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Collaborative Business

Achim P. Karduck (ed.)

[1] **CollECTeR: Collaborative Electronic Commerce Technology and Research**

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Welcome Message from the Conference Chair

On behalf of the steering committee, I would like to welcome you all to Furtwangen University and CollECTeR Europe 2005.

The "networked economy" challenges organizations to consider the use of Collaborative Business, involving the combined deployment of groupware and e-business infrastructures. Mobile computing technology and collaboration support have reached a level that makes a seamless integration of communications and data processing economically feasible. This constitutes our notion of Collaborative Business: the timely bundling of communication, coordination, and collaboration activities.

The portfolio of referenced papers in this proceeding - complemented by the plenary talk, invited speakers, and panels – indicates the mix of expertise required from researchers and industry representatives to elaborate on the foundations and industry potentials of the new areas of Collaborative Business.

The focus of CollECTeR Europe 2005 is on new forms of Customer Relationship Management (CRM) – including mobile CRM – that cover the whole value chain and use new working modes, focusing on the following aspects:

- Collaborative Systems: Infrastructures and Services.
- Customer Relationship Management: Business scenarios, including community-support, training/human resources support, and IT outsourcing projects.
- Intellectual Asset Management: The use of organizational expertise for CRM.

The program for this conference required the effort of many people. First, I'd like to thank the authors, whose research and development efforts are recorded here. Further, I'd like to express my thanks to the members of the program committee for their diligence and expert reviewing. Also, many thanks for the plenary speaker, the invited speakers, and panel organizers for their invaluable contributions and for taking the time to synthesize and prepare their talks. My thanks go as well to the students and staff of Furtwangen University, who enthusiastically contributed to the technology support, logistics and setup of the event. And finally, I'd like to express my special thanks to the founders of CollECTeR, whose vision and enthusiasm are the engine for the worldwide series of CollECTeR conferences.

I wish you an exciting conference and an unforgettable stay in the area of the Black Forest.

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Table of Contents
CollECTeR Europe 2005

Sessions

Session 1: Infrastructures for Collaborative Enterprises

1. Biometