information, presentation and interaction to its intended users and thus make the communication between organisations and users more efficient and more effective. In other words, the next few sections describe user characteristics, abilities and traits that could be included in user profiles as a basis for adaptation.

Section 3.5.1 focuses on physical (dis)abilities, section 3.5.2 on cognitive (dis)abilities of users, and section 3.5.3 on users' preferences for a particular cognitive style.

3.5.1 Physical abilities

The effectiveness and efficiency of computer use is influenced by the users' abilities and limitations with regard to:

- Visual perception, including acuity, abilities to see contrast, colours, etc.;
- Perception of sound;
- Fine movements with arms and hand.

Of the population at large, 10–15 percent experiences some kind of limitation or impairment that severely affects the ease of use and the accessibility of applications. It is estimated that in Europe alone, 37 million people have a disability that excludes them from using particular products, services or information (Diffuse, 2002). The physical limitations, such as reduced hearing, reduced sight and reduced ability to see colour luminance and contrasts, or increased effort to make small and precise movements, occur much more often among the elderly than in younger segments of the population. However, limitations in ease of use and accessibility might also be created by the environment and context in which an application is used. When electronic information is accessed while driving a car or through a small telephone display, the users temporarily share many problems with people who have more permanent dexterity problems or limited vision.

Electronic information is simultaneously a benefit to people with physical disabilities and an aggravation of their problems. Instead of having to go out for information and services, disabled users can summon the information where, when and how it suits them best. They can use their assistive technology that help them 'see' or hear the information, and change the default settings of their computer to accommodate their special needs. But even then, much information is presented in ways that make it inaccessible. For example, navigation in displays often relies on images and screen layout options that are hard to see for people with limited vision or colour blindness. Interaction with websites and other ICT applications requires both mouse handling, which might be problematic for people with fine motor dysfunction, and looking at a screen, which might be problematic for people with a visual impairment.

Most countries have laws or regulations in place that require the accessibility of web applications, especially for public (government-)related information and applications used for or within the workplace. The current standard is to comply with the Web Accessibility Initiative Guidelines (priority 1) of the World Wide Web Consortium W3C. The sixteen checkpoints at highest priority level are particularly focused on making websites accessible for and with assistive technology, such as screen readers.

It is easy to see that user profiles can be quite beneficial to people with physical limitations, whether or not they are using assistive technologies or non-default browser settings. If the user profile were to contain information about the users' preferences, special needs or assistive technology used, the presentation on screen could be adapted to the physical characteristics of the individual users.

3.5.2 Cognitive abilities

Physical abilities to perceive and access information are an essential condition for the individual, cognitive processing of the information. Cognition is an umbrella term for all kinds of processes that ‘go on in our heads’ when we perform everyday activities such as having a (mediated) conversation, conducting our banking affairs or making a shopping list. Cognitive processes include *attention*, *perception*, *memory*, *learning* and *language*.

Attention – the process of selecting things to concentrate on, at a point in time. Attention is triggered by signals that we perceive through our senses, in interfaces mostly visual (including verbal) or auditory signals. Attention allows us to focus on what is relevant to what we are doing and at the same time to filter out what appears not to be relevant. Adaptive interaction and interface design should present relevant information as more salient (attention-drawing) in its environment, for particular user goals and/or contexts of use.

Perception – the process by which information is acquired from the environment through the different sense organs, and transformed into experiences of objects, events, sounds and tastes (Roth, 1986). Perception interacts closely with other cognitive processes such as memory, attention and language. Vision is the most dominant sense, followed by hearing and touch. When information is presented in multiple modalities, e.g. both in text and in images, the processing of that information might cause extra cognitive load but often results in a deeper understanding or better learning. Essential is that the multimodal information is combined or linked carefully; even a slight delay in time between, for example, the visual information (e.g. a moving face) and the auditory information (e.g. speech) will make it difficult to perceive and to process the information. Adaptive interaction and interface design should present information in the perception modality that a particular user prefers or is more accomplished in (e.g. visual instead of verbal).

Memory – the storing and recalling of various kinds of information, encoding it into knowledge which enables us to act upon it at a later date. The more attention paid to a piece of information, and the more it is processed by perceiving it in multimodal forms, thinking about it, acting with it, comparing it with prior knowledge, the more likely that information is to be remembered later. The context in which a piece of information is encoded, influences the ease with which we can retrieve that information from memory. It is difficult to retrieve information that we have encoded in a different context than the one we are currently in.

People are much better at recognising things than at recalling them. Particularly our sense of visual recognition is highly developed compared with other types of memory. We recognise visual patterns (such as the grid of a web page or a logo) very easily, and expect that similar information or similar situations will be presented in a similar visual pattern. This means that most people prefer recognition-based scanning (e.g. backtracking through a series of linked web pages) to recall-directed search (e.g. recalling a particular word or information element from the desired page and then jumping to it with a search engine).

From the point of view of adaptive interaction and information design, it means that the presentation of information could be adapted to what the system ‘knows’ that the user has done before, or where the user has been before. It is important to note that the expectations of users and their established visual patterns are heavily influenced by

experiences and knowledge that they have acquired in situations other than during use of the ICT application. This is called a mental model of the ‘world’, which includes the tasks and goals users have in the ‘world’. The mental model that users have or develop for the ‘system’ and the functionality of the system should match their mental model of the ‘world’ and their goals and tasks in the ‘world’. Adaptive interaction and interface design should not only take into account what the user has done before in the ‘system’ but also what they have done in the ‘world’.

Learning – is the process of acquiring new knowledge, competence or skills. Most learning related to the use of ICT applications takes place in an informal, unstructured setting, in which users learn new things by doing it (trial and error), or by requiring support from manuals, help systems or support staff when they encounter problems while performing intended activities. Adaptive interface and interaction design should present information in ways that take into account the knowledge and skills that the users already have when using the system initially, and are acquiring through recurrent use.

Language – Information delivery and interaction in ICT applications is realised with verbal and visual means, thus appealing to the users’ verbal and visual language competence. Users can differ considerably from one another in their verbal language competence. Even on an individual level, the level of oral competence of a person (listening, speaking) can be very different from the level of written competence, just as the level of productive competence (speaking, writing) can be quite different from the level of receptive competence (listening, reading). User-related characteristics that are related to language competence are amongst others: being a native/non-native speaker of the language, individual cognitive abilities, education and opportunity to learn, topical knowledge including jargon and terminology, and context knowledge about the situation of language use. There is extensive evidence that verbal information is more easily processed and understood better when the language used is well adapted to the level of language competence of the receiver of the information. Hence, it seems advisable to include information about the individual user’s *language preference and competence* in a user profile system, and to use those user-related data to adapt the verbal presentation to the users’ needs and abilities.

The standard for human-computer interaction at present is the graphical user interfaces (GUI). Although GUIs are much more graphical and visual than their predecessors, they rely heavily on users’ language abilities. Much of the language used in the interface is ‘computerese’: jargon that pre-supposes a quite extensive topical knowledge of ICT and software. Also, many words used in the interface are in English or ‘Dunglish’, even if the interface is Dutch (e.g. home, website, file, scrollen, surfen, etc.). These terms are well-known and hence effective for experienced computer and website users but can be quite confusing to people who have just started using computers and/or have little mastery of English. It is well conceivable to include user data in a user profile system about the *users’ experience with computers, websites and (computer-related) English*. This information could - again - be used to adapt the verbal presentation to the abilities, needs and preferences of individual users.

Graphical user interfaces not only rely on users’ verbal language abilities but also make extensive use of a visual ‘language’, consisting of icons, buttons, bars, screen areas, etc. Although a large part of this visual language is by now developing into a set of conventions and standards, almost every ICT application also contains idiosyncratic elements which derive their meaning solely from the context in which they are used or from a text label that explains its function. Users must have the ability to ‘read’ and

understand both the conventional and the application-specific visual elements. Their ability is determined by their *experience with computers*, which can be acquired in formal or informal learning situations. If user-related information concerning the users' mastery of the visual language of ICT applications was available in a user profile system, the software interface could be adapted to the users' abilities, needs and preferences.

3.5.3 Style preferences

People have preferences for how they process information, think and learn. These preferences are called their cognitive style. Cognitive style is a part of a person's personality. It is an individual trait that, like all personality traits, cannot be changed at all or can be changed only over a longer period of time. It is conceivable that a user profile system would contain data about the individual's cognitive style and use it to adapt information or an interaction to the cognitive style of that individual user.

Cognitive style is a container concept for several individual preferences for thinking and learning. The two dimensions of cognitive style that have been investigated most are:

- Individual preference for processing information in visual or verbal form;
- Individual preference for holistic or analytic style of information processing.

Other personality traits, such as locus of control also seem to be related to the individual user's actual behaviour with computers. Locus of control is an individual's belief whether the outcomes of our actions can be attributed to what we do (internal control orientation) or to events and factors that are beyond our control (external control orientation). This personality trait appears to be particularly influential when users meet problems using computer systems, influencing how they go about finding solutions to their problems.

Many researchers in the field of adaptive hypermedia agree on the importance of modelling and using individual traits in the design of adaptive systems (Brusilovsky, 2001). Until now, the focus has mainly been on adapting the content, the presentation or the navigation to users' preferences or needs.

If we wanted to include data on user traits (such as cognitive style) in a user profile system, an important question would be how to collect data that are valid and reliable. Personality traits cannot be extracted with a few simple questions in a questionnaire, or inferred from user behaviour (Chin, 2001). Personality traits are measured with specially designed psychological tests, often to be administered under controlled conditions and to be analysed by trained analysts.

Two widely-used tests measuring cognitive style dimensions are the Group Embedded Figures Test for scoring whether someone has a 'visual or verbal' cognitive style and the Myers-Briggs Type Indicator, which distinguishes 16 'style types' on the basis of four dimensions of information processing style. Including data on cognitive style in a user profile would imply that the users are willing to take a test in order to be recognised as having a particular cognitive style. It is unlikely that users would be willing to take such tests unless they see clear advantages of the time and effort they have to invest.

3.6 Satisfaction and other affective factors

Although users may be expected to be satisfied already if an application is effective and efficient, it is widely recognised that affective factors are relevant as well. A related

concept is *Designing for pleasure*, as advocated by many human factor specialists (e.g. Jordan, 1999). Recently, the term *user experience* is also often used to refer to the affective aspects of usability. Satisfaction, according to ISO 9241, refers to the comfort and acceptability of the work system to its users and other people affected by its use.

In this section we will focus on two concepts that are important to satisfaction: motivation and credibility.

- *Motivation* refers to the choices that people make as to what experiences or goals they will approach or avoid.
- *Credibility* refers to the degree of trust that is raised by an application. There are many factors that influence credibility. In this section we will focus on the role of the message and the interface.

3.6.1 Motivation

Motivation refers to the magnitude and direction of behaviour. According to Keller (1983, p. 389), it refers to 'the *choices* people make as to what experiences or goals they will approach or avoid, and the *degree of effort* they will exert in that respect'. As such, motivation is a rational process that is influenced by many internal and external aspects, which have been studied profoundly.

Keller gives an extensive overview of research conducted in the area of motivation. His ARCS Model of Motivational Design was aimed at making instruction motivating and it has been applied and tested by numerous researchers ever since.

Keller developed his ARCS Model to make instruction (both classroom and CAI or computer-assisted instruction) more motivating. In other words, the model was developed to be applied in a reading-to-learn setting. Using an application and maintaining a user profile are tasks in a reading-to-do or even a reading-to-learn-to-do setting. Nevertheless, we believe that the motivational strategies proposed by Keller may increase motivation outside a reading-to-learn setting as well. Research is necessary to study the effects of these motivational strategies outside this setting and more particularly in the setting of user profiling and applications adapted to user-related information in user profiles.

The ARCS Model of Motivational Design defines four major conditions that have to be met for people to become and remain motivated. Each of these conditions subsumes several areas of psychological research:

1. *Attention*: arousing and sustaining curiosity;
2. *Relevance*: linking to learners' needs, interests and motives;
3. *Confidence*: helping learners develop a positive expectation for successful achievement;
4. *Satisfaction*: providing extrinsic and intrinsic reinforcement for effort.

Attention strategies include using novel, incongruous, conflictual, and paradoxical events. Attention is aroused when there is an abrupt change in the status quo (i.e. banners or pop-ups). However, the extent to which attention can be held with this strategy depends on the frequency and complexity of its use: the unusual can become commonplace and lose its effect. Another way to arouse attention is to use anecdotes and other devices for injecting a personal, emotional element into otherwise purely intellectual or procedural material. Also, giving people the opportunity to learn more about things they already know about or believe in, but also giving them moderate doses

of the unfamiliar and the unexpected can increase attention. Another strategy is using analogies to make the strange familiar and the familiar strange. Finally, attention can be increased by guiding users into a process of question generation and inquiry.

Relevance strategies primarily focus on making the content of information relevant to users. Providing opportunities for choice, responsibility and interpersonal influence can also increase relevance, as can establishing trust and providing opportunities for no-risk, cooperative interaction.

Confidence strategies are applied to increase expectancy for success. This can be established by increasing experience with success, by indicating the requirements for success, by using techniques that offer personal control over success (i.e. individual contracting, assuming that the contract includes criteria for evaluation) and by using attributional feedback and other devices that help learners connect success to personal effort and ability. So, confidence in this respect can be seen as confidence in oneself, in the application and in the expected outcome.

Satisfaction strategies are applied to maintain intrinsic satisfaction. In order to accomplish this, Keller suggests using task-endogenous rather than task-exogenous rewards, using unexpected, non-contingent rewards rather than anticipated, salient, task-contingent rewards (except with dull tasks), and using verbal praise and informative feedback rather than threats, surveillance or external performance evaluation. To maintain quantity of performance, Keller also suggests using motivating feedback following the response, and to improve the quality of performance, providing formative (corrective) feedback when it will be immediately useful, usually just before the next opportunity to practice.

Not all of the above-mentioned strategies will be easily applicable on the basis of user-related information in user profiles. For instance, to *sustain* attention, a response to the sensation-seeking needs of the user is required. The category satisfaction also requires a reaction to the particular, current state the user is in. In order to apply these specific strategies, more sophisticated measures are necessary than the standard information-gathering measures used to create and maintain user profiles. However, the remaining strategies can be adapted to specific users with the help of user-related information in their profiles.

On the basis of user-related information in user profiles, attention strategies can be adapted to the specific user: when current knowledge, interests and beliefs are known, it is possible to give users the opportunity to learn more about things they already know about or believe in, thus arousing attention. When a user profile offers information about what is or is not familiar to the user, it becomes possible to give the user moderate doses of the unfamiliar to increase attention.

If the user perceives the information, using the application, building and maintaining the user profile as relevant, then according to Keller, the user will be motivated to a higher extent. In other words, if content and presentation of information is based on individual user profiles, thus making it more relevant to that particular user, then the user will be more motivated to act upon the information. For example, using an example with parents and children will be more relevant to a user with children than to a user who does not have children. Also, presenting an analogy on the basis of fishing will be more relevant to, work better and be more motivating for users who like fishing and have the required prior knowledge than to/for users who do not. Another example of a relevance-increasing

strategy is to provide the user with the choice for the display of information: not only concerning structure (how would you like the sequential order of menus in the application to be?) but also concerning presentation (would you like these twelve questions presented to you all at once or in chunks of four at a time?).

The same link with motivation applies to confidence: if the user feels that a pre-set goal will probably be achieved in a successful manner, then motivation to pursue that goal will be higher. Confidence can be increased by assuring and persuading the user that he or she is quite able to accomplish a certain goal or that accomplishing the goal is achievable anyhow. When this is done properly, the user will feel more confident, thus be more motivated to act upon the information. Another way of boosting confidence is by offering the information in chunks. This is also a good strategy for users in need of a low cognitive load. User-related information can reveal a user's previous accomplishments, which can be used as comparison: 'You've successfully purchased books from us before, so purchasing another book should be easy'.

So, motivation strategies adapted to the individual needs of a specific user may very well motivate that user to read the information and effectively work with the application. Song and Keller (2001) showed this when they applied the ARCS Model of Motivational Design to a Computer-Assisted Instruction (CAI) setting. This resulted in three motivational conditions of CAI: adaptive (to the varying needs of the user during the instruction), saturated and minimised. The motivationally adaptive CAI showed higher effectiveness, higher overall motivation and higher attention than the other two CAI types. For efficiency, both motivationally adaptive and minimised CAI were higher than motivationally saturated CAI. Apparently, providing users with motivational stimuli they do not need is worse than not providing them with motivational stimuli at all. Assessing which motivational stimuli are needed can be performed on the basis of user-related information in user profiles.

The ARCS Model of Motivational Design does not explicitly reckon with possible influences of emotional appeals from either content itself or presentation of content on user motivation. In our view, behaviour in general and motivation in particular are not purely rational processes: even when reaching a certain goal would be preferable on the basis of rational processes, a user might still decide not to take action towards pursuing it. Here, irrational variables such as emotions probably have an influence as well.

3.6.2 Credibility

In this section, credibility is defined as the features of messages and interface that affect the trust of the users in the quality of the application. There are many other features of applications that influence trust, as well as factors that are not directly related to the applications (e.g. trustworthiness of the organisation, the manufacturer, etc.). These are discussed in chapter 7.

It is important that credibility is not a quality of an application (or its interface) in itself but a quality 'in the eye of the beholder'. First of all, credibility is constructed by the user on the basis of perceptions: there are certain features that are 'seen' or 'not seen' by the user. Moreover, this perception has an intuitive and holistic character. Credibility cannot be calculated as the sum of a number of features of an application. And finally, credibility is based on an evaluation by the user in which different criteria may play a role.

Coney and Steehouder (2000) regard credibility as a quality of the author persona of a website. They argue that, just as the reader persona is not a real person but a fictitious character created in a message (cf. section 3.3.4), the ‘speaker’ or ‘author’ of a website is not the real person or organisation responsible for that site but a creation of the designer, an artificial character or author persona. By creating an appropriate author persona, the designer of a website (and probably also of other ICT applications) can enhance the credibility.

Coney and Steehouder, following Alexander and Tate (1999), offer a number of suggestions for features that can increase the website visitor’s confidence in that the information is reliable and relevant. Fogg et al. (2001) conducted a large online survey (N=1410) to investigate which elements of websites affect people’s perception of credibility. Together, these studies justify the following conclusions:

- First of all, effectiveness and efficiency of an application add considerably to its credibility. Fogg et al. (2001) conclude that ease of use is one of the main factors that create credibility for visitors of websites;
- For websites, and possibly also for other applications, markers of expertise and trustworthiness contribute to credibility. This concept refers to a number of features that indicate the expertise of the person or organisation responsible for the application. Examples are: the mere identity (facts about the organisation) and credentials. Markers of trustworthiness are, for example, a policy statement on the reliability of the content, or a privacy statement. A reverse effect can be expected from excessive ‘commercial’ (advertising) elements and ‘amateurisms’ such as unprofessional language or graphic design and spelling errors;
- An interesting conclusion from the Fogg et al. (2001) study is that tailoring the user experience contributes to credibility.

One of the ways user profiles can help to enhance credibility is that they can prevent an *overdoses* of credibility-enhancing features. For instance, when users visit a website for the first time, or only occasionally, markers can be useful to or at least tolerated by the visitor. But when the user sees the same information every time he enters an application or visits a website, it might become irritating and counterproductive. When user data indicate that a user is using the application for the second time, the content can be adapted so information is not repeated.

3.7 Forms of adaptation: electronic forms

Many government agencies and other organisations have recently started to replace their paper forms with electronic forms distributed via websites. Increased efficiency seems to be the most important motive behind this innovation. However, it is also assumed that completing electronic forms is easier for the clients of the organisations, and that electronic forms will decrease the number of forms filled in incompletely or inaccurately.

A number of studies in the 1970s and 1980s have increased our understanding of the way people fill in application forms and of the problems they have with this task (an overview is given in Jansen & Steehouder, 2000). Digital forms are expected to prevent a number of problems that people have when completing regular paper forms:

- *Routing problems* may be eliminated by using a branching program that asks only relevant questions, given the answers to earlier questions;
- *Verifying* calculations may become less important as the computer does all the computation. Moreover, computer programs may contain ‘built-in’ checks that detect

- implausible or contradictory answers to questions. Such features may warn the form filler about possible errors;
- *Terminology* problems may be solved by pop-up definitions and explanations;
 - *Explanations* may be available via online help. Some explanations may even be replaced by wizards that do not explain how to find an answer to a question but that guide the user step-by-step to the right answer.

However obvious these advantages may seem, it is not clear whether such features really have the intended effects. There are only a few studies of electronic form filling that permit only very tentative positions on the question whether electronic forms really help, and most of these are quite outdated, using electronic forms that are far below today's standards (Bergen, Scheifes, & Jansen, 1992; Frohlich, 1986). As results of usability tests are generally not published, there is only little evidence available. The only exception is a published study by Steehouder and d'Haens (2000). A usability test was carried out to compare the problems of people who completed a traditional paper Dutch Income Tax form (*E-biljet*) with the problems that were met by users of an electronic tax form (*Aangifteprogramma*). The results showed that there were no significant differences on accuracy, mental load or motivation between completing paper forms and electronic ones, although electronic forms did appear to solve some of the traditional problems of form fillers, such as calculations. However, the users still had many problems related to features that were expected to help them, such as selecting relevant questions and using online explanations of the tax regulations.

The application of *user profiles* for electronic forms seems a big step forward in cutting down on the administrative burden of form fillers. It would even be possible to add answers before the form is filled in, and possible to skip questions if the answer is already known. This is not unique for electronic forms, however. There are examples of paper forms that are pre-filled. For instance, Dutch civil servants receive the form for the *Tegemoetkoming ziektekosten* (compensation for medical expenses) every six months to check the data. This form has to be returned only if the pre-filled data have changed in the past period. Other forms use the same principle but have to be signed (in agreement) and returned.

No studies have been published on whether fully or partially completed forms (paper or electronic) are really usable and useful. The available studies of form-filling behaviour suggest some serious doubts:

- Citizens or clients are supposed to check whether the data on the form are correct. However, earlier studies of form filling showed that form fillers do not check the correctness of their answers (they follow a 'kick-and-rush'-strategy);
- Citizens or clients are supposed to be able to signal the necessity to change or add information in the form. To that end, they need quite a high level of understanding of the regulations or the conditions that underlie the questions on the form. Earlier research showed that this understanding is usually lacking, and that most form fillers have a surprisingly low need to know and understand the regulations. Explanations are scarcely read.

3.8 Forms of adaptation: information seeking

Information seeking refers to a variety of behaviours that people apply to get new information out of digital systems, such as databases or the WWW. In their review of research on information seeking on the Web, Choo, Detlor and Turnbull (1999) distinguish four modes of information seeking:

- In *undirected viewing*, the individual is exposed to information with no specific informational need in mind. The goal of broad scanning implies the use of a large number of different sources and different types of sources;
- In *conditioned viewing*, the individual directs viewing to information about selected topics or to certain types of information. The individual has isolated a number of areas of potential concern from undirected viewing, and is now sensitised to assess the significance of developments in those areas;
- During *informal search*, the individual actively looks for information to deepen the knowledge and understanding of a specific issue. The overall purpose is to gather information to elaborate an issue so as to determine the need for action by the organisation.
- During *formal search*, the individual makes a deliberate or planned effort to obtain specific information or types of information about a particular issue. The overall purpose is to systematically retrieve information relevant to an issue in order to provide a basis for developing a decision or course of action.

Several models of the Information Seeking Process (ISP) have been suggested in the literature as frameworks for understanding problems of information seekers and developing tools that support them (e.g. Ellis, 1989; Ellis & Haugan, 1997; Marchionini, 1998; Steehouder, 1994). The following can be considered an integrative model of the ISP. It distinguishes 6 categories of generic information-seeking activities.

Detecting the need for information
Selecting the information source
Formulating the information need
Locating information in the source
Interpreting the information
Evaluating the information

Detecting the need for information – The information process starts with the user’s experience of an information need in a particular context (Marchionini, 1998; Steehouder, 1993). Surprisingly, this activity is neglected in many models of ISP (e.g. Ellis, 1989; Ellis & Haugan, 1997). Information needs can be classified in various ways. For instance, the need may be *functional* (information to solve a particular problem), *symbolic*, or *hedonic* (Loeber & Christea, 2003). Functional needs can be classified as (cf. Steehouder, 1994):

- *impasses*: the user does not know how to proceed in a given situation;
- *errors*: the user is ‘blocked’ or ‘surprised’ by unexpected events;
- *discoordination*: the user needs an overview or understanding of a certain situation;
- *uncertainty*: the user has an assumption of certain facts and seeks confirmation.

Selecting the information source – The information seeker identifies media and sources of interest that can serve as starting points for the research. There are several theories that predict media preferences:

- The *Media Richness Theory (MRT)* states that people have a preference for so-called *rich* media if their problems are vague, ambiguous, non-standard and complex, and a preference for *lean* media if their problems are standard and relatively simple. Daft and Lengel (1984, 1986) present a media richness hierarchy, arranged from high to low degrees of richness, to illustrate the capacity of media types to process ambiguous communication in organisations. The criteria are: a) the availability of instant feedback; b) the capacity of the medium to transmit multiple cues such as body language, voice tone and inflection; c) the use of natural language; and d) the personal focus of the medium. Face-to-face communication is the richest communication medium in the hierarchy followed by telephone, electronic mail, letter, note, memo, special report, and finally, flyer and bulletin.
- The *Media Features Approach (MFA)*, coined by El-Shinnawey and Markus (1998) states that the functionality of a given medium is an important criterion of the preference of information seekers. They showed for instance that e-mail is often preferred to the telephone, regardless of the type of problem at hand, because e-mails do not interrupt others in their activities, allow for some time to formulate problems and thoughts, can be copied to other people, and can be archived.
- The *Social Information Perspective (SIP)* (Suh, 1999) states that media preference is primarily influenced by social factors such as attitudes and behaviours of others: people often prefer the sources advocated by their peers or that are 'in fashion'. Not mentioned by Suh but in line with his approach is the preference for media that create a social awareness. This might explain why people often prefer to discuss their problem in a discussion group on the Internet instead of reading documentation.

Formulating the information need – Most information sources and strategies require the user to find verbal expressions that match his information need. This can happen in many ways. Most common are systems that require the user to insert keywords, often connected with boolean operators (e.g. Google, most library systems). Such systems are based on full text search or on indexation. On the other side of the spectrum are systems that allow users to formulate their problems in their own words, e.g. discussion groups, e-mail helpdesks, or user forums on the Internet. There is only little research on the content and structure of such 'problem statements' (Steehouder, 2002).

Locating information in the source – After the first formulation of the problem, several activities can be applied for locating the relevant information.

- *Browsing* takes place if the application offers chunks of information in a certain structure. Information seekers use content lists, headings, hyperlinks and other devices to find relevant information;
- *Filtering* is the activity of progressive differentiation of keywords and prioritising sources in order to find the (most) relevant information;
- *Extracting* is the activity of systematically working through a particular source or document to identify information of interest.

Interpreting the information – It is obvious that the information needs to be understood by the user. But understanding is often not enough. The user has to apply the information to the problem that was the reason for seeking it in the first place. In many situations, the 'interpretation' of information may cause considerable problems (e.g. knowing that a problem with a computer program is caused by memory overload does not immediately lead to a solution to the problem).

Evaluating the information – Finding the right information is often not enough, an evaluation is needed to know whether the information is reliable, topical and complete enough for the initial problem.

How can user profiles help to facilitate information seeking?

A relevant activity of web users is monitoring: keeping abreast of developments or new information in a particular area. A distinction can be made between:

- *Pull monitoring*, where the initiative is with the user (e.g. by using bookmarked webpages, or revisiting a site);
- *Push monitoring*: receiving alerts, e.g. via e-mail newsletters, setting up a channel or user profile, or subscribing to services.

Choo, Detlor and Turnbull (1999) observed the information-seeking behaviour of 34 web users and discovered that only very few of them used push monitoring techniques.

3.9 Forms of adaptation: online help

One of the fields in which adaptations to user characteristics has been developed to a certain level, is the offering of online help in applications. Here, help includes all kinds of task-supporting information, not only on the level of syntax (buttons, data entry and menus), but also on the functional level (how to use the system to reach particular outcomes), and as strategic support (how to use the application for ‘real life’ goals, such as a better administration or publishing articles).

Help systems can be adapted to the user in several ways:

- By being context-specific: the content of the help is selected on the basis of the function the user is working with. This kind of user support is often applied in systems that require data input, such as electronic forms. The user has to put the cursor in a particular field and the system offers help information in a separate field (most often, the user has to call up the help information by pressing a key or clicking a button);
- By layering: the help starts with the essentials and the user can choose to get elaborations or details by clicking hyperlinks. This approach enables the user to get help information that is accommodated to his level of expertise;
- By keeping track of earlier actions of the user. For instance, some systems signal repeated use of certain functions, and after a number of them, they come up with a practical advice or suggestion (e.g. to automate the function or create a macro);
- Wizards support users in performing certain tasks in applications by asking them for specific data or preferences.

4 Aim 2: Inferring and predicting behaviour, segmentation⁶

4.1 Introduction

The concept of user profiling could be considered similar to segmentation, a strategy that is developed and used in conventional marketing of products and services. The methodology as it has evolved in this area, and the experience gained with its implementation, may greatly facilitate the development and progress of successful user profiling methods. This chapter will provide an overview of the concept of segmentation, and will discuss various ways in which it is implemented and, where possible, indicate how these different ways could also be used in user profiling. After discussing two particular segmentation techniques, the VALS 2 and Netpoll's psycho-demographic segmentation of web users, special attention is devoted to psychographic segmentation and ways in which to circumvent the problems associated with this promising type of segmentation.

In marketing, segmentation aims to divide a market into subcategories, each of which can subsequently be targeted by different strategies. Segmentation can take different forms. One way involves the division of a group of consumers into subgroups; instead of targeting all potential consumers, marketing communication may target a specific group that distinguishes itself by particular characteristics, such as their income level, educational background or the amount of leisure time they have. Another way involves creating subgroups of products, such as herbal teas in addition to an assortment of more conventional kinds of tea as Earl Grey or English Blend. Sometimes these approaches go hand in hand: specific subgroups of products may appeal to specific subgroups of consumers. In addition to an already existing product, a company may create a new subgroup of, say, diet products, which is most likely to appeal to a specific group of health-conscious consumers.

4.2 Rationale behind segmentation

As became clear in the previous section, consumers and users may differ in a variety of aspects, ranging from education and income to values, preferences and cognitive styles. An important goal behind segmenting is either selecting those consumers with a particular relevant characteristic, and subsequently adapting communication to this specific group, or create different products that meet the different needs of a variety of consumer groups. Pursuing the majority, i.e. adapting product or communication to the preferences of the largest group of consumers, is not always the most rewarding (Kardes, 2002). Smaller segments may well be more profitable, as competition in that segment may be quite low as opposed to the largest segment. Furthermore, in services marketing there is increasing awareness that understanding particular market segments is the key to developing long-term relationships with customers (relationship marketing, Zeithaml & Bitner, 1996). Unless careful market segmentation has taken place, customers' expectations, needs and requirements may be defined too broadly, which may leave a large proportion of customers unsatisfied. Contrarily, focusing predominantly on the

⁶ Author: P.W. de Vries & B.M. Fennis

needs and requirements of new customers may cause current customers to become dissatisfied and seek their required services elsewhere (Zeithaml & Bitner). In sum, market segmentation is an important tool in opening up new profitable markets by targeting specific subgroups of customers, as well as retaining one's current customers. In this chapter, we will propose several new approaches to segmentation that may fit consumers' needs on the Web better than conventional bases. But before this, we will commence with an overview of these more conventional bases.

4.3 Bases of segmentation

Segmentation may take place on several different bases, such as geographic, demographic, behavioural and psychographic variables (Kardes, 2002).

4.3.1 Geographic segmentation

Geographic segmentation is based on cultural differences that may exist between people from different countries, cities, city areas, provinces, regions, etc. If users within a certain area share similar preferences and tastes, demographic segmentation is particularly useful. Examples listed by Kardes include differences in appreciation of spicy food in relation to climate (both within and between countries, people in warmer regions appear to have a stronger liking for spicy food than those in colder regions), and the marketing of alcohol-free beers in countries in the Middle East by Heineken.

In a similar vein, segmentation on the basis of geographically defined areas may be used for user profiling. The overall economic situation of such an area, for instance, has implications for the ICT infrastructure; in less advanced areas, albeit on the scale of countries or regions within countries, the infrastructure may be such that, on average, people have to cope with lower speed Internet connections than they would in more prosperous areas. This would imply that the amount of information directed at the user should be adapted on the base of this variable.

4.3.2 Demographic segmentation

Demographic segmentation involves differences in age, gender, education, occupation, household size, etc. These variables are usually measured by having people fill in application forms, questionnaires and surveys, which constitute simple, quick and cheap means of data collection.

Buying patterns are sometimes strongly related to demographic variables. Which fragrances, clothes and magazines are bought, depends heavily on the gender of the consumer. Similarly, choice of sports equipment depends to a certain extent on the age of the buyer; people in the 'over-55 segment' may have a stronger interest in equipment related to such sports as golf, whereas young adults have a preference for equipment to be used in sports that require a higher degree of physical exertion, such as soccer, tennis or rock-climbing.

In the context of user profiling, there may be several demographic variables of interest. An elderly user, for example, may require different online information than a young person. Not only may an elderly person's visual acuity be less than that of a teenager, his or her knowledge of online interaction may also be less well developed. In other words, elderly users may require more information on how to interact properly in an online context.

Similar to geographic segmentation, an important drawback of using demographic variables for segmentation purposes is that they often only correlate with certain types of consumer behaviour (i.e. purchase patterns) without shedding light on the nature of the relationship. Hence, we do not know whether these variables cause the proposed behaviour, or whether the relationship is spurious and caused by an (unknown) third variable. More in general, because of their descriptive nature, geographic and demographic bases for segmentation do not inform the marketer of the precise (psychological) mechanism that may account for the variations in buying behaviour.

4.3.3 Behavioural segmentation

Behavioural segmentation involves differences in usage situation (usage coupled with a specific time of the day, week, year, etc.) or usage frequency (e.g. non-users, heavy users, etc., see Kardes, 2002). Some products tend to be used at specific moments: warm clothing in winter and t-shirts in summer, milk or fruit juice at breakfast and alcoholic beverages at dinner or when going out, and fireworks to mark special occasions. Categorisation in terms of frequency of use involves distinguishing between non-users, light users, medium users and heavy users. Advertising directed at non-users normally attempts to increase product awareness and to educate the consumer with regard to its specific benefits.

Advertising targeted at light users aims to change beliefs and attitudes, and attempts to increase the importance of already familiar benefits, inform the consumer about less familiar benefits, or position a brand more effectively with respect to competitors' brands (Kardes, 2002). Light users especially tend to be brand switchers. Their reasons tend to differ widely, however. Whereas variety seekers simply get tired of using the same brand continuously, market stimulus switchers switch purposefully to buy the least expensive brand. Random switchers do not seem to have specific reasons; perhaps they simply mistake one brand for another or grab the first brand they come across. Making a product's package look similar to the main competitor and negotiating prominent locations in stores may influence these consumers.

Advertising targeted at heavy users should employ a maintenance strategy. This type of user is already familiar with the product and needs only to be reminded of the brand and its benefits (Kardes, 2002). Sometimes heavy users are targeted with frequency marketing, offering them special bonuses, such as frequent-flyer miles.

A particular strength of this approach to segmentation is that it focuses on actual behavioural patterns.

For user profiling, the division of users on the basis of their frequency of use is also highly applicable. Congruent with strategies in conventional marketing, non-users of electronic services require information to persuade them to visit a particular site. The exact approach with which this persuasion should be attempted, however, depends on whether the potential user is merely a non-user of the focal service, or a non-user of the Internet altogether. In the former case, product awareness could be established electronically, i.e. via online advertisements or e-mail. In the latter case, however, strategies to increase service awareness should pursue more conventional routes of supplying information, such as printed media or via direct mail. Perhaps such potential users should first be informed about the use and benefits of the Internet, in general, rather than specific services. One cannot expect users to engage in online banking if they are not to some extent familiar with the Internet. Light users of ICT or Internet applications

require information that targets their beliefs and attitudes to prevent them from switching to a competing electronic service. As competing brands may be a mere mouse click away, the importance of adequate strategies is evident. Information to heavy users should simply attempt to remind them of the benefits associated with one particular organisation.

Another important variable may be the location in which online behaviour takes place. If people access the Internet from within the sanctity of their own homes, they may spend a considerable amount of time on one specific site. The duration and intensity of online behaviour may be entirely different, however, if it takes place in their working environment. The pressure of pending tasks or the disapproval of colleagues and superiors may be such that users only allow themselves to be online for a short time, which increases their need for information that is compact and to the point.

4.3.4 Psychographic segmentation

Psychographic segmentation is performed on the basis of personality characteristics, attitudes, beliefs and lifestyles. Personality characteristics that may be of importance to marketers are need for cognition, self-monitoring, locus of control, need for closure, etc. Lifestyles are ascertained by asking people about activities, interests and opinions (Kahle, Beatty, & Homer, 1986). A widely used technique for psychographic segmentation is the VALS 2 (Values and Life Styles) technique (Riche, 1989); about 2,500 consumers were asked to agree or disagree with each of 43 statements regarding values and lifestyles. Some of the questions focused on resources, such as income, intelligence, and health, whereas others targeted orientations. From the resulting data a number of different categories were constructed (see Figure 4.1). Principle-oriented consumers act on the basis of their own personal beliefs and attitudes; status-oriented consumers are primarily concerned with the beliefs and attitudes of others; action-oriented consumers are physically and socially active; actualisers have the greatest income and resources, and this group has achieved a balance among these three orientations. At the other end of the spectrum, strugglers have low income and resources and are more concerned with survival. Strugglers tend to be older and more brand loyal than other groups. Fulfilleds are typically high-income, principle-oriented consumers, whereas believers are low-income, principle-oriented consumers. Achievers and strivers try to impress others, but the former have more resources to achieve their goals. Experiencers and makers are both extremely active, but experiencers tend to be relatively young and highly interested in new products and services. By and large, principle-oriented consumers prefer brands that provide quality and value, whereas status-oriented people favour prestigious brands. Action-oriented consumers are sensation seekers who are into a wide range of activities, such as skiing, scuba diving, parachuting, etc. Within each of these three categories, consumers with greater resources purchase more expensive brands (Riche, 1989).

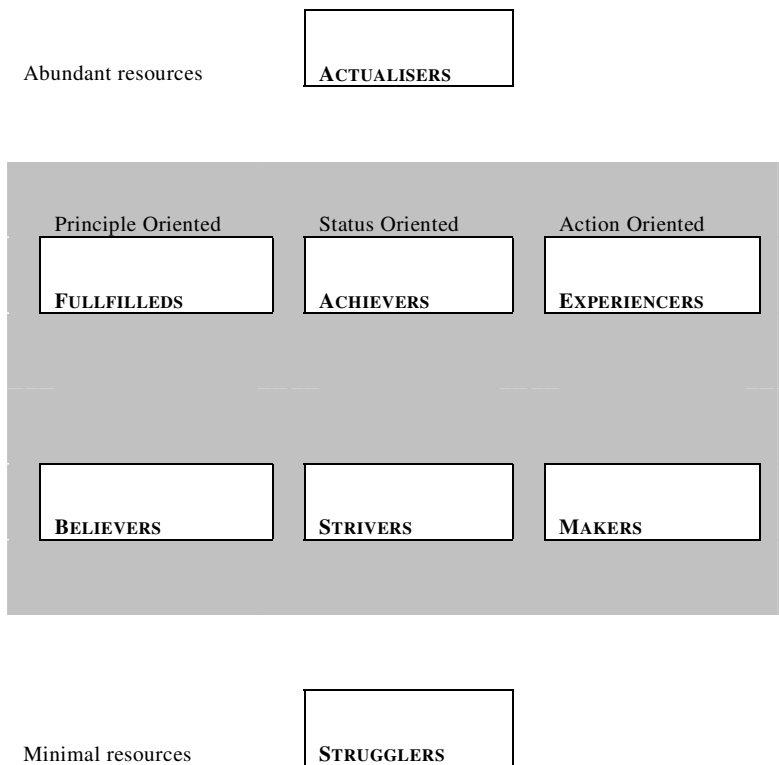


Figure 4.1: Segmentation based on the VALS 2 technique (Riche, 1989)

Defining market segments is usually followed by creating profiles of each relevant subgroup of customers. Segmentation on the basis of frequency of usage, for instance, may lead the management of a nationwide hotel chain to define incidental customers, such as holiday makers, and potential regular customers, such as travelling salespeople. People in the former category are likely to arrive late at night, stay only for one night, and be on their way again the next day; as such, they basically only need a decent bed, bathroom and breakfast. People who spend a lot of time travelling may have very different needs, such as an abundance of different newspapers, a quiet lounge where one can socialise with other guests, a one-day laundry service, and many other services that facilitate a life on the road. Whereas a strategy to attract both categories of customers may seem worthwhile, it may also have particular disadvantages. It implies, for instance, that identical sets of services are offered to all customers, regardless of which group they belong to, which is either inefficient or simply not good enough, depending on the segment. Other considerations concern the question whether having two subgroups under one roof constitutes a good combination: holiday makers may be full of excitement in anticipation of their travel destination, which may well irritate other people who want some peace and quiet after a day's work.

Whereas companies offering products or services online may have few concerns about the compatibility of groups of customers, as these are not likely to ever meet one another, certain aspects of online interactions need to be adapted to the wants and needs of users.

Users are bombarded with information on the Internet. This may enable them to compare different products or brands in terms of price and quality, but it also makes it harder for them to sift through it. Too much information may cause confusion. Manufacturers, retailers and providers of services face the task of standing out in this avalanche of information so that consumers are actually able to reach their site, and at the same time

provide them with the information they need without unnecessarily starting yet another stream of information. As competing brands are just a mouse click away, and price and quality comparisons are relatively easy on the Internet, companies and organisations may have to provide other benefits to users in order not to lose them to competitors. Such benefits may be low-cost shipping and handling or home delivery, after-sales services, reputation and trustworthiness, or ease of use of the particular application. Exactly which benefits to provide depends to a large extent on the segment that the consumers belong to. Low delivery costs, for instance, may especially appeal to elderly people living on a meagre pension, or people in low-income groups. Similarly, people who have become regular visitors may no longer need to be presented with information regarding safety precautions and privacy policy, as they have interacted with the online retailer before and already know about these matters.

Typologies such as used in the VALS 2 technique have been constructed in the field of online marketing as well. Several methods exist to typify web users (e.g. see Bickerton, Bickerton, & Pardesi, 2000), offering companies a means to target specific groups. Table 4.1 shows an example of the psycho-demographic profiles of web users used by Netpoll (www.Netpoll.com).

	Age	Marital status	Occupation	Web access	Interests	Characteristics
Gameboy	15		None; living at home	Home, school, friends, Internet cafés	Online gaming, role playing, soccer	Hip; knowledgeable about Internet
Cyberlad	23		Well-paid job	Home, work	Sport, sex, e-mailing	Believes to be knowledgeable about Internet
Cybersec	31		Personal assistant to boss of small firm	Office	Shopping	Exploring the possibilities of Internet
Infojunkie	40	Married, children	Senior civil servant or partner in small law firm		Reads various newspapers and magazines	Spends a lot of time online to improve professional skills
Hit-and-runner	38	Married or living together	Marketing executive	Office	Stocks; holiday-planning	Internet strictly for acquisition of information; values speed; little leisure time
Cybermum	42	Married, children	Nursing, medical sector	Home	E-mailing; maybe online shopping (in future)	Lags in Internet adoption; little knowledgeable

Table 4.1: Netpoll's psycho-demographic profiles of web users

Such typologies may help organisations to reach specific groups of users, as well as adapting information to that group. It may be clear, for instance, that users who fit the Gameboy-profile are interested in gaming and supporting their hip image. As such, they are likely to be found on what they consider hip websites or gaming sites. To satisfy their

gaming needs, they may come into contact with a lot of other gamers, which makes them interesting for organisations who aim to use word-of-mouth to make users aware of the services or products they have to offer. Similarly, the Cyberlad also spends a lot of time online but visits sites that are quite distinct from the online hang-outs of the Gameboy.

The Hit-and-runner views the Internet as something functional, i.e. for the acquisition of information. As he or she typically has a demanding job and hence little leisure time, this type of user values swift interactions, quick information acquisition procedures and websites designed with efficiency of use in mind.

Whether a user belongs to the Hit-and-runner, the Gameboy or the Cyberlad group has important implications for website design and the informational content of the interaction. As the latter two groups spend a lot of time online, they may not be as much inclined to select websites on the basis of their efficiency in communication as the Hit-and-runner does. Instead, they may select sites, for instance, on their flashy appearance, whereas the Hit-and-runner will find graphic displays and flash movies a nuisance, because they slow down a site's accessibility.

The Cybersec and Cybermum may represent groups that lag somewhat in their adoption on e-commerce for personal use but that are not disinterested either. Their somewhat cautious yet positive attitude towards online activities may enable them to become enthusiastic online shoppers, if targeted adequately.

Typologies such as Riche's and Netpoll's have the advantage of offering clear-cut, well-described socio-cultural segments to the marketer, which can subsequently be targeted with an offer tailored to the needs of the particular segment(s). However, it does so at the cost of transparency about the rationale behind the VALS. More in particular, the typology as such is the product of a commercial enterprise. As a consequence, no information whatsoever is provided to the marketer on the composition of the segment, and the rationale behind the various labels. It is as if one is selling the output of a factor analysis (i.e. the factor labels) without informing the client on the factor loadings of each of the items making up the factors. This is not just unacceptable from an academic point of view, it may also hinder the marketer in further maximising the fit between segment and offer.

4.4 New approaches to psychographic segmentation

The enormous increase of interest in direct marketing has been accompanied by an increased interest in database marketing. Customer databases contain information on relevant aspects that allow consumer segmentation to be undertaken. As Nancarrow, Wright and Alakoc (1999) argued, a major issue in the construction and design of such a database is exactly what consumer variables to include. Important considerations in this regard are which variables increase targeting efficiency and how readily they can be obtained or, more specifically, how easily, cheaply and validly they can be obtained or measured (Nancarrow et al., 1999).

Nancarrow et al. (1999) argued that databases as they are typically used in principle only hold customer or business demographics and transaction information, such as types of products or services purchased, value and frequency. Earlier, we argued that these types of information suffer from a number of drawbacks that severely limit their value as a marketing tool. Personal information, such as data on region, age, gender, income and occupation can be supplemented with other variables that are indirectly linked to

lifestyle, such as postal codes. Other lifestyle-related information can be added by merging information from lifestyle surveys into the database, although this may only yield information on a mere subset of customers in the database. Information about those aspects of consumers' personalities that have a direct relevance to their market behaviour is seldom available.

Recent developments in consumer psychology, however, have opened new venues of assessing consumer personality and behaviour-related variables that may be used to create consumer profiles with regard to web applications. Nancarrow et al. (1999) argued that variables should be sought that are both efficient in terms of predicting relevant aspects, and are easily obtainable. A variable as socio-economic status or income, for instance, may be easy to incorporate in surveys but may be met with resistance: many people will be unwilling to divulge information which they regard as a strictly personal matter. This problem, however, can be circumvented by asking respondents to list the occupation of the head of the household: this variable is also easy to ask, is more likely to meet with respondent cooperation and, at the same time, constitutes a good indication of socio-economic status, especially in combination with other variables.

Research by Nancarrow et al. (1999) suggests respondents' birth order to be another potentially interesting variable. Its importance was first noted by Adler (1927), who felt that birth order and relationships with siblings are the most reliable predictors of later behaviour, more important even than such variables as social class or region (Berthoud, 1996). Although an early review of studies examining the effect of birth order on a wide variety of personal characteristics was largely inconclusive (Murphy, Murphy, & Newcomb, 1937), Schachter (1959) reported a series of studies that pointed to dramatic effects of birth order on behaviour in the real world. Schachter found, for instance, that US fighter pilots in the Korean War who were later-borns were more successful in terms of the number of achieved 'kills' than first-borns were. A second study found an above average occurrence of alcoholism among later-borns than among first-borns. Finally, first-borns were found to be more likely to resort to psychotherapy and persevere with it. Furthermore, Schachter (1959) argued that, when feeling anxious or troubled, first-borns tend to seek social means to cope with their anxiety, whereas later-borns are more likely to seek non-social means. Additionally, Nancarrow et al. (1999) argued that first-borns receive more attention from parents in terms of support and control and thus come to rely more on 'social stroking' to reduce anxiety than later-borns do. Based on these results and a meta-analysis by Sulloway (1995), Nancarrow et al. hypothesised that first-borns who are about to make an expensive purchase are more likely to seek social means to reduce their anxiety by consulting others than later-borns are. Their results suggest that this was indeed the case: both before and after a high-anxiety purchase first-borns were indeed more likely to talk to others.

People also differ in their need for information regarding safety precautions and privacy policy of an online retailer. It is interesting to note that many consumers still consider online shopping a risky affair. Online purchases suffer from an aura of various dreaded outcomes, such as credit card abuse, failure of product delivery, poor service, lack of warranties, etc. Hence, research has shown perceived risk to be the most prominent reason why consumers do not shop online (Brynjolfsson & Smith, 2000; Miyazaki & Fernandez, 2000, 2001; Pavlou, 2003). In addition, lack of trust in both the Internet vendors and in the Internet as a shopping channel has been found to play an important role when consumers consider online shopping (Ba & Pavlou, 2002; Hoffman, Novak, & Peralta, 1999; Jarvenpaa, Tractinsky, & Vitale, 2000). Given the prominence of risk perception and lack of trust in understanding why consumers refrain from online

shopping, surprisingly little is known about the effect of risk perception on aspects of online shopping other than the decision to buy in an online or a conventional store. This issue is currently being addressed in a series of experiments in which a predominant consumer self-regulation motive is explored and its impact on web-related behaviour is assessed (van Noort, Fennis, Kerkhof, & Kleinnijenhuis, 2004; van Noort, Kerkhof, & Fennis, in press). More specifically, experimental research has shown that online shopping prompts a so-called 'prevention focus' (cf. Pham & Higgins, 2004): a dominant motive to avoid losses or negative outcomes (van Noort et al., in press). This leads consumers to search for and process web content that is compatible with this motive. More in particular, prevention-focused consumers will look for information that will reassure them and remove the perception of loss from the online interaction. To the extent that web vendors can accommodate this motive, they will be successful, to the extent that they don't, they will lose customers. Hence, in an online context, warranty-information becomes pivotal as well as a clear identification of the Internet vendor, terms of delivery, safety measures with regard to payment, etc. Of course, there are individual differences in prevention focus. Not only will less experienced consumers probably have a more salient prevention focus than their more skilled counterparts, intrinsic differences in prevention focus also exist (i.e. prevention focus as a personality trait, Pham & Higgins, 2004). Nevertheless, this perspective to look at the dominant self-regulatory motives of consumers constitutes a new and promising approach to segmentation and hence to creating user profiles of consumers on the Web. It is innovative in that it is the only approach to segmentation and 'profiling' that considers the dominant motives of consumers as they relate to the online environment. In contrast to the VALS typology, for instance, with its rather general description of several segments, the self-regulation approach is specifically tailored to explain actual consumer behaviour in the online context and to create user profiles based on this interaction between consumer and the Internet.

Interesting in this regard is another, easily obtainable variable, namely the difference between collectivistic and individualistic cultures. Yamagishi and Yamagishi (1994), for instance, found that, contrary to popular views, people in individualistic cultures are more likely to base decisions whether to engage in a transaction with an unknown other on the trust they have in this person, whereas individuals with a collectivistic background are less likely to do so. In such cultures, Yamagishi and Yamagishi (1994) argued, cooperation between business partners is not necessarily a manifestation of trust, but rather a result of contractual, legal and social obligations and constraints. The social costs of a preliminary end to a transaction in collectivistic cultures can be quite considerable, causing people to think twice before doing so. In individualistic cultures, these constraints are largely absent, which forces potential partners to follow their trust judgement. Extending these findings to information use and consumer behaviour, this implies that the need for information about the security of online transactions and privacy policy may depend on the cultural background a person has. Someone from a collectivistic culture, e.g. Japan, may be used to transaction partners living up to their promises to the best of their possibilities and, as such, would be less likely to require knowledge of safety precautions and privacy policy. People from individualistic cultures, such as the United States and parts of Western Europe, however, may feel very different: as they would not expect persons to be bound by social obligations and constraints as collectivists would, they may demand such information to be within easy reach. As online transactions often require products to be shipped internationally, information regarding country of origin or cultural background can relatively easily be ascertained.

4.5 Conclusions

Market segmentation is an important tool in opening up new profitable markets by targeting specific subgroups of customers, as well as retaining one's current customers. Traditionally, segmentation has taken place on the basis of geographic, demographic, behavioural and, sometimes, psychographic information, and can relatively easily be applied to user profiling.

Factors that have been argued to be of relevance to user profiling concern wealth and status of ICT infrastructure in relation to geographic location, implying that the amount of information should be adapted on the base of this variable. Furthermore, it was argued that the age of the user should be taken into account: an elderly person's decreased visual acuity may call for larger font sizes, for example. In addition, elderly users may require more background information about online interactions than young people do, simply because they may be less experienced than younger users who tend to be more technologically savvy.

Another distinction between users that is relevant to user profiling is the division on frequency of use. In the context of relationship, it is especially important to focus on light users, as they are more prone to be tempted by competitors than other groups are. The fact that these competitors are closeby makes extremely high demands on adequate strategies aiming to dissuade them from switching.

The location in which online behaviour takes place may prove to be a factor of importance. Time pressure and presence of colleagues at work are likely increase the need for information that is compact and to the point.

Netpoll's psycho-demographic segmentation technique was argued to convey information that is highly relevant to the implementation of user profiling. If classification of users into profiles is performed properly, then this technique may provide valuable information about users' 'online hang-outs' and demands placed on information, which facilitates the acquisition of new visitors as well as the management of existing relationships.

Unfortunately, these bases for segmentation come with considerable drawbacks. Geographic and demographic bases for segmentation, for instance, do not inform the marketer of the psychological mechanism that may account for the variations in buying behaviour. A drawback of behavioural and psychographic segmentation is that the multifaceted nature of personality has led to confusion as to which facets to measure and use. Also, measuring personality variables reliably and validly has been difficult and expensive and serious research into its effects in the past has yielded contradictory findings.

Despite these shortcomings, several researchers, notably Loudon and Della Bitta (1988), and Foxall and Goldsmith (1988) have remained optimistic as to their potential. The field of user profiling would, in short, benefit greatly if new ways were found to measure psychographic variables in a manner that is reliable, valid, easy and unlikely to cause users to be reluctant to divulge information.

Psychographic variables that seem especially promising are such variables as birth order and cultural orientation, not in the least because these constitute variables that can be easily measured, while at the same time they may be good indicators of aspects of

consumer behaviour such as consulting others when making high-anxiety purchases (in the case of birth order) and demands on security-related information, particularly in an online interaction (in case of cultural orientation). In addition, a self-regulation approach to segmentation might prove fruitful to a better understanding of the behaviour of people on the Web and to segmenting them on the basis of regularities in that self-regulatory behaviour.

5 Aim 3: Influencing and changing behaviour, tailoring⁷

People who visit the Internet site www.drinktest.nl are asked to fill in an online questionnaire with questions about demographics, their health, drinking behaviour and attitudes. After completing this questionnaire, they immediately receive online feedback with a personal advice about their use of alcohol, 'tailored' to their individual situation. This is an example of computer-tailored health communication (Kreuter, Farrell, Olevitch, & Brennan, 2000). In health communication, messages are used to provide people with the information they need to make informed decisions on their health and *persuade* people to adopt healthy lifestyles, participate in disease prevention and screening activities or to adhere to therapy advice. Computer tailoring is increasingly used in health communication. With the use of computers, individual assessment data can be rapidly processed and interpreted to generate customised feedback from a database of messages on a large scale (Kreuter et al., 2000). This makes it possible to reach many people in an individualised way.

Tailoring is not unique to health communication but may also be applied in other communicative situations such as advertising or marketing. In these settings often the terms customisation or personalisation are used, instead of tailoring. This chapter starts with an explanation of what is meant by tailored communication. Next, the theoretical background of tailoring will be discussed. Subsequently, it will be described how computer-tailored interventions are developed and what tailoring strategies can be used; moreover, some examples of interventions will be described and the effects of tailoring discussed.

5.1 Defining tailoring of communication

Tailoring has been defined as 'any combination of information or change strategies intended to reach one specific person, based on characteristics that are unique to that person, related to the outcome of interest, and have been derived from an individual assessment' (Kreuter et al., 2000; Kreuter & Skinner, 2000). According to this definition, tailored health communication differs in two important ways from other forms of health communication: its messages are individually focused rather than intended for a group of people, and these messages are based on an assessment of the unique characteristics of specific persons. Not only demographic characteristics of people are assessed but also characteristics that are related to the health problem of interest, such as the individual's health status, knowledge, needs, beliefs and behaviour.

Communication strategies can be classified according to the extent that messages are: 1) assessment-based, and 2) individualised, as is shown in figure 5.1 (Kreuter et al., 2000).

⁷ Author: E. Taal

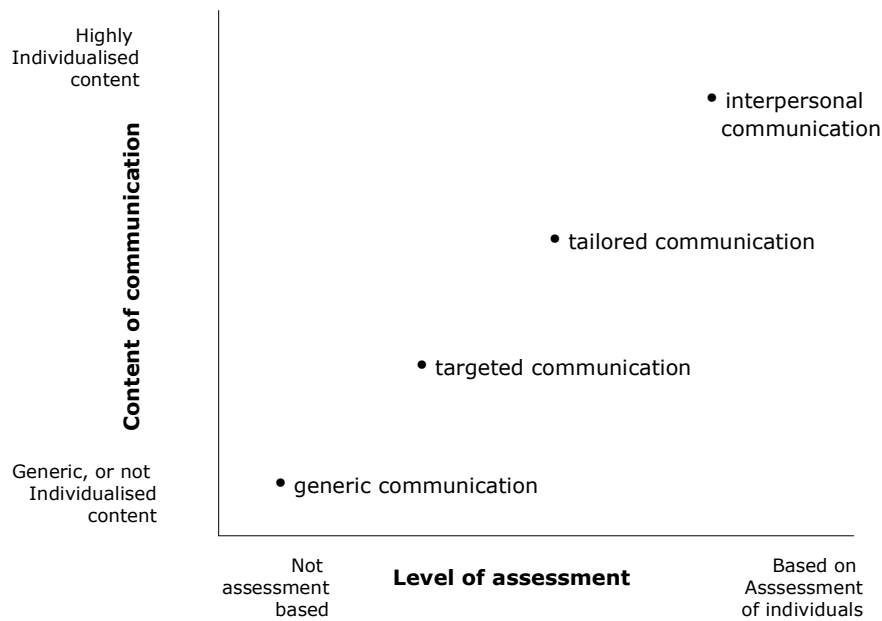


Figure 5.1: Classification of communication strategies by level of assessment and nature of content. (Source: Kreuter et al., 2000)

In mass media campaigns aimed at large populations, often generic health messages are used that do not take into consideration characteristics of specific groups or individual persons. In generic materials, a comprehensive set of information about the health problem of interest is provided. It is not assumed that all people need the same information but that individuals can select the information that applies to them and skip the information that is not relevant. Targeting or tailoring the information can make the presented information more relevant to people and thus lessen the burden of sorting out irrelevant information. Targeted health communication messages are aimed at specific segments or subgroups of a population, usually defined by characteristics shared by the subgroup's members. This approach is based on segmentation principles (see chapter 4). The rationale behind the targeting approach is that subgroups of the population have different health risks and/or differ in their health behaviours (Institute of Medicine, 2002; Kreuter et al., 2000). However, the targeting approach mainly considers demographic and other factors on a group level but does not address individual differences in e.g. health behaviours or attitudes. There is some evidence that targeted health communication is more effective in changing behaviour than generic communication is (Institute of Medicine, 2002; Kreuter et al., 2000).

Tailored communication is in many ways similar to the interpersonal communication approach of counselling. Both approaches have an assessment-feedback structure, but contrary to interpersonal communication, the interactivity of tailored programmes is limited because of the predetermined assessment questions and feedback messages. The advantage of computer-tailored communication above interpersonal communication is the possibility to reach large populations.

In this report we use the term personalisation as a synonym for tailoring. Kreuter et al., (2000) make a clear distinction between tailoring and personalisation. Personalisation, by adding a person's name to a message, can be done to draw attention to a message that is not tailored in other ways to individual characteristics. This approach is often used in direct-mail marketing to promote consumer products.

5.2 Theoretical perspectives on tailoring

In this paragraph we will discuss from different theoretical perspectives why tailored communication may be more effective in changing behaviour than non-tailored communication. First, an information-processing perspective based on the Elaboration Likelihood Model will be described. Next, two behaviour change models, the Theory of Planned Behaviour and the Transtheoretical or Stages of Change Model are discussed.

5.2.1 An information processing perspective

The elaboration likelihood model (ELM), a theory of information processing, provides a theoretical rationale for the effectiveness of tailored communication (Kreuter, Bull, Clark, & Oswald, 1999; Kreuter et al., 2000; Perloff, 2003; Petty & Cacioppo, 1981). The ELM states that persuasive messages can be centrally or peripherally processed. The central processing route requires a person to think critically about a message and the relevance of the presented arguments. Processing of information through the peripheral route requires less cognitive effort of the individual. When people process messages through the peripheral route, they use simple cues in deciding whether or not to accept the message. Peripheral cues can be e.g. the lay-out and appearance of a brochure or Internet site or the physical appeal or verbal style of the communicator. When people process messages peripherally, they rely on simple decision-making rules or heuristics. For instance, an individual may be persuaded by an 'expert' because of the heuristic 'experts are to be believed'. Peripheral or heuristic processing is expected to lead to less stable and enduring changes in attitudes and behaviour than processing of information by the central route. One must take into account that variables that are peripheral cues in many situations can sometimes serve as a persuasive argument (Perloff, 2003). For instance, the attractive appearance of a politician can function as a peripheral cue to vote for him or her in an election, whereas the good looks of a model in an advertisement can be a very persuasive argument to buy a beauty product.

According to the ELM, people are more likely to process information thoughtfully through the central route if it is perceived as personally relevant.

The rationale for tailoring derived from the ELM can be described as follows (Kreuter et al., 1999; Kreuter et al., 2000): a) redundant information is left out; b) the remaining information is more relevant to the receiver; c) more attention is given to relevant information; d) this will lead to more thoughtful consideration of factors that might hinder or facilitate behaviour change; and e) if relevant information tailored to the specific needs of an individual is thoughtfully processed, it will be more useful in helping to enact behavioural changes than non-tailored information will.

Kreuter et al. (2000) summarised results of several studies consistent with these expectations. Compared with non-tailored materials, tailored materials have been found to be read and remembered, be discussed with others, be perceived as interesting, personally relevant, and having been written especially for them. In a study that compared tailored and non-tailored weight-loss materials, it was shown that participants who received tailored materials had more positive thoughts about the materials, positive personal connections to the materials, positive self-assessment thoughts, and positive thoughts indicating intentions to change behaviour than recipients of non-tailored materials (Kreuter et al., 1999). The results of this study suggest, in line with the ELM, that tailored materials led to greater elaboration, and greater elaboration was related to subsequent behaviour change.

5.2.2 The Theory of Planned Behaviour

Before we can develop tailored messages to persuade people to change behaviour, we need to know what the relevant factors are that determine behaviour change.

The Theory of Planned Behaviour (TPB) of Icek Ajzen (1988, 1991) helps us to understand what determinants determine human behaviour. The theory states that the behavioural determinants can be influenced, therefore behaviour can be 'planned'. TPB is the successor of the Theory of Reasoned Action (TRA) of Fishbein & Ajzen (1975, 1980). The succession resulted from the finding that behaviour appeared not to be completely voluntary and under control, as the Theory of Reasoned Action states. This discovery resulted in the addition of the factor 'perceived behavioural control' and the renaming of the theory in the 'Theory of Planned Behaviour'.

The TPB (figure 5.2) assumes that behaviour is mainly determined by someone's intention to perform that behaviour. This intention is in turn determined by his or her attitudes towards the behaviour, subjective norms and perceived behavioural control (Ajzen, 1991). Attitudes are based on beliefs people have about the consequences of behaviour and the evaluation of the desirability of these consequences. Subjective norms are based on what people believe that relevant others think what they should do and their motivation to comply with those relevant others. Perceived behavioural control refers to people's perceptions of their ability to perform a given behaviour. Other factors such as demographics and personality characteristics are regarded as more distal determinants of behaviour and intentions. These factors influence intentions and behaviour through the more proximal determinants: attitudes, subjective norms and behavioural control.

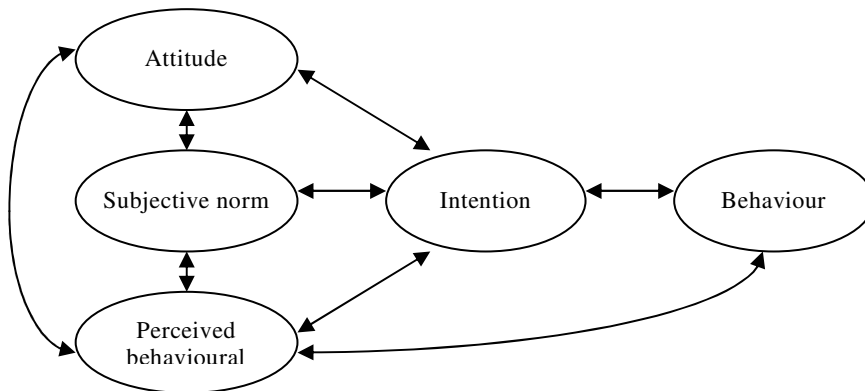


Figure 5.2: The Theory of Planned Behaviour (Ajzen, 1991)

According to the TPB, messages aimed at persuading people to change certain behaviours should be aimed at influencing the relevant attitudes, subjective norms and control beliefs. Targeting interventions to certain demographic subgroups are expected to be less effective than tailored interventions that take into account individual differences in attitudes, norms, control beliefs and intentions, because demographic factors are supposed to be more distal determinants of behaviour (Brug, Oenema, & Campbell, 2003).

5.2.3 The Transtheoretical Model

The Transtheoretical Model or Stages of Change Model assumes that health behaviour change is a phased process (Prochaska & DiClemente, 1983). It was originally developed

to explain the process of smoking cessation, but has also found to be useful for other types of behaviour (Skinner & Kreuter, 1997). This model not only considers whether a person has or has not performed a health behaviour, but also the degree to which they have considered performing the behaviour and whether they have continued performing the behaviour. The Transtheoretical Model suggests that in changing behaviour people move through a series of stages as depicted in figure 5.3.

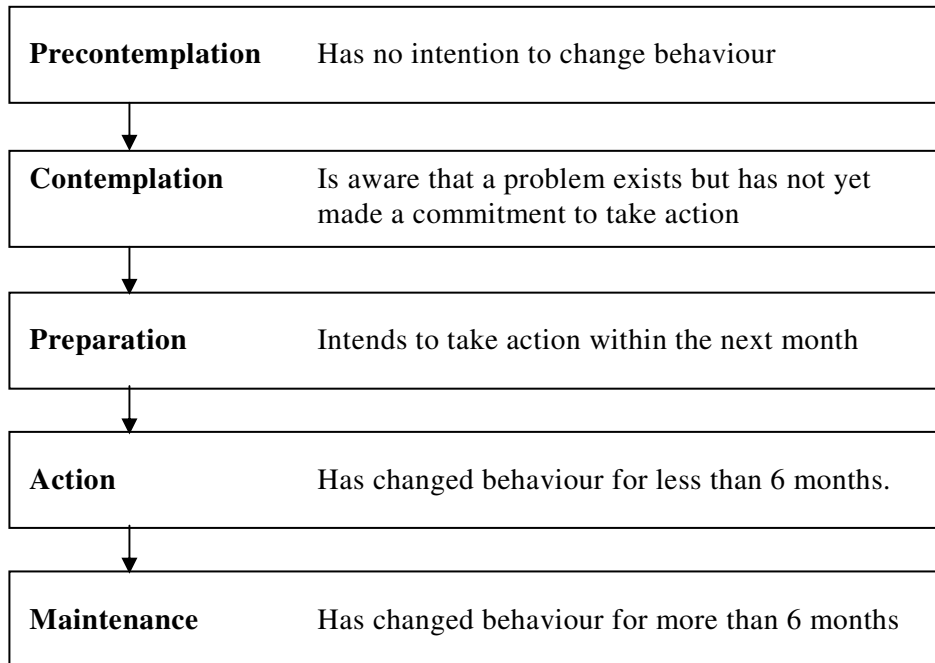


Figure 5.3: The Transtheoretical model

The model suggests that people in different stages behave in different ways, with different factors influencing their behaviour. For instance, people in precontemplation and contemplation stages have to be convinced that changes in their behaviour will be beneficial to them, hence they are most in need of attitudinal information. People in the preparation stage already have positive attitudes and may move to the action stage by information aimed to influence their control beliefs, whereas people in the action and maintenance stages probably gain most from normative information. So, different kinds of persuasive messages will be necessary for people in different stages of change to move them closer to changing their behaviour. This means interventions will probably be more effective if they are tailored to the stage of change and attitudes, norms and control beliefs of the intended recipients (Brug et al., 2003; Kreuter et al., 2000; Skinner & Kreuter, 1997).

5.3 The development of computer-tailored interventions

The process of developing tailored interventions can be divided into three phases: 1) preparation; 2) tailoring; and 3) integration (Figure 5.4; Dijkstra & de Vries, 1999).

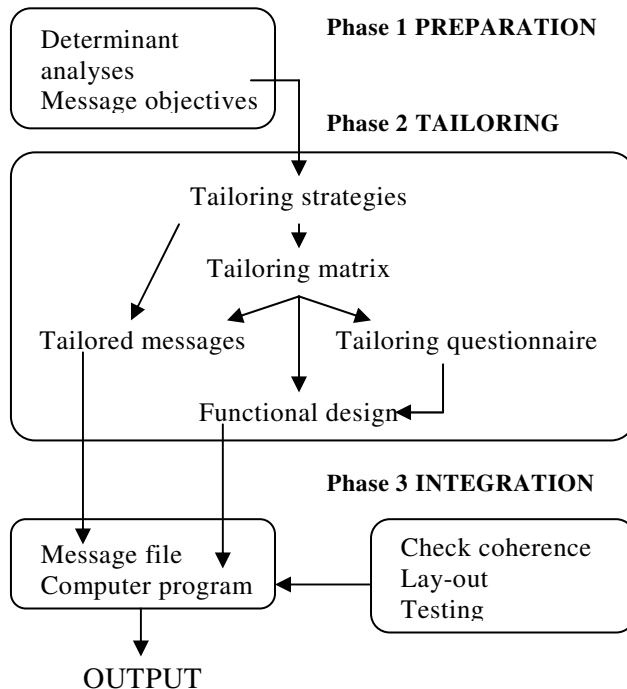


Figure 5.4: Three phases in the development of computer-tailored interventions (Source: Dijkstra & De Vries, 1999).

5.3.1 Preparation phase

In the preparation phase, interventions have to be formulated based on the study and analysis of the determinants of the behaviour in question. Theoretical models such as the TPB and the Transtheoretical Model can serve as a useful framework for the general description of relevant behavioural determinants. To determine the actual relevant determinants of the behaviour in question empirical data are needed.

5.3.2 Tailoring phase

In phase 2, the tailoring phase, it has to be decided to what extent people with different characteristics need different messages. A tailoring matrix has to be designed that specifies the individual characteristics to which the messages have to be adapted. Based on this matrix, the tailoring questionnaire is developed which assesses the individual characteristics that are used to tailor the messages. A database with messages is developed from which the computer program can compose the individually tailored interventions. To enable the computer program to compose the interventions, decision rules are written for the choice of messages based on the individual characteristics of the recipients. In the messages that are designed, two types of tailoring strategies can be used: adaptation of messages and feedback.

Adaptation of messages

Four message adaptation strategies can be distinguished (Table 5.1).

Adaptation strategies

1. Adaptation to knowledge of an individual
2. Information relevant to a specific individual
3. More information
4. Adaptation to stage of behaviour change

Feedback strategies

1. Feedback on cognitive and behavioural states
 2. Normative feedback
 3. Positive feedback
 4. Feedback on personal characteristics
 5. Empathic feedback
 6. Ipsative feedback
-

Table 5.1: Tailoring strategies: adaptation and feedback

These adaptation strategies can be used in relation to the individual characteristics that are used in the tailoring matrix. A message can be adapted to the knowledge an individual already possesses of the topic of interest. Leaving out redundant information can make the information offered more relevant and may increase attention to the message. For example, information about the risks of taking certain medication when pregnant is only relevant to women and not to men. By omitting redundant information, there is more room for extensive relevant information.

A fourth strategy is to adapt messages to the stage of behaviour change of an individual. For example, trying to persuade an individual, who does not believe smoking is very bad for his health, to stop may lead to counter argumentation (“My grandfather is 95 and he has smoked all his life”). Defensiveness should be avoided by adapting the message to the low motivation of this individual, e.g. by providing information about the health effects of smoking and try to move the smoker from the precontemplation phase to the contemplation phase. However, a smoker who is in the contemplation phase does not have to be convinced that it is good to stop smoking, but should be persuaded to take action, e.g. by planning a quitting date.

Feedback

Dijkstra and de Vries (1999) distinguish six types of feedback strategies that can be used in tailored communication (Table 5.1). The first five strategies have in common that feedback is given on a characteristic state of an individual. Feedback on cognitive and behavioural states concerns information provided to an individual about the scores on the tailoring questionnaire (“You state that you believe drinking is...”; or “You state that you smoke...”). In normative feedback, an individual’s state is compared with that of comparable others. Positive feedback is a reinforcing reaction to a desired state (“You haven’t smoked for a month. Fantastic!”). Reinforcement should be provided about desired states, but detrimental states might be better ignored. To personalise the message and enhance curiosity in and involvement with the message, information on personal characteristics (e.g. name, drinking history) can be provided. Caution must be taken that personal characteristics that are fed back to personalise the message do not interfere with the persuasive power of the message. The fifth type of feedback is the use of empathic reaction to an individual’s state; for example, showing understanding for someone’s worries about health problems.

A sixth strategy is ipsative or progress feedback. This strategy can only be used when multiple assessments and multiple tailored messages are used. In these cases, feedback can be given on cognitive and behavioural changes between assessments.

5.3.3 Integration phase

In the integration phase, the separate tailored messages must be combined into a logically consistent text for each individual. To test whether the computer system designs coherent texts, simulated data from non-existing individuals can be used.

In this phase, the lay-out has to be developed depending on the way the tailored information will be presented. In tailored health communication often printed materials are used, such as newsletters or booklets. However, not only print media can be used but also audio- or videotapes, telephone, Internet sites, e-mail or computer kiosks.

5.4 Applications of tailoring

Tailoring has most often been used in health communication to create individualised printed educational materials aimed at persuading people to adopt healthy lifestyles and participate in screening activities (Kreuter et al., 2000). Tailoring is also increasingly used in patient care (Bental, Cawsey, & Jones, 1999). More and more tailored applications are being developed that use web-based interfaces instead of printed materials (Bental et al., 1999; Oenema, Brug, & Lechner, 2001). In this section, first tailored printed communication will be discussed. Next, we will discuss web-based tailoring of health communication which is the most relevant to this report. Finally, we will discuss the application of web-based tailoring outside the field of health communication and health care.

5.4.1 Tailoring of printed materials in health communication

Tailoring of printed educational materials has been shown to be more effective than non-tailored materials in helping people to stop smoking, in promoting healthy dietary habits, to increase levels of physical activity, and to improve health screening behaviours such as breast cancer screening and taking cholesterol tests (Kreuter et al., 2000). Most studies have only compared tailored with generic materials. The effect of messages might depend on the level of tailoring that has been applied. Prochaska et al. (1993) studied self-help programmes for smoking cessation and showed that printed materials that were tailored to stages of change, individual beliefs about the pros and cons of smoking, normative beliefs and self-efficacy, were more effective in helping people to stop smoking than messages that were only adapted to the stage of change (precontemplation, contemplation, action, maintenance, or relapse), a 'targeted' approach. Brug et al. (1999) showed that nutrition education letters that were tailored to respondents' consumption of fat, fruit and vegetables and their dieting attitudes, perceived social support and dieting self-efficacy, were not more effective than letters that were only tailored to the consumption of fat, fruit and vegetables.

In patient care, tailoring of printed educational materials has not been applied very often (Bental et al., 1999). Materials are mainly tailored to information from medical records and not to assessments of individual behaviours and beliefs (Bental et al., 1999).

5.4.2 Web-based tailoring of health communication

Most computer-tailored interventions to date have used printed materials. However, with printed materials only part of the potentials of computer tailoring can be used, because interactivity and immediate feedback are not possible (Brug et al., 2003). Web-based computer tailoring offers interactivity and can provide immediate feedback on answers to online assessments. It can also offer additional supportive resources, such as online discussion fora, opportunities to ask questions by e-mail, or weblinks to other sources of information and support. Up to now, little is known about the effectiveness of web-based tailored interventions in persuading people to change their health behaviours, compared with generic health messages or tailored printed health messages.

Oenema, Brug and Lechner (2001) investigated the potential of a web-based tailored nutritional intervention in comparison to a written generic nutrition information newsletter in an experimental situation. Tailoring was based on an assessment of food consumption and awareness, attitudes, self-efficacy and stages of changes regarding dietary habits. Immediately after the intervention, participants in the web-based tailored intervention group appreciated the intervention better and had higher intentions to change to healthier diets than participants in the control group who received generic information. However, effects on dieting behaviour and longer term effects were not studied.

McDonald et al. (2004) evaluated a computer kiosk-based tailored intervention to promote household safety behaviours for parents of young children who visited a hospital-based primary care practice. Tailoring was based on an assessment of knowledge, beliefs and behaviours related to injury prevention. The study showed that follow-up intervention group parents had more knowledge about child injury prevention and performed more preventive behaviour than parents in the control group who received no information.

Brunsting and van de Putte (2004) showed a significant change of stage of drinking behaviour among visitors of www.drinktest.nl who received a drinking advice tailored to their stages of change, attitudes, normative beliefs and self-efficacy related to alcohol use. However, this was a non-experimental case study without a control or comparison group.

Bental et al. (1999) reviewed tailored patient information systems. Most of the web-based or kiosk-based systems that have been developed mainly tailor on information from medical records. Evaluations have shown that patients are very positive about these systems but the effects on health behaviours of patients and on patient care have not yet been evaluated.

An example of a new web-based tailored patient information system is the website of the Dutch Arthritis Association (www.reumafonds.nl). Patients who want information about their illness fill in a short online questionnaire that asks about their age, gender, work situation, the disease they have, and the stage of this disease. They then receive tailored online information about their disease.

In the aforementioned examples the tailoring is still limited. Combining information from medical records with assessments of patients' knowledge and beliefs about their illness and treatment, adherence to treatments and self-management behaviours to inform and support patients has great potential to improve patient care. Patients could be provided with personal websites where they can find information tailored to their specific

situation and where ipsative feedback can be continuously given on changes in their medical situation.

5.4.3 Application of web-based tailoring in other fields

The application of tailoring on stages of change, personal beliefs and behaviours has shown to be a promising strategy in health communication to persuade people to change their behaviour. It has been shown that many people are willing to answer questions on their health behaviour and attitudes.

Possibly, tailoring can also be a valuable strategy in other situations, e.g. marketing. Many organisations and companies already gather information about individual consumer behaviour in order to make customised offers. The information gathered is mainly 'hard' data available from transaction records (e.g. when purchases are paid with a credit card or a loyalty card) (Norberg & Dholakia, 2004).

Information about personal preferences and attitudes needed for individual tailoring can only be collected by asking people to provide it. Although people are often willing to fill in assessments about their health attitudes and behaviours, it is likely that they are cautious to disclose information about their personal preferences and opinions of commercial organisations (Norberg & Dholakia, 2004). When organisations request personal information from consumers, these may provide incomplete or inaccurate information, e.g. because they fear misuse of information. Incomplete or inaccurate information might lead to tailored offers that do not match the expectations and preferences of the consumer.

5.5 Conclusions

Tailoring printed messages on the specific characteristics of individuals has been shown to be a promising strategy 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 left out 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 weblinks 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.

Most studies that have evaluated tailored health messages have compared these with generic messages. We do not know from these studies to what level messages should be tailored. Is tailored communication always more effective than communication targeted at segments of the population? How can we make use of the advanced interactive functions of web-based technologies to enhance the effects of tailored interventions? Is tailoring always more effective, or does the effectiveness depend on the kind of behaviour or the population? One of the most important questions is what variables we should tailor on. In most tailored interventions, behaviour change is seen as a rational

process and messages are tailored on individual beliefs about the behaviour in question, e.g. based on the theory of planned behaviour and/or the stages of change model. Messages can be tailored on the stage of change, actual behaviour, knowledge, attitudes, normative beliefs and/or control 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 personal emotions are also taken into account. For instance, in health care when patients have to make decisions on their treatment, when they feel frightened or anxious about the course of their illness or the side-effects of the treatment might well be important aspects for tailoring information.

6 Condition 1 for effective use of user profiling: Access⁸

6.1 Introduction

Particular characteristics of users are crucial conditions for the acceptance of profiling applications as user-friendly and trusted systems as well as for the initial and continued use of such applications. These conditions are twofold. The first condition is *access* to the digital technology that is used for profiling applications. The concept of access relates to the problem of the so-called *digital divide*: one part of the population has access to the new technology whereas the other does not. The second condition is *interest, motivation and preference* to adopt user profiling as a tool in electronic information retrieval, communication, transactions, registrations and entertainment. An investigation of these conditions is able to produce answers to the following research questions:

- What kinds of users are most likely to accept and use applications of user profiling by means of information and communication technology?
- What kinds of users will probably not accept and apply these applications because they do not have access to the means or are not able or motivated to work with them?

In order to answer these questions, this chapter will summarise the state of the art of digital media user research predominantly focused on computer and Internet applications. A comprehensive causal model of factors explaining the acceptance and use of profiling applications by individual users will serve as a framework and guideline for a concise presentation of the most important empirical and theoretical results in this field so far. The chapter will finish with the identification of a number of potential adoption groups considering user profiling, from those most likely to adopt these applications to those less likely to do so.

In this chapter, usage and user characteristics will be emphasised. In Chapter 8 the other determinants of acceptance will be stressed, such as the characteristics of the innovation (applications of user profiling) and social system variables (the organisational and wider social context).

6.2 Main concepts

Mostly, user characteristics are framed in terms of *demographics*. However, this approach is much too superficial to explain the actual and probable acceptance and use of applications such as user profiling. The static and simplistic approach in terms of individual attributes fails because the full appropriation of technology is:

- a *behavioural process*, with preconditions and consequences, itself consisting of a number of phases of appropriation: motivation to use the technology, physical access, skills required and actual usage;
- a *relational affair* of suppliers/organisations offering the technology and others using it; some using it sooner and more frequently than others, thus appropriating the technology for themselves (J.A.G.M. van Dijk, 2005).

⁸ Author: J.A.G.M. van Dijk

In this chapter, a relational approach of technology acceptance by different groups of users is elaborated: relations among users with different characteristics and relations between users and suppliers/organisations. In the context of user profiling, it is important to frame ICT applications that employ user profiles as a *means of relationship* between a particular manufacturer and consumer, a provider and a client, a government agency and a citizen, a management and an employee. Only in this way will one be conceptually prepared to find the most probable compromise for the conflicts of interest attached to user profiling: the informed consent of both parties. Moreover, the appropriation of the technology itself is also a relational affair between opposing social categories that are known to be unequal both in social position and new media access: younger and older generations, males and females, management and employees, the rich and the poor, those with high and low educational levels, with many or few credentials, ethnic majorities and minorities, etc. All research on the contemporary digital divide shows that the first-mentioned of these categorical pairs are also the first to appropriate the new technology and use it for their own interests (see J.A.G.M. van Dijk, 2005, for a summary).

As an anchor for the present chapter, we use an adaptation of a comprehensive causal model is new media use and acceptance. The original model is published in J.A.G.M. van Dijk (2000, 2003, 2004, 2005) and (partially) tested by University of Twente and Sociaal Cultureel Planbureau (Social and Cultural Planning Office) researchers in multivariate analyses and structural equation modelling in L. van Dijk et al. (2000), de Haan (2003), and de Haan and Iedema (in press). See below for the model adapted to the purpose of this chapter.

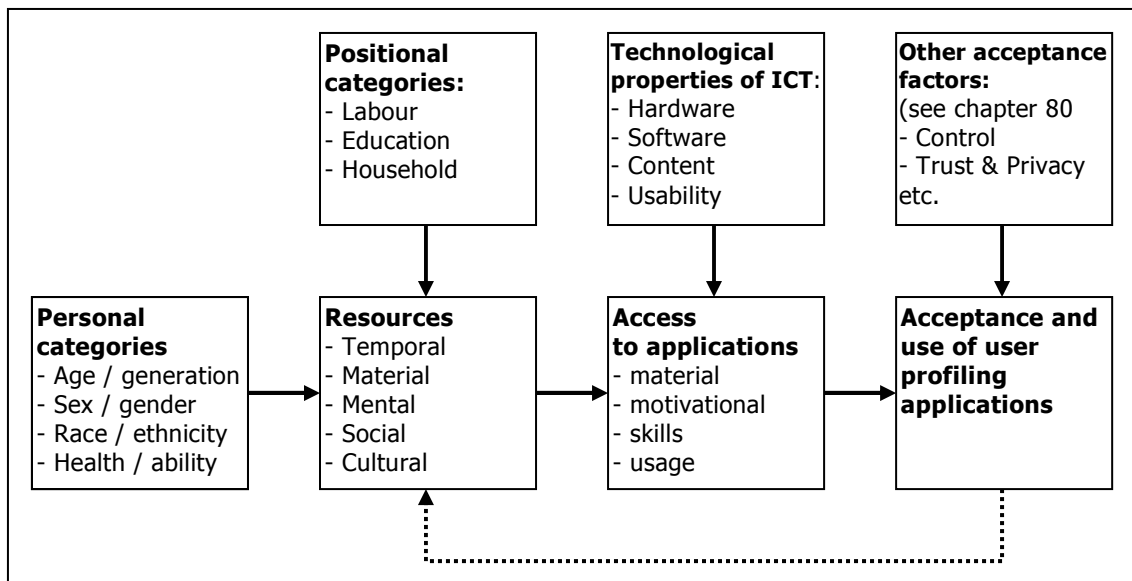


Figure 6.1: Comprehensive Causal and Sequential Model of Factors Explaining the Acceptance and Use of Profiling by Individual Users

As figure 6.1 shows, access to applications depends on the technological properties of the applications and the resources of the user. In turn, these resources depend on a number of user characteristics that can be divided into two categories: *personal*, referring to individual characteristics, and *positional*, referring to the relationship of an individual with other individuals or organisations. The individual user characteristics are considered as not having a direct relationship with *access*, but a relationship via the *resources*, which thus becomes a central concept in the model.

6.3 Main theories and Research overview

All theories and research about access to and acceptance of digital media applications show that the most important personal and social demographics correlate with access and acceptance: age, sex/gender, race/ethnicity, health/(dis)ability, work or occupation, educational level and household composition. See for example NTIA (1995, 1998, 1999, 2000, 2002), Pew Internet & American Life Project data (2000-2004), UCLA Internet reports (2000, 2001, 2003) for American data and L. van Dijk et al. (2000) and de Haan (2003) for Dutch data.

The Dutch Sociaal Cultureel Planbureau (Social and Cultural Planning Office) tries to explain the correlations revealing wide gaps of access with a theory of resources or economic, social and cultural capital, whereas J.A.G.M. van Dijk (2005) adds a relational view on social and informational inequality following Tilly (1998). A combination of both theoretical approaches is able to explain the inequality of access (the ‘digital divide’) by different possessions of resources that in turn can be explained by a number of personal and positional categorical inequalities (see top-left part of Figure 6.1). The categories and resources will serve as the framework for the first part of the overview.

6.3.1 Personal categories

Age is the most important determinant of access, and probably also the acceptance of user profiling. All available research data reveal the highest levels of access among people under 30, moderate access between 30 and 40, subsequently declining and even falling rapidly with senior citizens over the age of 65. People between 50 and 65 caught up somewhat between 2000 and 2005.

These data suggest that acceptance of user profiling will probably be higher among the young generations than it will be among older generations. This projection is reinforced by user preferences and attitudes to the new technology and to privacy. Young people care less about their privacy in using these media (Heuvelman, van Dijk, & Peeters, 2004). Conversely, older generations have a more critical attitude to the digital media, inspired by higher levels of distrust and fear, and on average they have more problems with potential privacy violations. As this study (and others) hold, the technology of user profiling is still loaded with issues concerning trust and privacy.

Gender is the second most important personal characteristic. In terms of physical access the gender gap of digital media access has almost closed in the western high-tech countries (according to all references mentioned above), but not in other countries and certainly not in the developing countries. However, gender inequalities in skills and usage of these media are still large in western countries too (J.A.G.M. van Dijk, 2003, 2005; J.A.G.M. van Dijk & Hacker, 2003). Combined with the category of age, it is likely that elderly and middle-aged women will be among the last groups to adopt user profiling.

Race, or rather **ethnicity**, is certainly among the most relevant characteristics that affect resources. In all countries with minority ethnic cultures, they appear to have less access to the digital media than the majority culture (according to all references mentioned above). This gap is caused by lower income and education and by fewer speaking and writing skills in the common language and/or English. Moreover, many applications are biased in favour of majority cultural views, values, expressions, symbols and ways of thinking.

(Dis)ability is recognised as a fourth personal characteristic of importance. People with motor, sensory or cognitive disabilities have significantly less access to the digital media than fully functioning people do (Madden, 2003; NTIA, 2000, 2002).

6.3.2 Positional categories

Perhaps even more important than personal characteristics are the *positional* characteristics of individuals: the characteristics that relate people to one another and to organisations.

Education is a strong predictor of computer and Internet access and use. Those who did not become acquainted with digital media whilst at school (roughly those over 35), and who did not recover from this lack of experience later on in their professional life will most likely be found on the wrong side of the digital divide. Education is a prime motivator and big differences in practice will occur between types of education. At some schools, primarily remedial drills (i.e. filling in databases, learning word processing and making simple calculations) are practiced with computers, whereas at others advanced intellectual skills are learned (Warschauer, 2003; Wenglesky, 1998). In this way different digital skills are learned (see below) with more or less competencies to engage in user profiling.

Employment. Having a job or a particular occupation is also a reliable predictor of the use and acceptance of computers and the Internet. Having to use computers for job-related tasks (data entry, text processing, etc.) may well compensate the lack of computer use in one's education (as many people over the age of 35 have experienced). People who are employed are much more likely to have access to computers and the Internet with the opportunity of experiencing e-commerce and e-government, such as filling in forms and questionnaires and being a candidate for user profiling, than are the unemployed and those having a manual or executive job requiring no, or very simple and temporary dealings with the computer.

Household composition is the final important positional category to be mentioned here. Sharing a household increases the chances of having a computer and Internet connection. Households with schoolchildren are the biggest computer owners of all. In the Netherlands even ethnic minority households (on average, low in income and education) had a computer penetration of 97% (!) in 2001 if they had schoolchildren (de Haan & Huysmans, 2002b). In general, households of more persons, and especially those with children, are the best candidates for user profiling.

6.3.3 Resources

Personal and positional categories determine the *resources* people have. Having these resources directly affects the sequential four types of access (see 6.5) and the indirect cause of the probability that users will accept and employ user profiling applications.

Temporal resources seem to be the most interesting for access to user profiling applications as they determine the length of daily digital media use. Two considerations may be taken into account:

- Since in many applications efficiency may be the most important motive for applying user profiles, people with little time are the most likely to accept and use these applications. People with greater temporal resources (pensioners, the unemployed) are not candidates for accessing and employing user profiling applications, whereas people with a full agenda might well profit the most, and therefore be good candidates.
- However, taking advantage of user profiles for the sake of efficiency also demands an investment in time. Time is needed to fill in questionnaires, boxes of preferences, etc. Busy people will not be particularly motivated to do this.

Material (financial) resources remain a condition of computer access in general and user profiling in particular, even in rich countries (J.A.G.M. van Dijk, 2003, 2005; L. van Dijk et al., 2000). People with sufficient purchasing power form the most preferred target group for suppliers and the most probable user group of consumers of user profiling. Those with little purchasing power might be interesting to profile as (high-)risk groups (not paying, etc.). Data on financial resources might even be important for applications employed to detect crime and tax fraud.

Mental resources (knowledge and technical skills) are important for computer access. People with general technical skills acquired early in life, such as the contemporary ‘digital youth’, will have much fewer problems with motivational access, digital skills access and advanced uses of digital media. Even if applications are designed for a maximum usability (‘sense and simplicity’) – which is often not the case – they may need extensive user instructions and help before they can be used. And even if people can use an application (e.g. retrieve information correctly), it might be desirable that they understand how the application works (e.g. understand how the information is produced and selected by the system so as to be able to judge its reliability). It is questionable, however, whether users are *willing* and *able* to understand technical systems to that extent.

Social resources (networks and relationships) are an often neglected source of access to the digital media (J.A.G.M. van Dijk, 1999, 2005). The motivation to purchase or install a computer, Internet connection, advanced mobile phone and the like stems from the social environment of the potential user. The social network also helps with technical problems, with the acquisition of digital skills and with drawing attention to particular applications. It will also be vital for the acceptance of user profiling. In such a network, both positive and negative experiences with profiling will spread rapidly.

Cultural resources (cultural goods, preferences, lifestyles and interests or hobbies) are crucial determinants for digital media access and the acceptance of user profiling. Access and profiling have to fit a particular lifestyle that is characterised by a medley of cultural goods and experiences, attitudes to achieve things in life and make new discoveries. The most important new media user types discovered in a 2002 German survey were the ‘young wild’, the ‘experience minded’, the ‘achievement minded’ and the ‘new culture minded’, whereas the ‘classical culture minded’ (the ‘haves’ of many traditional cultural goods), and especially the ‘home loving’, the ‘solitary/retired’ and even the ‘sociable, active’ (in traditional ways), simply hated computers and all types of new media applications offered (van Eimeren, Gerard, & Frees, 2002). Most likely, these conservative lifestyles will reject all efforts required to participate in user profiling (as they are the most important non-response groups in contemporary surveys).

6.3.4 Access

An important assumption made in this chapter is that there are different, subsequent and accumulative types of access as a process of complete appropriation of new technologies. It is obvious that the problem of the digital divide is not solved as soon as (almost) everyone has a computer and Internet connection. People should also be motivated to use the technology, they should have the necessary skills and they should adopt a multitude of applications appropriate for them. This is expressed in the model in figure 6.2, which can be seen as an elaboration of the 'Access' box in figure 6.1.

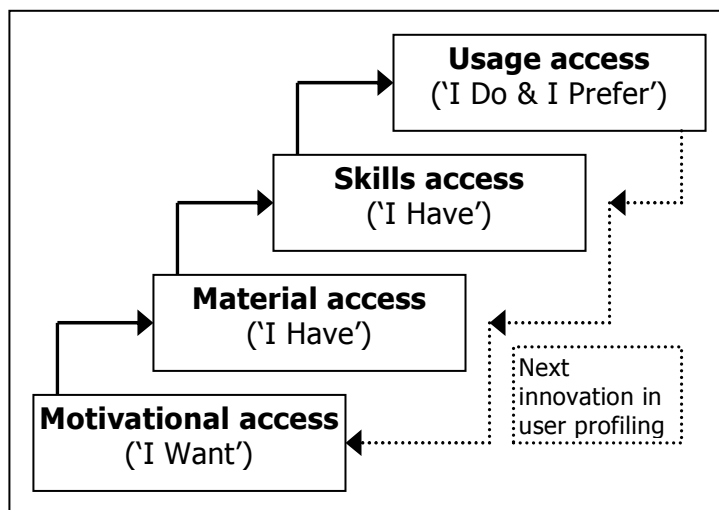


Figure 6.2: Model of digital access (J.A.G.M. van Dijk 1999, 2003, 2004, 2005; J.A.G.M. van Dijk & Hacker, 2003).

Some people are insufficiently motivated to attempt to obtain access. These 'want-nots' consist of a diverse collection of intermittent users, dropouts, and net-evaders. Currently, they comprise about half of the people in the developed countries without access. The other half are the 'truly unconnected', who have no choice about computer use or few opportunities to choose. The dividing line between these two groups is not distinct, and it is constantly shifting. The reasons supplied in surveys and interviews for this lack of motivation are both emotional and rational. They include no need for use or for significant usage opportunities, no time or liking, rejection of the medium, lack of money, and lack of skills. The people with a lack of motivation to gain access to computers and networks should not be accused of being backward. Instead, the finger should be pointed at the current flaws in the technology concerned: lack of user friendliness, usefulness, attractiveness, affordability, and safety. (J.A.G.M. van Dijk, 2005, p. 43).

6.3.4.1 Motivational access

Behind motivational access problems often lie specific mental or psychological problems. Computer anxiety, 'button fear' and technophobia are much more widespread than the ICT industry tends to think. Technophobia – fear or hatred of computers or any computerised technology – was found among 30,3% of new Internet users in the U.S., declining to 10.8 % among (even) experienced Internet users (6 years and more) in 2002 (UCLA, 2003, p.25).

To these general problems of motivational access, specific problems of motivation, trust and security concerning user profiling should be added. They are discussed in other

chapters of this report. Particularly, they refer to the rejection of the medium referred to in the aforementioned quote. Many 'want nots' distrust computers and their applications because to them they are obscure machines, they lack any knowledge of computer networking and they have heard too many negative stories about them (whether or not in the media).

6.3.4.2 Physical/material access

Contemporary digital divide discussions and research are completely pre-occupied with physical access to the technology. In this chapter, a broader concept is used: material access. This concept also contains conditional access to the new media (payment and access permissions) but allows for many more details in the observation of physical access (advanced versus basic equipment, software and applications).

If we track the evolution of basic and simple access to computers and the Internet, we will observe that between 1985 and 2000 all gaps in physical access in terms of age, education, income, employment and ethnicity increased in the Western world (see: J.A.G.M. van Dijk, 2005, pp. 51-51). The only exception was the gender gap that (almost) closed during this period. From about 2000 onwards, the other gaps have also started to decrease as the 'top categories' reach a stage of saturation. However, large differences remain between the top and the bottom social categories. At present, we do not know how much these gaps will close in the developed world – in the developing countries they are still widening. However, recalling the history of the telephone that needed seventy years to reach the current (almost) universal distribution, it will take several decades to reach the same distribution for computers and the Internet. In 2004, about one-third of the population, even in the most advanced high-tech societies, had no physical access at home or at work (the Scandinavian countries and the Netherlands score better).

It goes without saying that physical access, and depending on the application also conditional access, is a prerequisite for user profiling applications.

6.3.4.3 Skills access

Digital skills are even more unequally divided among the personal and positional categories mentioned in 3.3.1 and 3.3.2 than motivation and physical access are (J.A.G.M. van Dijk, 2003, 2004, 2005; J.A.G.M. van Dijk & Hacker, 2003). Digital skills are the skills needed to operate computers and their networks, to search and select information in them and to use them for one's own purposes. In this definition, three types of digital skills are mentioned:

- *Operational* skills are the skills to operate computer and network hard- and software. Operational definitions are to be found, among others, in the seven modules of the European Computer Driving Licence (see: <http://www.ecdl.com/main/index.php>).
- *Information skills* are the skills to search for, select and process information in computer and network sources. They consist of formal information skills, such as being able to handle the file structure, information structure and hyperlink structure of computers and the Internet, and of substantial information skills such as learning to search for information in a systematic way in electronic sources, learning to make selections, learning to edit information oneself and being able to apply quality assessments of information sources. See van Dijk (2005, pp. 81-86 for the complete list).

- *Strategic skills* are the capacities to use the information sources as the means for specific goals and for the general goal of improving one's position in society (on the labour market, in education, in households and in social and sexual relationships).

Research worldwide indicates that operational skills access is more unequally divided than physical access (e.g. de Haan, 2003; NTIA, 2002; Park, 2003). Categories with no or few digital skills are (large) majorities of people over 55, unemployed women over 35, and people with low levels of education and income. These figures may even be optimistic as most data are derived from self-assessments in surveys. The actual skills observed in real tests of capabilities are far poorer (see e.g. Hargittai, 2002).

The situation is even more alarming with respect to information skills (see J.A.G.M. van Dijk, 2005, pp. 85-86). Often these are not even sufficiently mastered by journalists and scientists: information seekers *par excellence*.

However, the worst results are to be expected with strategic skills. Unfortunately, exactly these skills are paramount to the appropriate use of profiling agreed on by providers and users. Most are not able to judge whether they should comply with a particular profiling request, which personal data they should reveal and what they should refuse, let alone react to the unsolicited attempt of profiling. Most users simply have no idea how the Internet works, how mobile telephony services work, how database management works, what operations are carried out with their data, what file coupling means, what is safe and what is not, let alone the practices of data mining and knowledge discovery in databases. The average user not only lacks such technical knowledge, but also the (bureaucratic) competency to judge which input will result in which organisational action by providers. The world behind user profiling is a completely obscure and abstract world of networks, databases, organisational procedures and marketing strategies.

These observations regarding skills access have important consequences for the feasibility of 'informed consent' in user profiling. Open and informative information policies and explanations have to be created that are accessible to everyone. Even so, a substantial role for intermediaries and advisers of individual users will become inevitable.

Usually, digital skills are not learned through formal education, but in practice, through trial and error and in communities of work, school and interest (de Haan & Huysmans, 2002b; J.A.G.M. van Dijk, 2005). Only senior users are taking considerable advantage of computer courses and computer books in adult education. For others, daily user experience will result in basic digital skills.

6.3.4.4 Usage access

Physical access does not emulate the actual use of digital media. The actual use and usage time of computers and the Internet is much more unequally divided. For example, whereas the gender gap in terms of physical access has almost disappeared, in 2000, Dutch males used computers and the Internet at home more than twice as often as their female counterparts, according to time diary studies. For telephony, the opposite occurred (Breedveld & van den Broek, 2001). All known social and cultural differences between personal and positional categories of people become visible again in the actual use, the usage time and the usage diversity of digital media. They strongly depend on the different kinds of resources mentioned above.

Actual use, the usage time and the usage diversity are the most important usage variables to be investigated in this field, together with the increase in broadband use and creative use (not only consuming but also producing information for computers and the Web). As the relevant data are far too numerous to be presented here; we refer to de Haan and Huysmans (2002a) and Huysmans, de Haan and van den Broek (2004) for the Netherlands; Katz and Rice (2002), Wellmann and Haithornthwaite (2002), for the United States; and J.A.G.M. van Dijk (2005, pp. 106-116) for a general overview.

In the context of user profiling, usage diversity seems the most important variable. As ICT merges more and more in society and everyday life, so too is usage diversity increasing daily among all the personal and positional categories discussed above. This is quite normal for an individualising and differentiating society (J.A.G.M. van Dijk, 1999). However, distinct media user types and structural inequalities of use (usage gaps) are also appearing in this way.

Considering the new media, the following user groups can be distinguished on account of their particular lifestyles and preferences (de Haan & Huysmans, 2002a; McQuail, 1997; van Eijk & van Rees, 2002; van Eimeren, Gerard, & Frees, 2001):

- information seekers;
- communicators;
- commerce- and service-oriented people;
- entertainment and infotainment seekers.

Obviously, all users reveal these preferences up to a certain extent, but for particular groups of users one or two of them are dominant. This has a particular relevance to user profiling applications as they are more or less designed for one of these purposes. Most of them are designed for transactions of e-commerce and e-government. Others are a kind of information agent. Others, still, improve message exchanges (for instant messaging, teleconferencing or dating) with intelligence.

A *usage gap* appears between one part of the population using advanced applications of information communication and commerce, with a large potential demand for advanced user profiling (niche markets), and another part of the population using simple applications of information, communication and commerce and primarily entertainment with a potential demand for simple and accessible user profiling (mass market), see van Dijk (1999; 2003; 2004; 2005). This gap has important consequences for the adoption groups of user profiling to be expected. See the Conclusions below.

6.3.5 Technological properties of ICT (user profiling applications)

Evidently, the technological properties of user profiling applications, i.e. the properties of the hardware, software and services concerned, also have an impact on potential access. These properties are accessibility, usability and user-friendliness. Accessibility is the relatively complicated conditional or initial access to user profiling. Usability refers to the objective structure and design of the user profiling application more or less enabling use. User-friendliness concerns the subjective behavioural aspects of daily use appropriate to the needs of users such as the ease, enjoyability and gratification of use. These properties are discussed in (van Kuijk & Jansen, forthcoming).

6.3.6 Acceptance and Use (the ultimate effect)

All previous factors affect directly or indirectly the acceptance and use of user profiling in general and particular types thereof. On the basis of survey data and with multivariate techniques of analysis, it is possible to predict the acceptance of certain profiling applications by particular groups of users within large margins of error. However, this can only succeed with a broad concept of access that includes the user needs for these applications and the drive to start using them at all (motivational access).

The conclusions in section 6.6 will identify three broad classes of potential adopters to start this research with. These classes can be specified by taking a particular application of user profiling into account. This could be done with every new application to be developed and marketed. It will, moreover, inspire continuous future research.

6.3.7 Feedback: user profiling as a new resource

Figure 6.1, which formed the basis for this chapter, shows a feedback connection between the use and acceptance of user profiles on the one hand, and the resources on the other. This feedback line is essential, because the ultimate goal for users who accept the profiling application is to turn this into a new resource that saves time (temporal), saves on expenses (material), adds to the knowledge of one's own needs, lifestyle and position in life and society (mental), helps to improve social resources (online and offline contacts, communities, user groups) and contributes as a cultural resource to the quality of life (e.g. as a tool to organise the complicated average day of work, care, rest, leisure time and mobility). If these goals are insufficiently achieved by the special effort and risk (misuse) of using profiles, they will simply not be adopted and fail on the market.

6.4 Conclusions

The available research, summarised in this chapter, suggests that in general 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

6.4.1 The information elite

About 15% of the population in developed high-tech societies is working with the new media for a large part of the day. A 'broadband elite' is developing that uses about 10 different applications of ICT daily (Pew Internet, 2000-2004). They are active information seekers and communicators, strongly motivated to use the digital media. They have complete and multi-channel physical access, and they are experienced users who possess the required operational, information and strategic skills. They might be the 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.

6.4.2 The electronic middle class

About 55 percent (the majority) of the population in developed high-tech societies has access to the digital media, usually only one or two channels (at home and at work). They have a more focused motivation to use them. They have moderate operational and information skills. They have few strategic skills. 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 the informed consent to user profiling.

6.4.3 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. To solve this problem would require additional effort in providing basic public access sites (of computers and the Internet) with service staff and/or similar applications of user profiling on the basis of old media (print media, telephony and face-to-face service).

7 Condition 1 for effective use of user profiling: Trust⁹

7.1 Introduction

In April 2003, first-time visitors to on-line bookstore Amazon.com were greeted with the message that the retailer ‘...continues to show remarkably high levels of customer satisfaction. With a score of 88 (up 5 %) (according to the American Customer Satisfaction Index)¹⁰ it is generating satisfaction at a level unheard of in the service industry...’. Information such as this is commonly used in the world of e-commerce. Displaying objective test results aims at increasing trust, similar to, for instance, the use of testimonials: users may reason that if so many other people have positive experiences with this online retailer, this company can be trusted, and engaging in a transaction is likely to yield positive results for them as well. As only first-time visitors receive this message, this constitutes a simple example of user profiling: providing such trust-enhancing messages aims to counter potentially low trust of a specific group of potential customers, i.e. first-time visitors. Returning visitors, on the other hand, are not exposed to it. First-time customers of an online retailer such as Amazon.com are especially prone to feelings of uncertainty. They may be ignorant of the company's security measures, causing them to become reluctant to enter their credit card number, they may fear that their personal data will be made available to third parties, or they may be unsure whether the purchased product will meet their quality standard.

Apparently, displaying positive test results is deemed especially effective for establishing new customers' trust. Once these have been persuaded to take the first step and complete an online transaction, Amazon's arrows are aimed at maintaining, instead of merely establishing a relationship, which may well require different means.

This chapter aims at defining and characterising one of the most important prerequisites for the implementation and acceptance of user profiling: trust.

User trust is influenced by various sources. Trust in relation to user profiling will be influenced by:

- the users' trust in the organisation he or she is dealing with;
- the users' trust in the services or products that the organisation is providing;
- trust in the systems the organisation uses to interact and communicate with the user, including the user profiling system;
- communication (messages and interaction) that establish and reinforce trust; and
- the user's trust propensity in general, a personality trait.

This chapter will address the following questions: what is trust and what is its role in the relationship between organisations and their audiences, specifically in users' interactions with e-commerce and web service organisations? What forms and sources of trust influence users' decisions to use ICT applications in general? What types of user-related information are relevant to establishing and maintaining user trust?

⁹ Author: P.W. de Vries

¹⁰ See: www.theacsi.org/

7.2 The role of trust

Trust is generally considered to be the mechanism that reduces feelings of uncertainty or risk that customers, clients or citizens might experience. Specifically, trust effectively limits the vast number of possible future interaction outcomes to only a relatively small number of expectations. This may allow for a more careful investigation of the remaining options, thus reducing both uncertainty and risk of the actor (Luhmann, 1979).

Trust is a relevant issue especially in the service industries, both off- and online. After all, one important reason for people to ask the help of a service provider is that they do not have the knowledge or skill to do it themselves. A lawyer, for instance, is typically hired by people who do not hold a law degree themselves, and are thus insufficiently familiar with legal matters. This may seem a straightforward deal: in return for money, companies or people deliver a service that clients cannot perform or produce themselves. The downside, however, is that clients' infamiliarity with the subject matter makes it virtually impossible for them to judge whether the service provider does a good job. The uncertainty that results from the inability to monitor the service process can only be compensated by a sufficient degree of trust of the client in the service provider.

Online interactions, such as e-commerce transactions, are also characterised by uncertainty. The exchange of the consumer's money and the requested goods or service, for example, do not necessarily occur simultaneously, which creates the opportunity for the seller to behave opportunistically by not fulfilling his or her part of the deal. Because the online seller will probably remain anonymous, this behaviour is largely beyond the control of the consumer (Grabner-Kräuter & Kaluscha, 2003). Therefore, if the consumer does not trust the seller to be honest, he or she will probably not order a product online. The same goes for online information systems. A low level of trust may cause online advice or results of information queries to be met with scepticism, if not to fall on deaf ears. Thus, a user with a low trust level must reduce uncertainty or risk by seeking additional information elsewhere to corroborate the information provided by the seller, or the transaction will not take place.

A sufficient level of trust is necessary for transactions to run to a satisfactory completion, and for information to be duly accepted, whether in an on- or offline (social) context. Segmenting users on the basis of their degree of trust may therefore be useful. Providing specific groups of users or individuals with trust-enhancing information, for instance, may cause them to initiate or continue an interaction, which may result in an actual purchase or an effective information exchange.

The implementation of user profiling, however, also has major implications for user trust. User profiling implies requesting, collecting and storing user information, which very probably causes additional uncertainty. Users may feel highly uncomfortable about supplying the requested information and unsure as to whether their privacy will be honoured or violated. A privacy statement that is misinterpreted by the user, or simply overlooked, may make them feel exposed to the risk that their personal data are out in the open, for everyone to take advantage of.

This chapter provides an overview of current notions on the subject of trust. First, attention will be devoted to trust models that have proved influential in trust research, followed by a discussion on possible differences between trust between human partners on the one hand, and trust between a human and a non-human actor (application or system) on the other. Finally, the role of direct and indirect information in the formation

of trust will be examined. Suggestions for further research will be made in the final paragraph.

7.3 Forms of trust: general, social, interpersonal and organisational trust

The concept of trust has been studied in various disciplines, ranging from economics and political sciences to personality research and social psychology. Each of these disciplines may treat the concept differently with regard to whether trust is seen as a dependent, independent or interaction variable, whether it is static or dynamic, or whether it is studied on the institutional, group or individual level (for an overview see Bhattacharjee, Devinney, & Pillutla, 1998; Earle, Siegrist, & Gutscher, 2002; Rousseau, Sitkin, Burt, & Camerer, 1998).

Even within the discipline of psychology, different theories of trust and its constituents exist. The concept of **general trust**, or generalised interpersonal trust, for instance, relates to the trust people have in most other people, or in strangers, and is treated as a stable characteristic of both individuals and groups (Earle et al., 2002). As such, general trust can be seen as a necessary prerequisite for other forms of trust to develop; without a general sense of trust, a user would not be willing to enter interactions of any kind. From a user profiling perspective, it would be worth knowing what this stable trust level of an individual or group is, in order to predict whether interaction-specific trust may be built up; low general trust simply provides an insufficient feeding ground for other types of trust.

Contrary to general trust, **social trust** is based on social relations and shared values. The actors at which this type of trust is directed are more concrete than with general trust; specifically, they are persons or organisations that are perceived to share the trustor's values (Siegrist, Cvetkovich, & Gutscher, 2001). Social trust, a focus of attention in risk management research, involves little or no interaction, and is often a 'one-shot' affair (Earle et al., 2002). Value similarity may be inferred after shooting only a quick glance at the trustee; simple cues, such as skin colour or gender may be enough for the trustor to infer that if the trustee looks similar, he or she may also hold similar values. If user profiling is aimed at establishing social trust, the profile should contain information about the relevant values that the profiled person holds about social issues, persons and organisations. It seems difficult, however, to determine which of the many values that people hold are relevant in a particular interaction between organisation and user, and what the correct way should be to convey these values.

Interpersonal trust is established and maintained in and through interaction and communication. It is a kind of trust much studied in social psychology where it is treated as an expectation of the other's behaviour that is specific to the interaction (Bhattacharjee et al., 1998). This expectation is argued by some to be based on perceptions of the other's competence and honesty (Renn & Levine, 1991) or goodwill (Yamagishi & Yamagishi, 1994). If a user profile contained the information on the basis of which interpersonal trust can be predicted, it should be fed with information about the interactions and communication occurring between the partners; in this case the organisations on the one hand and the users on the other. This means that the user profile needs to be updated continuously.

Different labels for and distinctions between types of trust are found in the literature of the different fields. However, most are analogous to the typology described above.

Zucker (1986), for instance, used the term **characteristic trust** to denote trust based on social relations, comparable with Earle et al.'s (2002) concept of social trust. In addition, Rotter (1980) distinguished between **dispositional** and **relational trust**, the former relating to others in general, the latter based on interaction with a particular other. **Propensity to trust**, proposed by Mayer, Davis and Schoorman (1995) as a stable characteristic affecting the likelihood that someone will trust, may be thought of as a general willingness to trust others, and as such, it bears a strong resemblance to general trust.

Of particular importance to the implementation and acceptance of user profiling are **organisational trust** and **system trust**, as interacting with an organisation online involves both the organisation itself, as well as a system which enables this interaction. Obtaining tax refunds online, for instance, involves the tax agency as the organisation that enables and controls online interactions, as well as several interfaces that enable clients to submit information about their income and deductible expenses electronically, or use calculation models to determine the financial consequences thereof.

Both organisational trust and system trust can, to a certain extent, be viewed as special cases of social or interpersonal trust, as will be discussed in the next sections. Whereas the application of such trust antecedents as value similarity and intentionality to organisations is an easy step to make, for trust in systems this step is more difficult. After a brief discussion of the antecedents of organisational trust, it will be argued, however, that applying human-like concepts to systems is by no means far-fetched.

7.4 Trust in organisations

Researchers differ somewhat in their opinion on whether **trust in organisations** should be considered identical to or different from trust in persons. Most, however, appear to treat organisational trust as a special case of interpersonal trust. Mayer, Davis, and Schoorman (1995), for instance, presented a model in which the trust of one party in another is determined by the trustee's **ability**, **benevolence** and **integrity** (as perceived by the trusting party). The impact of each of these factors was argued to be moderated by the trustor's **propensity to trust**. As such, someone with a low trusting propensity would require more evidence of the trustee's ability, benevolence, and integrity before engaging in an interaction with the other party, than someone with a high propensity would.

Doney, Cannon and Mullen (1998) noted the importance for trust-building of perceived **intentionality**, i.e. an assessment of the trustee's motives, and **capability**, the former conforming to Mayer et al.'s benevolence and integrity, and the latter to ability. In addition, Doney et al. noted other processes that are relevant to the formation and building of trust, namely **calculative**, **prediction** and **transference processes**. The first process relates to the trustor calculating costs and benefits in case the trustee proves to be untrustworthy¹¹. Prediction refers to the trustor's belief that the trustee's future actions can be predicted from past actions (also see Rempel, Holmes & Zanna's (1985) predictability, in the following section). Finally, transference processes entail trust to be transferred from a known entity to an unknown one.

¹¹ For most researchers and theorists, however, this assessment of costs and benefits represents the element of risk that is a prerequisite for, rather than an antecedent of trust; trust implies a willingness to be vulnerable, i.e. to engage in a situation typified by an unfavourable cost-benefit assessment.

This transference of trust may be especially important for user profiling. If transference indeed happens, then the likelihood that a user accepts his or her data to be gathered and entered into a user profile probably depends on the trust he or she has in the organisation. For example, a user may decide to buy groceries online via the site of a particular supermarket, and allow a user profile to be constructed because he or she has the opinion that the brick-and-mortar version of the supermarket represents a decent company. Likewise, the positive impression of the national tax service may be reason to submit tax statements online instead of by conventional mail, and allow personal data to be collected to speed up next year's submission.

Zaheer, McEvily and Perrone (1998) defined interpersonal and interorganisational trust as different constructs. In doing so, they conceptualised organisational trust as a type of trust that partly overlaps the categories of social and interpersonal trust: it has an organisation or group as its referent, as does social trust, and at the same time is based on interactions, as is typical of interpersonal trust.

From the perspective of user profiling, this overlap of organisational with interpersonal and social trust, suggested by Zaheer, McEvily and Perrone (1998), is of major importance. It implies that the trust of a user in an organisation can be based on inferred **value similarity**, as well as on direct interactions. Thus, one may perceive a health insurance company as untrustworthy, simply because a value such as making profit may not match that of the user, who is merely interested in receiving good coverage for medical expenses. The situation may be different, however, if an organisation covers medical expenses without the objective of making a profit. At the same time, judgements of organisational trust may also be based on direct interactions, with positive experience leading to increased trust, and negative experiences to decreased trust. In principle, these two bases of trust could both enhance or attenuate one another. It is up to researchers in the field of organisational trust to determine which base of trust will prove to be superior.

7.5 Trust in systems

The concept of **system trust** can also be seen as a special case of interpersonal trust. Like interpersonal trust it refers to expectations about the behaviour of a specific other, rather than a group of others or strangers. In the case of system trust, however, the referent is not a human partner or a group of humans, but rather an object, i.e. the system with which a user is in interaction.

The concept of trust as it is studied in the context of (online) human-system interactions relies to a large extent on trust models that originated in personality (Rempel et al., 1985) and sociology research (Barber, 1983). Whereas the former strictly deals with interpersonal relationships, albeit applied by others to a more technical domain, the latter specifically deals with both humans and non-humans as interaction partners.

Rempel, Holmes and Zanna (1985) presented a theoretical model that describes how interpersonal trust develops in close relationships. According to them, there are three stages through which trust between people develops, namely predictability, dependability, and faith. **Predictability** begins when each partner observes the other's behaviour. If one partner repeatedly fulfils his or her promises, the other will view this as predictability. Predictability may be influenced by a number of factors. Among them are the consistency of recurrent behaviour, stability of the social environment, and knowledge of functional reinforcements and restraints on behaviour. When the partner has witnessed enough consistently performed behaviour, trust moves to the next stage,

dependability, which refers to the other's general traits instead of the predictability of specific behaviour. After a partner is seen to behave predictably, he may be labelled dependable or reliable. The final category, **faith**, evolves as partners grow confident that their relationship will last. Decisions on faith represent a shift from expectations about a partner's current traits to expectations about his or her general motives concerning the present and future value of the relationship.

Barber (1983) also noted the importance of observed behaviour, be it human or system behaviour. He defined trust as a taxonomy of three specific expectations, namely expectations of persistence of natural and moral social orders, technically competent role performance, and fiduciary obligations and responsibility. **Expectations concerning the persistence of natural and moral social orders** entail beliefs that others are, and will continue to be good or decent. The **expectation of technically competent role performance**, Barber argued, is not only central to trusting others who perform actions or services for us, but is also at the very heart of trust in human-system interactions. Finally, **expectations of fiduciary obligations and responsibility** represent a basis for trust when the user's technical competence is exceeded by the interaction partner, or referent's, or is unknown to him or her. Unable to form a judgement based on the referent's competence, the user is forced to rely on the referent's moral obligation not to abuse the power he has. As such, it offers the possibility to trust an unknown hospital physician based on the thorough educational system that this person is assumed to have undergone, and the high ethical standards this is accompanied by.

7.5.1 Trust in other people versus trust in systems

Generally, models of system trust used by many researchers do not explicitly distinguish between human and non-human actors. Some researchers, however, have put this assumed equality of interpersonal trust and system trust to the test.

Lerch and Prietula (1989), for instance, investigated how attributions of qualities to agents, i.e. a human or a system providing financial management advice, influenced trust on the part of the operator. They found that **source pedigree**, i.e. the source being a human novice, a human expert or a computer, played an important part in the formation of trust. Interestingly, their results suggest that although participants' levels of trust in an expert system did not differ from their trust in a human novice offering the same advice, the information used to form these judgements differed. In addition, although trust in the human expert's advice was greater than in the human novice, the information used seemed to be the same. Specifically, if the source was human, participants did not seem to use their judgements of agreement with each individual piece of advice to update trust levels when an unpredictable, negative event occurred. Contrarily, agreement judgements regarding such an event were incorporated in their final trust judgement if the source of advice was an expert system.

Waern and Ramberg (1996) conducted two studies in which they compared trust in advice given by humans or by an expert system but found contradictory results. In a study requiring participants to solve problems in a matrices test, they found that human advice on the correct answer was trusted more than computer advice, whereas in a study concerning car repair problems they found opposite results. Waern and Ramberg argued that these findings may well be explained by differences in the **particular task** and participants' **background knowledge**. Compared with the first study, the task in the second study was more difficult and required domain-specific, rather than general,

knowledge about cars, which may have caused participants to place more trust in computer-generated advice than in advice from humans.

Lewandowsky, Mundy and Tan (2000) argued that in process control tasks a person's trust in automation is positively linked to **system performance**, in the same way as when humans operators interact with a human partner. Different from control delegation between humans, however, Lewandowsky et al. argued that switching to automatic control implies that the person delegating control still bears ultimate responsibility for the quality of the process' outcomes. Because this responsibility is recognised by system operators, the occurrence of errors may affect their self-confidence. Contrarily, in situations in which humans interact with one another and switch control of task performance, the responsibility is shared. This distributed responsibility may cause a human operator's **self-confidence** to be more resilient to the occurrence of errors. Indeed, in their study Lewandowsky et al. found that self-confidence remained largely unaffected by errors during manual operation in the human-human condition. They also found no evidence indicating that people are more reluctant to delegate control to a human collaborator than to automation, and concluded that '...the moment-to-moment dynamics of trust between people who share tasks within a complex environment resemble those observed between human operators and automation' (2000, p.121).

Earle, Siegrist and Gutscher (2002) proposed a dual-process model of cooperation between partners in interaction, in which a distinction between the concepts of trust and confidence is made. According to them, trust is a relationship between an agent and another (presumed) agent, and is based on **social relations, group membership, and shared values**. Confidence, on the other hand, concerns agent-object relations, and is proposed to be a belief concerning the occurrence of expected future events, based on experience or evidence. Another difference, according to Earle et al. is the centrality of **emotions** to trust, and the attempt to avoid them in confidence.

7.5.2 Attributing intentionality to systems

Central to some of the ideas mentioned above is the contention that the difference between trust in humans and non-humans lies in the **attribution of concepts as traits, reasons, intentions, and values** to the entity-to-be-trusted. Lerch and Prietula (1989), who found that the same advice was trusted more when it was given by a human expert rather than a computer or a human novice, argued that this phenomenon was caused by users' attributing a trait as dependability to human experts, but not to human novices and expert systems. In a similar vein, Lewandowsky et al. (2000) argued that trust between humans and automation is asymmetrical, because people may not be willing to attribute values, motivation and personal goals to machines. Although Earle et al. (2002) did not exclude the possibility that people may take certain objects to be agents, their distinction between confidence and trust appears to favour a similar distinction between trust in other humans and trust in non-human entities based on the inference of agency; given sufficient interaction, people attribute agency (value similarity, intentions, reasons) to other people, but probably not to systems. Interaction with systems will probably not encourage judgements to go beyond the mere prediction of behaviour from objective evidence, such as perceived causes.

However, empirical evidence has yet to show that the attribution of concepts such as values, intentions or goals allows for a valid distinction between system trust and interpersonal trust. One could argue that the development of system trust to the point where such attributions are made is a mere matter of **interaction duration and**

complexity. Rempel et al. (1985) argued that the level of dependability is reached only after the trustor has observed a sufficient amount of predictable behaviour. As such, interpersonal trust is assumed to develop from observation of objective information (the other's behaviour) to a stage in which attributions are made, i.e. dependability. In the light of this notion, the contention that trust in systems seems to be based on different information than trust in humans, as implied by Earle et al. (2002), may not necessarily stem from conceptual differences, but rather from differences in developmental stages. In other words, system trust may indeed be based on different information than interpersonal trust, but perhaps only because the former has not yet had the opportunity to evolve into the same developmental stage as interpersonal trust. Not only may our interactions with systems be less frequent than those with other people, but trust-relevant information may also be more available in social interaction than in human-system interactions (for a discussion, see Ronald & Slipper, 2001). Differences in the frequency of interactions as well as the amount of trust-relevant information available per interaction may cause system trust to develop more slowly than interpersonal trust. Given sufficient time and interaction, system trust may also become based on trait inference, i.e. that users attribute traits such as dependability to the systems they interact with. An important implication of this possibility for user profiling would be that this stresses the need to distinguish between regular and extremely experienced users. If the attribution of traits indeed becomes more likely with experience, that would imply that users do not adjust their opinion or judgement of a system on the basis on anomalies encountered while in interaction, but instead rely on their attributions, which may be formed on the basis of considerable interaction experiences and hence are relatively stable.

Attribution of causality to system behaviour, which is supposed to build confidence rather than trust (according to Earle et al., 2002), can probably only develop when the system's inner workings are relatively straightforward. Systems that are considerably more complex may make it hard, if not virtually impossible, for a user to establish cause-and-effect relations. If causes remain obscure to users, they may turn to less objective information such as emotions, and may be less reluctant to attribute traits such as dependability, competence and agency to the system, thus transcending Rempel et al.'s (1985) stage of predictability.

The observation that system trust comes down to predicting future outcomes after observation of behaviour, does not exclude the possibility that, given time and complexity, it will evolve to a stage analogous to trust in a human actor. The fact that most people are aware that systems cannot actually hold traits, values or intentions in the same way humans do, is by no means detrimental to this conclusion. In fact, research by Nass and Moon (2000) clearly indicates that individuals mindlessly apply social rules and expectations to computers, although every single one of them articulated awareness that a computer is not a person, and does not warrant attributions or treatment as such. For instance, after being exposed to a virtual agent with social cues (in this case a Korean or Caucasian video face), persons with the same ethnical background as the virtual agent perceived it as being more attractive, persuasive, intelligent and trustworthy, compared with participants with a different ethnicity, just as they would have if they had been dealing with a real person. As Nass and Moon put it: 'Once categorised as an ethnically marked social actor, human or nonhuman was no longer an issue' (2000, p.86).

Indeed, value similarity and other human-like concepts as a basis for trust may not be restricted to interpersonal relationships. Similar phenomena can be found outside this context. It may, for instance, be comparable to selectivity, a principle thought to underlie trust in media, as some media researchers argue (Kohring & Kastenholz, 2000). Thus,

one may trust the content of a particular newspaper because its perceived social or political stance matches one's own, which becomes apparent from the selection of and reporting on news items. In a similar vein, the output of relatively complex systems may depend on a hierarchy of decision rules; a route planner, for instance, may favour a particular strategy for determining routes during rush hours, whereas another strategy is selected in the quiet evening hours. A change in the prioritisation of decision rules that causes output patterns to change, could be interpreted by the user in the same way he or she interprets changes in the behaviour of another human to be indicative of intentions.

The inference of such traits as intentions, however, is little understood. It is possible, therefore, that users interpret the available information differently than intended by the designer of a system or webpage, and this may have dire consequences for the implementation and acceptance of user profiling. Acceptance of user profiling may be greatly enhanced if companies or organisations are explicit and honest about what they intend to do with the accumulated user data, and provide justifications for doing so, instead of leaving the inference of intentions up to the user.

7.6 Direct and indirect information as a basis for trust

A trusting person, Yamagishi and Yamagishi noted '... overestimates the benignity of the partner's intentions beyond the level warranted by the prudent assessment of the available information' (Yamagishi & Yamagishi, 1994, p.136). In other words, trust involves the extrapolation of insufficient information in order to reduce uncertainty. Indeed, trust is not blind; trust requires whatever information is available in order to evolve. Whereas Rempel et al. (1985) focused exclusively on observed behaviour as a source of information, Barber (1983) specifically noted the possibility that trust-relevant information can be obtained through other channels as well, an idea that was picked up by researchers such as Muir (1987), and Lee and Moray (1992). Following Barber's ideas, they incorporated the system's designer and his assumed motives and intentions in system trust theory. This means that system trust can be established by trusting the person or organisation behind the system. Users build up their view of the trustworthiness of the organisation behind the system by communicating and interacting with that organisation, but also by events and experiences outside the context of the use of the system.

The view that both direct and indirect information can influence system trust, was further elaborated on by Numan (1998; Also see Arion, Numan Pitariu & Jorna, 1994). Similar to other researchers, they considered direct information to be first-hand knowledge, derived from one's own experiences about what the system is good at and what not, allowing for assessments of **consistency of performance**, or **predictability** (cf. Zuboff's (1988) 'trial-and-error experience', Lee and Moray's (1992) 'performance' and Rempel et al.'s (1985) 'predictability', for instance). Indirect information, on the other hand, constitutes information about the system that is obtained from others, i.e. information that is not based on one's own direct interactions with a system. Numan, for instance, proposed that trust can be based on **observing someone else interacting with a system**. Behaviours that can be interpreted as trusting behaviour may induce the observer to conclude that the system is trustworthy. Likewise, one could base trust on 'second-hand experiences', i.e. the experiences of others, in the form of recommendations or reported interactions with a system.

7.6.1 Indirect information

Particularly in first-time interactions, the information available on which to build trust might be minimal; novice users, after all, do not have an extensive body of interaction experiences at their disposal. According to some theorists, such a lack of prior interactions implies that initial trust is low (for instance, see Blau, 1964), which would provide a major obstacle to adoption or acceptance of user profiling, or system advice and e-commerce, for that matter. After all, deciding to engage in interaction with an unknown e-commerce company requires a high level of initial trust to reduce uncertainty. As McKnight, Choudhury, and Kacmar (2002) argued, however, the mere fact that a potential consumer has not yet had any interaction with an online vendor does not necessarily mean that initial trust is low. In initial relationships, McKnight et al. argued, people may use whatever information is available; as such, initial trust can be influenced by a host of factors, such as **perceived website quality, reputation, third party endorsements**, e.g. by a professional medical association in the case of a medical website, but also on an individual's propensity to trust others (McKnight, Cummings, & Chervany, 1998). In addition, McKnight et al. noted the importance of institution-based trust, which refers to a belief in technical and legal structures upholding proper online conduct (2002). If such information yields sufficient initial trust, a first-time consumer may be persuaded to engage in a transaction (also see McKnight et al., 1998, in the context of organisational relationships).

7.6.2 Direct information

Direct experience is gained by actually interacting with the system and may, over time, yield information about the system's behaviour. Repeatedly yielding satisfactory output, the system may be perceived as predictable, consistent and stable, thus enabling users to anticipate future system behaviour (e.g. see Lee & Moray, 1992; Rempel et al., 1985, in the context of interpersonal trust; Zuboff, 1988). Also relevant in this context, however, may be that direct experiences seem to play a role in a more subtle way. Woods, Roth, and Bennett (1987), for instance, found that when the technicians that took part in their studies did not wait until unequivocal right/wrong feedback became available to them to form a trust judgement, but rather followed their own judgements on the plausibility of the system's 'line of reasoning' as it was fed back to them. Apparently, people sometimes judge the quality of system advice on feedback regarding the process that led to that advice.

Lee and Moray (1992) hypothesised that besides automation **reliability**, also **process** should be considered as a trust component of direct experiences. Process is used to denote an understanding of the system's underlying qualities or characteristics. Whereas in humans this might encompass stable dispositions or character traits, in a more technological domain this could be interpreted as rules or algorithms that determine how the system behaves. Others have come up with mental models to denote understanding of a system (e.g. see Carroll & Olson, 1988; Sebrechts, Marsh, & Furstenburg, 1987).

Such understanding of how a system arrives at a solution to a problem presumably increases user trust. One aspect important in this respect is **consistency**; users may conclude there is a reason for the system's process feedback to show a particular recurrent pattern. For example, someone using a route planner may request advice on a number of different routes and subsequently find that the system persists in favouring routes that use a ring road to those that take a shortcut through the city centre (or vice versa). The user may, subsequently, infer that although the shortcut through the centre

seems faster, the system may disregard it because it is prone to dense traffic. Although such explanations do not necessarily match the system's actual procedures, they may facilitate the formation of beliefs about what is happening 'inside' the application. Indeed, research by Dzindolet, Peterson, Pomranky, Pierce, and Beck (2003) has shown that participants working with a 'contrast detector' to find camouflaged soldiers in terrain slides, trusted the system more, and were more likely to rely on its advice when they knew why the decision aid might err, compared with those who were ignorant of such causes. Although Dzindolet et al.'s (2003) studies provide additional, empirical support for the idea that a sense of understanding is beneficial to trust, their participants did not obtain this information from their own direct experiences with the device, but received it from the experimenter. Research by de Vries, Midden and Bouwhuis (de Vries, 2004) strongly suggests that users gain understanding by actually observing system behaviour, as both Lee and Moray's (1992) concept of 'process' and mental model theory entails.

These findings support the conclusion drawn in an earlier section that it is important for user profiling to be accepted if users understand what will happen with the personal data they are requested to enter for the sake of creating a user profile.

7.7 Discussion

Trust is an important concept in situations that are characterised by uncertainty and risk. In fact, it determines whether consumers are willing to extrapolate what little information they have and subsequently place themselves in a vulnerable position. As such, trust is highly relevant to all actors who wish to construct user profiles in order to enhance the efficiency of online interactions by tailoring the information given to them.

Users may indeed feel they are putting themselves in a vulnerable position by allowing their existing user profile to determine what information they will be presented with. One of the risks they run concerns their perceived privacy; in the eyes of users, their data may be sold to third parties who may use it to send them personalised promotion material or unsolicited e-mails. As a result, users may have the unpleasant feeling that a part of them is 'out in the open' for everyone to take advantage of. Worse still, the constructed profile may contain information about such issues as a user's health that, if it ends up in the hands of health insurers, it may make it impossible for him or her to get cheap medical insurance. Another risk concerns the idea that users may feel deprived of information that they would have had at their disposal if they had had a different profile. It could happen, for instance, that users, whose profiles indicate that they are not novices, automatically skip information that is considered only relevant to novices.

However small these risks might seem in the eyes of the proponents of user profiling, they are real and relevant; feelings of risk that are not compensated by trust may cause the users to seek their information elsewhere, provided they actually have a choice. If an alternative is not readily available, however, insufficient levels of trust may cause the user to engage in additional processing of information, such as looking for related material that corroborates the information already provided. This, in fact, decreases the efficiency of the interaction, and, consequently, user satisfaction.

7.7.1 Antecedents of trust

Several factors that are likely to influence trust have come to light in the previous sections. The two concepts most relevant to user profiling, trust in organisations and trust

in systems, received special attention. Table 7.1 lists the main antecedents of both types of trust. It is important to realise, however, that the list of antecedents presented here may not be complete. Compared with trust in systems, where the role of recommendations and reputation, for example, is increasingly realised, research in organisational trust has so far largely neglected the role of indirect information. Nevertheless, information about organisations that is received from someone else, such as by word-of-mouth, might be of influence to trust in those organisations. In other words, Table 7.1 might give the impression that several factors are exclusive to the domain of system trust, but this may merely be a result of a somewhat different focus of research in this particular field, compared with research in organisational trust. It is, therefore, a good possibility that the factors listed here apply to both kinds of trust.

Trust in systems	Trust in organisations
Agreement	
Predictability, consistency	Prediction
Reliability, stability, dependability, competence	Ability, capability
Value similarity	Value similarity
Intentionality	Benevolence , integrity, intentionality
Recommendations, endorsements	
Perceived website quality	
Occurrence of (outcome) failures	
Understanding, process	
	Calculation
	Transference

Table 7.1: Overview of the antecedents of system trust and organisational trust, as identified in this chapter

One important antecedent shared by both types of trust is predictability or consistency of observed behaviour. According to Rempel, Holmes and Zanna (1985), this constitutes the first step in the development of trust. The next step would be the inference of reliability, dependability, competence and capability. Instead of referring to observed behaviour, these antecedents are actually attributions, i.e. assumed qualities of the system itself. At an even 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. Predictability or consistency in communication with the user, or in organisational behaviour in general, for instance, is beneficial to the development of trust. On this basis, several attributions about system or organisation may be formed, ranging from relatively low-level attributions of characteristics, such as competence and reliability, to more human-like attributions, such as intentionality, values or integrity. However, such inferential processes are little understood and, if left to the user, might run in a different direction than anticipated. Organisations would therefore be wise to make information about their values, intentions, etc., explicit, so as 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.

The occurrence of failures made by a system or an organisation, such as transaction mishaps or supplying users with inaccurate information, cannot be fully prevented. Measures should therefore be taken to provide a buffer against them; making values or intentions (more) explicit, or simply providing a means to users to understand the functioning of system or organisation, may make user trust less susceptible to occurring failures.

Special care is warranted by interactions that can be characterised as computer-mediated communication; in such cases, a computer application mediates the communication between a customer and the company or organisation. Whereas in direct interactions between customer and company the success of an interaction depends on the trust of the former with regard to the latter, in such mediated interactions also a third factor has to be taken into account: the application itself. Thus, the customer's trust may be directed at both the focal system and the organisation that operates the website. If either of these trust judgements falls below a certain threshold, the interaction is likely to cease. It is, for instance, possible that a brick-and-mortar bookstore is well-known and trusted by its customers but that those same customers are hesitant to buy a book online from the same store.

In addition, perceptions of application and organisation may influence one another. Indeed, web-based organisations often try to influence customer trust by displaying endorsements by independent, trustworthy third parties, e.g. by a professional medical association in the case of a medical website (Briggs, Burford, De Angeli, & Lynch, 2002; Corritore, Kracher, & Wiedenbeck, 2003; McKnight et al., 1998; for studies on the role of indirect information in different domains, e.g. see Meijnders et al., 2004; Standifird, 2001). As such, a customer's trust in the advice generated by an online public transportation travel planner may increase if he or she learns that a trustworthy partner, such as the national railway company, is also participating in the enterprise. However, it could also happen that a negative impression of either of the two causes the other to become less trusted as well (transference of trust, e.g. see Doney et al., 1998).

Employing user profiling places high demands on trust calibration. For online interactions, whether financial transaction or information acquisition, to run to a satisfactory conclusion, users' initial trust levels need to be correctly ascertained so as to ensure that low trust users receive information aimed at reducing existing uncertainty and feelings of vulnerability.

8 Condition 3 for effective use of user profiling: Acceptance¹²

8.1 Introduction

Acceptance is a key factor in user profiling. It consists of several dimensions: acceptance by users, acceptance by organisations and acceptance of the technology. The most important is user acceptance; it is a prerequisite for user profiling that the user allows a user profile to be built, just as he or she must be willing to accept the user profile to be used. In addition, in cross-domain settings the user must be willing to allow data to be exchanged between organisations from different sectors or domains.

User profiling also has to be accepted by the organisations themselves. At first glance, this might seem strange, because in probably all cases it is the organisation that takes the initiative and thus is willing to adopt and accept user profiling. But especially in cross-domain settings, the organisation has to accept the fact that other organisations may make use of the data it has collected. The fact that this organisation 'asset' is being shared or sold must be accepted. Organisations might be hesitant to accept data interchange if they do not trust the quality of the data provided or the applications that other organisations involved are planning with their data.

Most studies of acceptance of innovations are about the adoption decision and acceptance of the technology by users or organisations. User profiling implies a greater use of technology and essential business and communication processes such as delivering service will become even more dependent on technology than they are now. User profiling can reduce the human influence on organisational processes and increase the dependency on technology in the contact with users. The dependency of both user and technology might constitute important obstacles to an organisation to engage in user profiling.

The focus of this chapter will be on the users and their acceptance of new technologies.

8.2 Research question

The central question of this chapter is:

What factors determine and influence the (process of) acceptance of user profiling from both an organisation and user perspective?

The first section of this chapter will take a closer look at the concept 'Acceptance'. What is it? And what are relevant aspects and issues? Next, the most relevant theories on acceptance will be discussed, followed by a discussion of research aiming to extend the theories with more factors determining acceptance. These factors include *trust*, *motivation* and *self-efficacy*. Next, several factors that do not relate to one of the theories but are most likely to influence the acceptance of user profiling are presented.

¹² Author: W.J. Pieterse

These factors are:

- Control
- Privacy
- Emotions.

Finally, one of the most important prerequisites for acceptance, ‘Informed consent’, will be presented and discussed.

8.3 Defining acceptance

Dillon and Morris (1996) provide a definition of acceptance of information technology. They define users’ acceptance of information technology as:

The demonstrable willingness within a user group to employ information technology for the tasks it was designed to support (Dillon & Morris, 1996).

Although their definition applies to user acceptance, it also suits the organisation because it can also be seen as a user from the perspective of user profiling.

Dillon and Morris’ definition strongly focuses on the acceptance of technology. Acceptance of user profiling as a broader concept covers multiple aspects. The following aspects of acceptance of user profiling can be distinguished:

- Acceptance of the organisation: demonstrable willingness to communicate, interact and conduct transactions with the organisation;
- Acceptance of the technology: demonstrable willingness to use the organisation’s ICT applications;
- Acceptance of user profiling: demonstrable willingness to adopt the initial and continuous use of user profiling;
- Acceptance of the goals and effects of user profiling: demonstrable willingness to cooperate in achieving the goals and effects of user profiling.

Bouwman et al. (2002) describe a four-stage process of diffusion of ICT, which covers all stages that are relevant to the acceptance of technology. The model depicting the process is shown in the following figure:

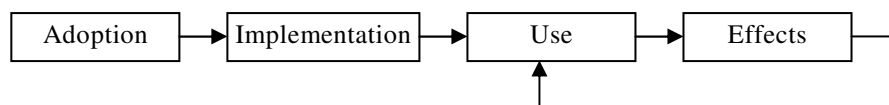


Figure 8.1: The process of ICT acceptance (adapted from Bouwman, J.A.G.M. van Dijk, van Hooff and van den Wijngaert (2002))

This model clearly shows that acceptance of technology is not a process that stops once the adoption decision has been made. Both users and organisations must continuously evaluate whether or not they accept the technology, its implementation, use and effects. This specifically applies to user profiling. User profiling is an ongoing process of collecting, using, updating and re-using data, etc. It requires a continuous effort of both users and organisations. A user who initially has accepted the use of his personal information, might revoke that decision at any moment that he loses his trust in the organisation or finds that the efforts do not (or no longer) match the effects or benefits. Organisations can also revoke the use of user profiling, but not at any given moment because it requires a major change of business strategy and systems. So it is important to focus not only on the initial adoption and acceptance of user profiling, but also on continuous acceptance during the complete life cycle of user profiling. Most existing

theories focusing on acceptance only address the initial adoption of an innovation. A number of theories will be discussed in more detail in the following paragraphs. They will help to understand the process of acceptance and to identify influential factors.

8.4 Theories on acceptance

ICT acceptance research to date has produced two types of theories. The Diffusion of Innovations Theory (DOI), presented here, is a representative of theories based on studies of communication, marketing and society (E.M. Rogers, 2003). It describes the acceptance of innovations at group level, monitoring acceptance in societies.

The other type of theories focuses on individual acceptance and adoption decisions. They are rooted in social psychology (Bhattacharjee, 2000). They state that individual behaviour (e.g. the acceptance and use of user profiling) is primarily determined by behavioural intention, which in turn, is predicted by multiple belief structures concerning the intended behaviour (Ajzen, 1991; Bhattacharjee, 2000). The intention-based Technology Acceptance Model (TAM) discussed here and the Theory of Planned Behaviour (TPB), discussed in chapter 5, are representatives of intention-based models.

8.4.1 Diffusion of Innovations Theory

Diffusion can be defined as ‘the process by which an innovation is communicated through certain channels over a period of time among the members of a social system’. An innovation is ‘an idea, practice or object that is perceived to be new by an individual or other unit of adoption’. And communication is ‘a process in which participants create and share information with one another to reach a mutual understanding’ (E.M. Rogers, 2003).

Diffusion research focuses on the conditions that increase or decrease the likelihood of a new idea, product or practice being adopted by members of a given culture. Diffusion of innovations theory predicts that both the media and the interpersonal contacts within a culture will provide information and hence influence the opinion and judgement of individuals or organisations taking the decisions to adopt or not adopt an innovation.

In his analyses of innovation processes, E.M. Rogers (2003) states that they are defined by four factors: invention, diffusion (or communication) through the social system, time and consequences. The information flows through networks. The nature of networks and the roles that opinion leaders play in them determine the likelihood that the innovation will be adopted.

Innovation diffusion research has (among others) attempted to explain the variables that influence how and why users adopt a new information medium, like Internet. Opinion leaders of groups or cultures exert influence on the behaviour of their audiences via their personal contact and communication channels. Intermediaries, called change agents and gatekeepers, also play a role in the diffusion process. Because individuals differ in their characteristics, needs, preferences, etc., different (groups of) individuals adopt an innovation at different times. E.M. Rogers (2003) describes five categories of adopters which adopt the innovation in succession: 1) innovators; 2) early adopters; 3) early majority; 4) late majority; and 5) laggards.

These categories follow a normal distribution curve: very few innovators adopt the innovation in the beginning (2,5%), early adopters make up for 13,5% a short time later,

the early majority 34%, the late majority 34%, and after some time, finally, the laggards make up for 16% of the entire population.

The decision to adopt an innovation is not a simple affair. It is a complex process. Rogers (2003) calls this process the *innovation-decision* process. This is the process through which an individual (or other decision-making unit, like an organisation) passes from initial knowledge of an innovation, to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. A model of this process is shown in the figure below.

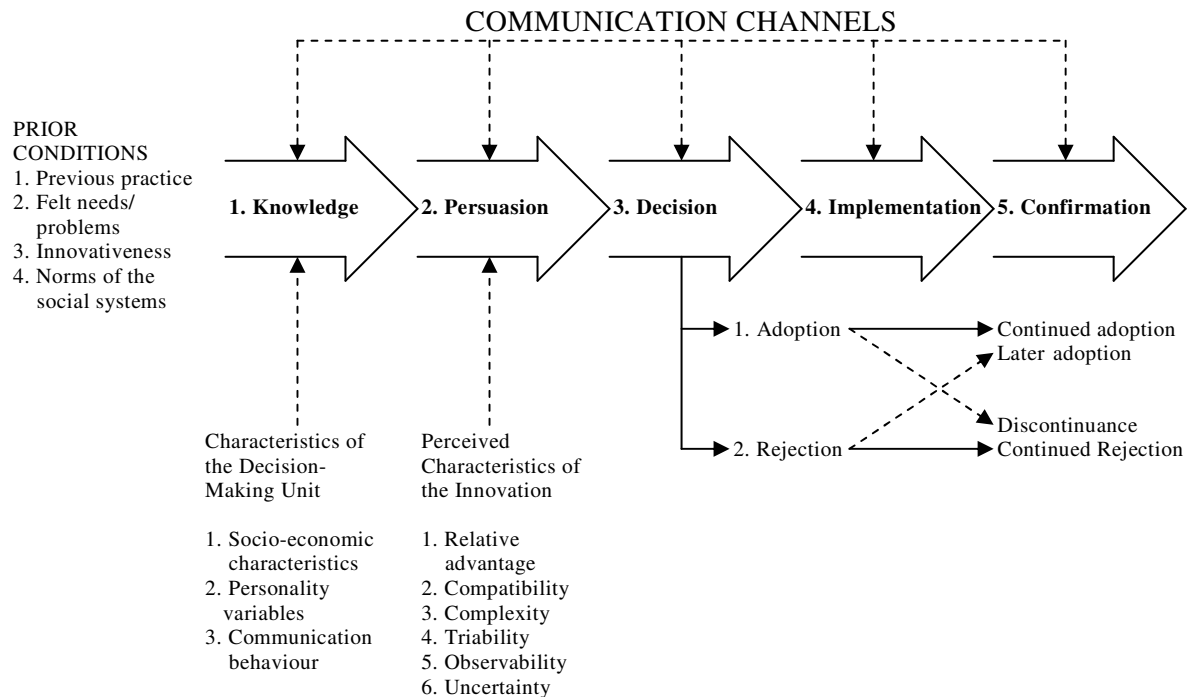


Figure 8.2: The Innovation decision-making process (E.M. Rogers, 2003)

E.M. Rogers (2003) states that various aspects influence the decision to adopt or reject the acceptance of an innovation. These are: prior conditions, characteristics of the decision-making unit (the individual or the organisation) and the perceived characteristics of the innovation.

Roger distinguishes the following prior conditions.

- *Previous practice* relates to the previous behaviour that is relevant to the adoption of innovations. For example: a person already using a computer might be more eager to use the Internet than someone not using a computer.
- *Felt needs/problems* refers to the perceived need for the innovation. It is likely that a person with a greater need for an innovation will adopt it sooner than a person who has no need for it at all.
- *Innovativeness* refers to how innovation-minded someone is. It is assumed that some people are more innovative than others.
- *Norms of the social systems* refers to the social influences that individuals or organisations are experiencing within their group or culture (system). The group or cultural norms can form an obstacle to change. Some groups are more resistant to change and potentially risky or uncertain situations than others.

E.M. Rogers distinguishes three types of characteristics of the decision-making unit, which in the case of user profiling is primarily the user.

- *Socio-economic characteristics*. These are factors such as income, labour, level of education, etc.
- *Personality variables*. Chapter 6 gives an overview of personal variables and presents four main factors: Age, Sex/Gender, Race and Health.
- *Communication behaviour* This refers to the use of communication means and media. A person who makes little use of the media to get information is less likely to know of the existence and potential benefits and drawbacks of an innovation than a person who uses various information and communication channels. Communication and media behaviour is important for the acceptance of user profiling, because the media can set the agenda for discussion about issues around user profiling. Organisations will use mass and group (segmented) communication strategies to motivate people and to generate levels of trust concerning user profiling.

The perceived characteristics of the innovation itself (in our case the user profiling system) also determine the degree of adoption by the individual or group:

- *Relative advantage* is the degree to which an innovation is perceived as being better than the idea it supersedes.
- *Compatibility* is the degree to which an innovation is perceived as consistent with the existing values, past experiences and needs of potential adopters.
- *Complexity* is the degree to which an innovation is perceived as relatively difficult to understand and use.
- *Triability* is the degree to which an innovation may be experimented with on a limited basis.
- *Observability* is the degree to which the results of an innovation are visible to others (Pijpers, Montfort, & Heemstra, 2002; E.M. Rogers, 2003).

Frambach and Schillewaert (1999) have added uncertainty as an important factor determining acceptance of innovations, one that might certainly be relevant to user profiling.

- *Uncertainty* is the degree to which users are uncertain about: 1) technical, 2) financial, and 3) social factors regarding the innovation.

8.4.2 Technology Acceptance Model

The Technology Acceptance Model (TAM), first introduced by Davis (1986), is an adaptation of the Theory of Planned Behaviour, which has been introduced in chapter 5. TAM was specifically designed for modelling user acceptance of information systems. It has been widely applied in research of information systems use (see: Legris, Ingham, & Colletette, 2003). It has also been used as a foundation for acceptance studies for systems such as mobile phones and intranets. There is a large number of studies that support the validity of the model (e.g. Adams, Nelson, & Todd, 1992; Davis, Bagozzi, & Warshaw, 1989; Horton, Buck, Waterson, & Clegg, 2001; Igbaria, Zinatelli, Cragg, & Cavaye, ; Legris et al., 2003; Mathieson, 1991; Szjana, 1996; Venkatesh & Davis, 1996).

The original objective of TAM is to provide an explanation of general determinants of computer acceptance that would help explain user behaviour across a broad range of end-user computing technologies and user populations (Davis et al., 1989). In subsequent studies, the model has been used and extended for various situations, both for introducing new information technologies for explaining the use of IT that has already been implemented (Pijpers, Bemelmans, Heemstra, & Montfort, 2001).

The model as presented by Davis (1989) is presented in figure 8.3.

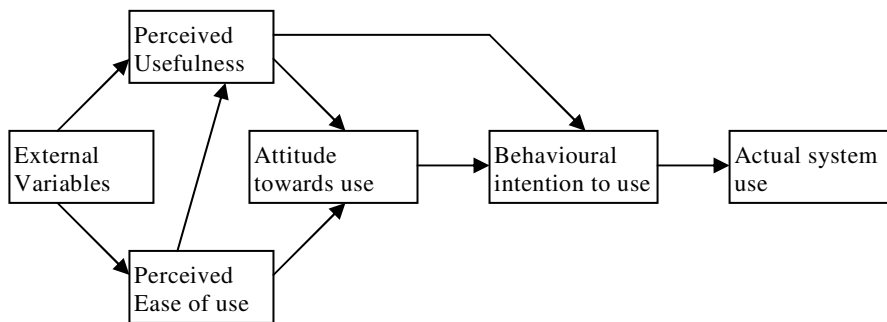


Figure 8.3: The technology acceptance model (Davis, 1989)

TAM posits that two particular beliefs or expectations, *perceived usefulness* and *perceived ease of use*, are most relevant for explaining computer acceptance behaviours. Perceived usefulness is defined as the prospective user's perception of how probable it is that using a specific application system will increase his or her job performance within an organisational context. Perceived ease of use refers to the degree to which the prospective user expects the target system to be free of effort (Davis et al., 1989).

Like the Theory of Planned Behaviour, TAM postulates that actual computer usage is determined by *behavioural intention* (BI), yet differs in that the behavioural intention is viewed as being determined both by the person's attitude towards using the technology and the person's perception of its usefulness.

TAM is different from the Theory of Planned Behaviour because it does not include the *subjective norm* as a determinant of behavioural intentions. Because of its uncertain theoretical and psychometric status, the subjective norm was not included in the TAM model by Davis et al. (1989). Others (e.g. Warshaw, 1980) do not agree and assume that social norms may influence an individual's behavioural intention towards acceptance directly and indirectly. A direct influence on acceptance is executed if a specific individual is willing to *comply* with mandates of important peers who think the individual should adopt the innovation. An indirect influence on acceptance is executed through attitudes which are formed in *internalisation* or *identification* processes. This suggests that the three forms of social influence, compliance, identification and internalisation (Kelman, 1958) determine how social norms influence behaviour.

Finally, TAM distinguishes external variables that influence the perceived usefulness and the perceived ease of use. Among the possible external factors investigated are training, documentation, user support (Davis et al., 1989), usability (Bewley, Roberts, Schroit, & Verplank, 1983), and system features (Dickson, DeSanctis, & McBride, 1986). In the following section, where past research is discussed, more attention will be paid to possible external variables. With regard to these, it can be concluded that the list of possibilities is virtually unlimited and that the exact influence of external variables is hard to determine, because it strongly depends on the situation investigated (the technology to be accepted) and the context (e.g. the organisation and the user involved).

Both the Diffusion of Innovations Theory and the Technology Acceptance Model might help to understand the process of adoption and acceptance of user profiling. Both theories suggest possible factors that might influence the acceptance process and are therefore a good starting point for research on the acceptance of user profiling.

8.5 Research on acceptance

Most studies in the field of user profiling explore the subject from the perspective of the technological possibilities of ICT. In this report, we focus on acceptance from an organisational and user perspective. From an organisational perspective, the central question is whether or not an organisation is willing to accept the technology necessary to engage in user profiling, due to economical and technical reasons. Research addressing the individual users' acceptance and the factors determining it exists to a much lesser degree. The next sections will discuss the known research on user profiling and related technologies. The discussion is aimed at identifying factors that might influence acceptance.

8.5.1 On acceptance of user profiling and personalisation

As user profiling is a relatively new term, no research to date is known that has investigated acceptance of user profiling from a clearly defined theoretical background. Nysveen and Pedersen (2004) studied acceptance of personalisation¹³ (rather than user profiling) in a slightly different context. They studied customers' attitudes towards using a website when the website contains interactive applications such as personalisation. They used the Technology Acceptance Model (TAM) and measured the perceived ease of use, the perceived usefulness and the attitude towards use of a simple personalised, static website.

Nysveen and Pedersen conclude that the implementation of interactive applications (personalisation) does not have an effect on the perceived ease of use, usefulness and attitude. This corresponds with Hanson's conclusion that excessive personalisation (on websites) is cumbersome, confusing and wastes consumer time (Hanson, 2000). Personalisation must provide added value, and this (according to the Nysveen & Pedersen study) is not the case for routine and simple product websites.

Hinnant and O'Looney (2003) have studied the level of interest of local governments in personalised online service. They do not focus on the individual (end-) user but on the organisation. The researchers developed their own innovation adoption model, instead of using one of the existing models. Their model focuses on three primary dimensions of online innovation: perceived need, technical capacity and risk mitigation. The results of their study suggest that perceived need, financial costs and the ability to mitigate the risks associated with privacy issues each influence the level of interest that public organisations have in personalised online services. It appears that those organisations must find reliable means of determining external demand for online innovations, as well as reducing the risks associated with each specific type of online innovation prior to adoption. Possible risks are technical failure, citizen dissatisfaction but most importantly, as the results suggest, the possible abuse of personal information.

Two general research projects focusing on personalisation are worth mentioning here. The first is the ChoiceStream Personalization Survey (ChoiceStream, 2004). This survey was conducted among 673 (U.S.) respondents, who were almost all (95%) Internet users. Overall, the survey found that more than 80% of consumers were interested in receiving

¹³ Because the research discussed here uses the term 'personalisation', this term is used instead of the term 'Tailoring' that has been used throughout this SOTA (see chapter 1).

personalised content. However, the percentages vary strongly for the different age groups of the respondents.

Younger respondents tend to be more interested in personalisation, with 87% of 18-24 year olds expressing an interest in some type of personalised content. This amount decreases from 82% (25-34 year olds) to 76% (35-49) and 77% (50+). Also the interest in content varies according to the age of the respondents. Younger respondents are more interested in receiving personalised music recommendations, followed by DVDs and books, whereas older people, particularly those in the 50+ category, are interested in personalised web search results followed by books, news and travel.

The second key finding is that the vast majority of consumers is willing to provide demographic and preference information in exchange for personalised content: the younger the consumer, the more likely he or she is to provide these types of information.

The third and last key finding is the result that consumers are willing to spend a significant amount of time answering questions about themselves in exchange for personalised content.

A second relevant research project is the Personalization Consortium's Online Consumer Personalization Survey (CyberDialogue, 2001). This survey was held among 512 respondents who were selected from a population of 3,500 and screened to represent this group of online users. The most important finding is that consumers who frequently purchase goods and services over the Internet have a more positive attitude towards personalisation than those consumers that never purchase over the Internet. Of the respondents, 56 percent said they are more likely to purchase from a site that offers personalisation, and 63 percent said they are more likely to register at a site that offers personalisation or content customisation.

Other relevant findings are:

- Usability drives consumers' demand for personalisation. Of the respondents, 87% indicated that they are annoyed when a site asks for the same information more than once. In addition, 82% are willing to provide such personal information as gender, age and ethnicity if the site will remember their preferences and personal information. These findings correspond with the findings of the ChoiceStream (2004) survey.
- Consumers who endorse personalisation spend more money on internet purchases. Of this group, 28% spent more than \$2,000 online last year, compared with only 17% of the clients who did not endorse personalisation..
- Online purchasers are likely to pay close attention to the protection of their privacy. Of the respondents, 82% state that a website's privacy policy is a critical factor in their decision to purchase online and 84% have refused to provide information to a website because they were unsure how the information would be used.

It is unknown to what extent the results of both surveys apply to other than the e-commerce domain, let alone to cross-domain profiling. It is also unknown what data consumers want to supply about themselves. The results show that consumers are willing to *spend time*, not what information they want to share. Finally, the results concerning respondents' attention to the privacy policy of websites might reflect what they say or think they would do, not necessarily their actual behaviour on e-commerce sites.

8.5.2 Extending TAM: Other factors influencing acceptance of new technologies

Most of the research discussed focuses on the technology acceptance model and the factors predicting actual use. It has been studied extensively in research on acceptance of ICT-related technologies. The factors *perceived usefulness* and *perceived ease of use* were found to be robust predictors of acceptance (the behavioural intention to use). The research was mainly aiming at: a) adding other factors to the model, or b) determining what the possible external variables of the model might be. The following section will explore these added factors.

Perhaps the most essential additional factor determining acceptance is *trust*, addressed in detail in chapter 7. Trust can be seen as a prerequisite (critical factor) for the adoption and acceptance of new technologies. Dahlberg, Mallat & Öörni (2004) interviewed participants in a focus group about the factors that determined their decision to adopt mobile payment services. Trust proved to be an important factor, which determined perceived usefulness. Gefen, Karahanna and Straub (2003) have researched trust in online shopping. They state that trust influences the behavioural intention (buying online) and the perceived usefulness. Trust itself is influenced by perceived ease of use, i.e. systems that appear to be easier to use are creating and enhancing trust.

Research by Hoffman, Novak & Peralta (1999) demonstrated that lack of trust was the major reason for people not to adopt online shopping. Warkentin, Gefen, Pavlou & Rose (2002) studied the role of trust in the adoption of e-services. They found that trust in the organisation using the technology and trust in governmental policies are important determinants for the adoption. They state that trust is a crucial enabler affecting purchase intentions, inquiry intentions and the intention to share personal information. The latter intention, of course, is especially relevant in user profiling.

Besides a direct relationship with acceptance of the technology, trust is related to many other issues that appear to be critical for user profiling. Firstly, trust is influenced by the *locus of control* for the user profile (Araujo & Araujo, 2003). When end users feel that they themselves or a trusted third party representing them controls the user profile and its applications, they will trust user profiling more than when they feel that the organisations in control are not primarily focusing on the users' interests.

Trust is also influenced by *privacy concerns*, and hence by the privacy policies realised in the user profile system. Concern about the privacy aspects of personal information shared on the Internet is correlated with increasing levels of Internet experience (George, 2002): the more experienced internet users are more worried about privacy issues. There is considerable resistance among many Internet users to engage in business-to-consumer transactions over the Web, primarily due to concerns about privacy and the trustworthiness of the Internet (Aldridge, Whithe, & Forcht, 1997; Wang, Lee, & Wang, 1998).

In section 8.5.3 and 8.5.4 we will focus on the issues of control and privacy concerns.

A second factor that has been added to the Technology Acceptance Model is *motivation*. Motivation has already been addressed both in chapter 3 and 6. Two types of motivation can be distinguished: extrinsic and intrinsic motivation (Vallerand, 1997). Extrinsic motivation points to the drive to perform behaviour to achieve specific goals/rewards (Deci & Ryan, 1987), while intrinsic motivation points to perceptions of pleasure and

satisfaction from performing the behaviour in question. (Vallerand, 1997). Extrinsic motivation is a factor that has been extensively researched. In TAM, extrinsic motivation is captured by the perceived usefulness construct (see Davis, 1989; Venkatesh, 2000).

Venkatesh (2000) has also studied the role of intrinsic motivation in technology acceptance. He introduces the factor *computer playfulness* as operationalisation of intrinsic motivation. In a similar vein, Pijpers, Montfort and Heemstra (2002) added the factor *perceived joy* (referring to the pleasure experienced when using ICT) on the basis of a quantitative study of ICT acceptance with 87 European managers. The prospective users' expectation that it is pleasant to work with a computer was found to be a significant influence on the acceptance of computers. Pijpers et al. (2002) assume that perceived joy influences the behavioural intention defined in TAM. Venkatesh (2000) assumes that computer playfulness leads to perceived ease of use about a new system.

Bhattacharjee (2000) found effects of the factor *self-efficacy* in the acceptance of e-commerce services. Self-efficacy is the degree of an individual's self-confidence in skills or ability to perform the intended behaviour (see Bandura, 1977). It has been studied extensively with respect to ICT acceptance. For example; Compeau and Higgins (1995) research among Canadian managers shows that self-efficacy exerts a significant influence on individuals' expectations of the outcomes of using computers, their emotional reactions to computers as well as their actual computer usage. Staples, Hulland, and Higgins (1998) found that those with high levels of self-efficacy in remote computing situations were more productive and satisfied and better able to cope when working remotely. Given the effects of self-efficacy on technology acceptance, one might expect self-efficacy to influence the acceptance of user profiling.

Various studies have focused on the possible *external variables*, which supposedly influence acceptance through the other factors summarised in TAM. External variables that have been found to be significant are shown in table 8.1.

Variable	Definition
Level of education	The level of education of the individual.
Computer experience	Indication of years of experience in using computers and using similar packages; and the current skill level.
Support	The support and encouragement for using technology.
Computer training	Amount and type of computer training received.
Image	Degree to which use of a system is perceived to enhance one's image or status in one's social system (group, organisation, etc).

Table 8.1: External variables. Based on: Al-Gathani and King (1999), Agarwal and Prasac (1999), Venkatesh and Davis (2000) and Pijpers et al. (2001).

The problem with most external (and additional) factors is that they depend to a large extent on the context in which the acceptance of technology takes place (Pijpers et al., 2002). This makes it difficult to predict the influence that particular factors will have, given the specific circumstances, organisation and technology studied.

8.6 Critical issues influencing acceptance

As shown in the overview of studies above, researchers distinguish many factors that influence the acceptance of various applications of information technology. They also have different interpretations of how influential particular factors are. Do these factors also apply to user profiling? User profiling and personalisation techniques are so new that very few studies have focused specifically on the acceptance of these new applications of ICT. Given the state of the art in acceptance research, we have to assume that the current theories (Diffusion of Innovations, Theory of Planned Behaviour, Technology Acceptance Model) predict and describe the factors influencing acceptance of user profiling technology. But it remains to be decided whether these same factors also apply to applications of user profiling. We recommend conducting specific studies of acceptance of user profiling, to support or reject the assumption that factors critical to technology acceptance in general also apply to user profiling.

In the previous chapters, a number of critical issues influencing acceptance have been identified which are not embedded in theoretical models of technology acceptance such as TAM. Those issues, i.e. control, privacy concerns and emotional response, will be addressed in the following sections.

8.6.1 Control as a condition for acceptance

As stated in the Alter Ego focus and refinement document (Telematica Instituut & IBM, 2004a), two aspects regarding control are important: first the hosting of the user-related information and second the updating and maintenance of user-related information. A study by Roy Morgan Research (2001) shows that 59% of the 1524 Australian respondents state that their trust in the Internet increases when they feel they have control over their personal information. The study also showed that:

- 91% of the respondents want to be asked for explicit permission before companies use their information for marketing purposes;
- 89% of the respondents want to know which persons and which organisations have access to their personal information;
- 92% of the respondents want to know how their personal information is used.
- User control obviously is a critical condition for user acceptance of profiling and personalisation. However, the study cited does not answer the question whether the users themselves should host the user profile themselves, nor whether trusted third parties can resolve the users' anxiety about control issues.

Alpert et al. (2003) studied user attitudes regarding the personalisation of content in e-commerce websites. In their study, the users expressed their strong desire to have full and explicit control of personal data and interaction. They want to be able to view and edit (update and maintain) their personal information at any time.

Byford (1998) perceives personal information as a property or asset of the individual ('Byford's property view'). The user is the owner of his or her personal information. In Byford's property view, individuals see privacy as the extent to which they control their own information in all types of Internet exchanges. The property aspect of the exchange manifests itself in the users' willingness to trade personal information for valued services such as free e-mail or special discounts from merchants.

A user profiling system that is not supported by a good system for user control of personal information is bound to lead to acceptance problems. However, building a user interface that allows users to control the information in their profiles is a complicated problem. Especially if the interface provides controls that go beyond a very coarse level of granularity (Cranor, 2004). Although users have indicated they want to be in control of their personal data, very few users make use of possibilities websites offer to control personal information. A number of e-commerce websites give users access to their profiles; however, it is not clear that many users are aware of this (Cranor, 2004, p. 69). Reports of operators of personalisation systems have indicated that users rarely take actions to proactively customise their online information (Manber, Patel, & Robinson, 2000).

8.6.2 Privacy concerns and acceptance

Throughout this report, privacy concerns have come up as a critical factor determining the acceptance of user profiling. Loeb (1992) distinguishes three types of privacy concerns: regarding protection of the user profiles and queries, regarding protection of the person's web usage history and regarding protection of the actual information if the delivery takes place over public networks.

Wang, Lee and Wang (1998) distinguish four types of privacy threats:

1. improper acquisition of information (e.g. uninvited tracking of the users' web usage);
2. improper use of information (e.g. distribution of data to third parties);
3. privacy invasion (e.g. spamming a mailbox with uninvited direct mailings);
4. improper storage and control of personal information (e.g. no opting-out, no means to remove incorrect or unwanted information)

It is still unclear which privacy threats and concerns are (most) influential for acceptance of user profiling. But it is clear that privacy is important for the users' acceptance of internet and hence for acceptance of user profiling. An overview of studies regarding privacy and personalisation on the Internet shows that users have significant concerns over the use of personal information for personalisation purposes on the Internet (Teltzrow & Kobsa, 2004). CyberDialogue (2001) found that 82% of all Internet users say that a website's privacy policy is a critical factor in their decision to purchase online. Even more salient is that 84% of the respondents have refused to provide information at a website because they were not sure how that information would be used. The fact that there is a concern, however, does not necessarily imply that users do not provide any information. The lack of trust in privacy policies moved a large majority of users to give false or fictitious information over the Internet, and thus protect their privacy (Culnan & Milne, 2001; Fox et al., 2000). Examples of this development include 'Anonymous Websurfing' (AWS) and the use of pseudonyms. Surfing under a pseudonym entails assuming another identity (see for example www.bugmenot.com) and consciously making mistakes when filling in (or partially *not* filling in) personal details on forms. With AWS use is made of all kinds of technical tools which make it impossible for suppliers of electronic services to place cookies, and make it possible for users to dislodge and block spyware and prematurely deactivate pop-ups. According to research conducted by the Winterberry Group, this development is increasingly becoming a problem for the collection of user relation information (Direct Marketing, 2001). It also makes it apparent that many users are reluctant about user profiling.

Users might be willing to sacrifice some privacy and trade personal information, in exchange for recognisable rewards, such as information that suits their needs or

preferences better. But even in the event that they are willing to give up parts of their privacy, they have to be reassured that their personal information is not used in ways they disapprove of. Mander, Patel and Robinson (2000) suggest two solutions to address privacy concerns:

- make use of encryption of passwords and sensitive data to guard information
- (possibly external) audit and evaluation procedures for data security and privacy issues.

Bonett (2004) states that organisations should declare a privacy statement (or disclosure statement) on their site, which describes the kinds of information gathered and the policies for using and sharing personal information.

Solutions like the ones mentioned could be less effective than expected, because not all users might be able to comprehend privacy statements and their implications. In order to guarantee privacy and to reach informed consent on the use of personal data, privacy and disclosure statements should be presented in plain language, in a way that makes the implications of the policies completely clear to all users. Again, a trusted third party, such as the Consumentenbond (Consumers' Organisation), could serve as an institutional guard of the users' rights on protection of personal information.

Another attempt to solve privacy issues on the Internet with respect to the use of personal information is the P3P initiative (see: www.w3c.org/p3p). The Platform for Privacy Preferences Project (P3P), developed by the World Wide Web Consortium, is emerging as an industry standard providing a simple, automated way for users to gain more control over the use of personal information on websites they visit. The aim of P3P is 'to communicate to users, simply and automatically, a website's stated privacy policies and how they compare with the user's own policy preferences.' At its most basic level, P3P is a standardised set of multiple-choice questions, covering all the major aspects of a website's privacy policies. Taken together, they present a clear picture of how a site handles personal information about its users. P3P-enabled websites make this information available in a standard, machine-readable format. P3P-enabled browsers can 'read' this snapshot automatically and compare it with the consumer's own set of privacy preferences. P3P enhances user control by putting privacy policies where users can find them, in a form users can understand, and, most importantly, enables users to act on what they see. Whatever solutions would be chosen to address privacy concerns, they should meet the same standards as P3P: users must be able to find them, understand them and act on them.

8.6.3 Emotions and acceptance

All the theories that are discussed in this chapter assume that people act on the basis of rational deliberations, even if these deliberations are fed by subjective information or the social norms of the group the people are part of. However, people often do not act as rationally as is assumed in the theories and models. In his book *Reason in Human Affairs*, Herbert Simon (1983) warns us that an explanatory account of human rationality must identify the significance of emotions for behaviour. User profiling, a technology that can easily evoke concerns about the security and integrity of the user's personal information, might well be a topic that leads to an emotional rather than a rational response. That is why the link between emotions and behaviour is addressed here.

One of the most basic models linking emotions and behaviour is Maturana and Varela's (1987) model of the cognitive system. This model states that action, emotions,

perceptions and feedback form one consistent whole. Actions are constituted of both emotions and perceptions. Emotions determine the intention to perform actions and perceptions give meaning to these actions. Abilities finally are needed to perform actions. Actions lead to feedback towards the perceptions and may alter the meaning of actions and emotions. The model shows the tight relations between emotions, perceptions and actions and makes clear that they interact at all time. Although little empirical data that tests the model is available, its notions are nevertheless interesting. The model is presented in figure 8.4.

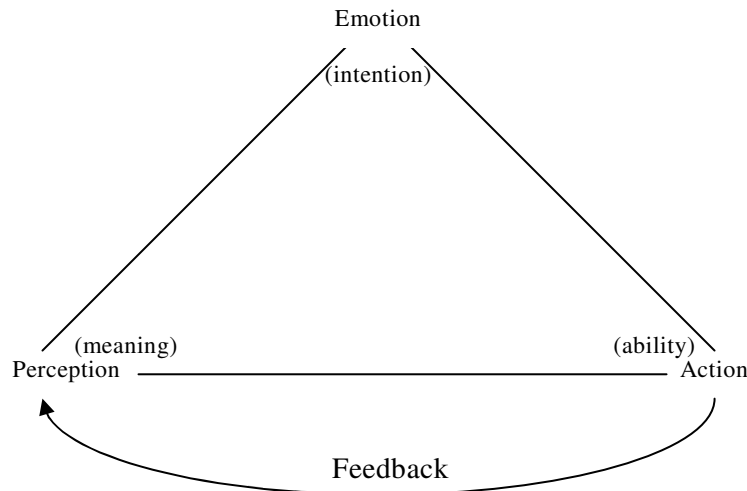


Figure 8.4: Maturana and Varela's (1987) model of the cognitive system

But what emotional factors are we talking about? Laros and Steenkamp (2004) propose a hierarchy of emotions that are important in consumer (buying) behaviour, divided into negative and positive emotions. The hierarchy is presented in figure 8.5.

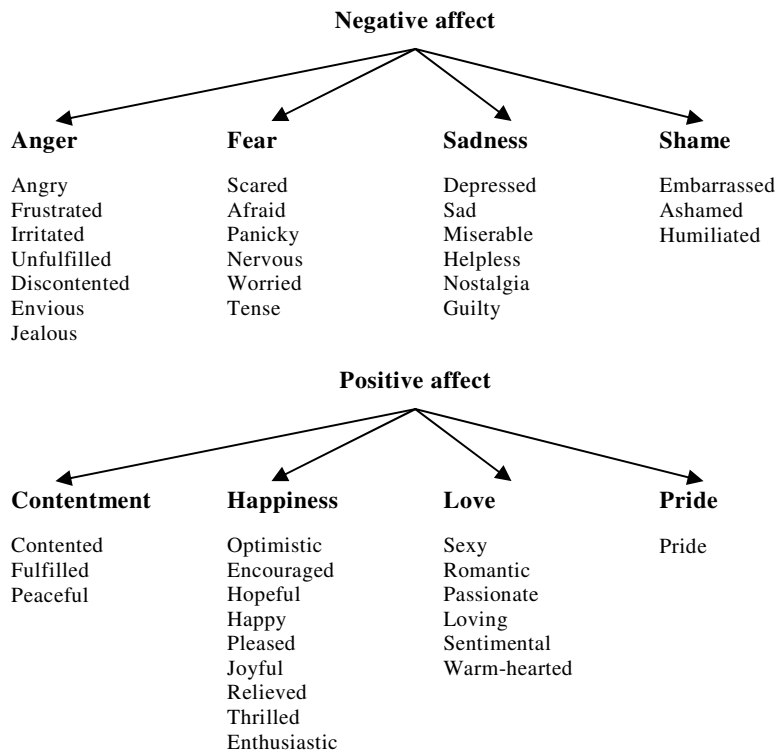


Figure 8.5: Laros & Steenkamp's (2004) hierarchy of emotions

In Laros' and Steenkamp's study of consumers' feelings (where feeling means 'positive' or 'negative' affect) towards food products, the emotions 'Love' and 'Pride' were not investigated further. All other emotions proved to be correlated to consumers' feelings

and via these feelings they might influence attitudes and intentions. Most research addressing emotions and buying behaviour have studied the emotional reactions to advertising and other post-purchase processes (see e.g. Mano & Oliver, 1993; Westbrook, 1987) and have thus concluded that a relationship exists between buying behaviour and emotions. However, direct relations between buying behaviour and emotions have a hypothetical status at the present moment. Nevertheless, researchers are increasingly discovering the importance of emotions in processes that have always been thought to be rational (see for example: Kaufman, 1999; Muramatsu & Hanoch, 2004; Oatley & Johnson-Laird, 1987). Although we have reason to assume that emotions will influence the acceptance of user profiling, we have no way to assess the degree to which they influence acceptance. Assessment of emotions through e.g. questionnaires or interviews can easily lead to ‘rationalisations’ by the respondents: rational explanations of behaviour that actually were emotionally inspired.

8.7 Informed consent: gaining acceptance

Throughout this chapter, an inventory has been made of factors influencing user acceptance of user profiling technology. Trust and control, especially in relation to privacy concerns are crucial for gaining acceptance from users. But how to win that trust, and how to give control to users? We propose to seek a solution in procedures of informed consent.

Informed consent enables users to make informed decisions on whether they want to participate in user profiling. The term is known from the field of medicine. Patients have the legal and ethical right to be informed on what will happen to their body, and make informed decisions on the intervention or treatment before it is started. Parallel to definitions from the healthcare sector, we can define informed consent on the use and application of personal data as follows:

Informed consent is the process whereby a fully informed user participates in decisions about his or her personal data. It originates from the legal and ethical right the user has to direct what happens to his or her information, and from the ethical duty of organisations using personal data to involve the user in the control, use and maintenance of these data.¹⁴

Sreenivasan (2003) states that informed consent in medicine consists of two parts: a duty to obtain the voluntary agreement of patients or trial participants before treatment or enrolment; and a duty to disclose adequate information to the patient or participant before seeking this agreement.

Friedman, Millet and Felten (2000) state that informed consent in web privacy policies comprises the following elements:

- Disclosure
- Comprehension
- Voluntariness
- Competence
- Agreement.

¹⁴ See: <http://eduserv.hscer.washington.edu/bioethics/topics/consent.html>

Disclosure refers to providing accurate information about the benefits and harms that might be reasonably expected from the action under consideration. What is disclosed should address the important values, needs and interests of the individual.

Comprehension refers to the individual's accurate interpretation of what is being disclosed. This component raises the question: What criteria must be satisfied in order to say that something has been adequately comprehended? For example: does a user understand the privacy statement? Why (not)?

Voluntariness means that an individual should only participate voluntarily; there must be no control of an individual's actions and the action may not be coerced.

Competence refers to possessing the mental, emotional and physical capabilities needed to be capable of giving informed consent. Children, for example, might not be mentally and emotionally capable of judging whether or not to provide personal information on websites.

Agreement refers to a reasonably clear opportunity to accept or decline to participate (Friedman et al., 2000). This not only implies the opportunity to choose whether or not to participate at all, but also to the opportunity to choose to stop or continue the participation at any given time. This means, for user profiling, that the individual should have full control at all time.

Translated in a procedure parallel to the medical world, the following elements should be addressed in an informed consent procedure regarding user profiling.

1. The nature of the personal data collected for the sake of user profiling.
2. The organisation's objectives with user profiling and its prospective effects for the user. This includes the sharing of data with other organisations, and their respective objectives for user profiling (cross-domain user profiling).
3. The alternatives when no data are collected, or when no user profiling is applied. Also, the alternatives when particular types of user-related information are rejected, or when particular applications of user profiling are refused.
4. Relevant risks, benefits and uncertainties related to user profiling, for the various alternatives.
5. Assessment of the user's understanding of the information.
6. Explicitly stated acceptance or refusal of the user, for all or particular types of user-related information, and for all or particular applications of user profiling.

The consent must be voluntary, and the user must have the competence to understand the information and its consequences, or the right to decide on the use of one's own personal information. Therefore, special attention must be paid to those groups in society that do not have easy access to ICT (see chapter 6). Both the procedure and the information on user profiling should be explained in layperson's terms. The user's understanding and acceptance must be assessed along the way, not only on initial adoption of user profiling.

Informed consent is a critical condition from the perspective of the individual user, but it might not always be in the interest of organisations to inform the public about the collection and use of user-related information. According to Business Week¹⁵ 88% of users want sites to guard their consent when personal information is collected. According

¹⁵ See: http://www.businessweek.com/2000/00_12/b3673010.htm

to a report from the Federal Trade Commission, 59% of websites that collect personal identifying information neither inform internet users that they are collecting such information nor do they seek the user's consent (Federal Trade Commission, 2000). This strongly conflicts with the public's interest and might even be a violation of European privacy and personal information protection laws.

8.8 Conclusions

Acceptance can be seen as a cumulative factor that correlates strongly with discussed concepts like trust, motivation and privacy. An important means to obtain acceptance from users might be informed consent. The organisation and the user must undergo an informed consent procedure before the actual user profiling can take place.

Acceptance is a very complex subject. The list of factors that appear to influence or determine acceptance of user, organisation, application and user profile seems endless.

This chapter opened with the question which factors determine and influence the (process of) acceptance of user profiling. The most important factors identified in this chapter are: **trust, control, privacy concerns, motivation and emotions**. These factors are distinguished in addition to factors captured in the Diffusion of Innovations Theory and the Technology Acceptance Model. The state of the art on acceptance of user profiling is that research on critical factors is only just starting. We recommend that future research and development projects in the field of user profiling focus on exploring these critical factors further.

9 Conclusions and recommendations¹⁶

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.

¹⁶ Authors: T.M. van der Geest, J.A.G.M. van Dijk & W.J. Pieterse

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.

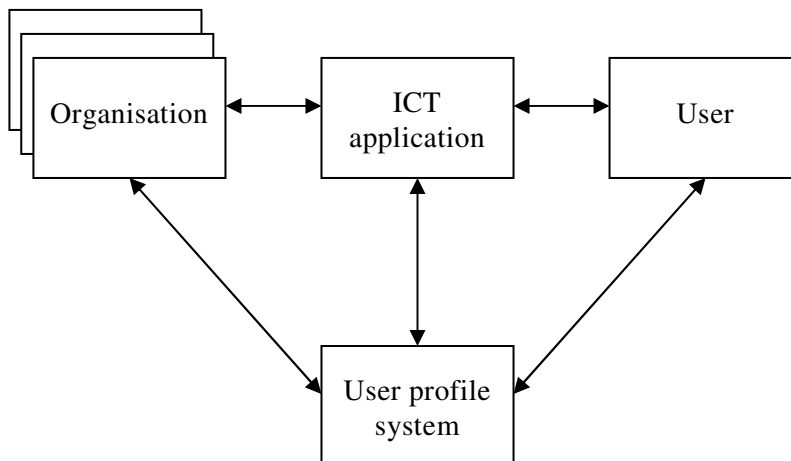


Figure 9.1: The Framework of user profiling

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. Similarly, 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 contexts (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.

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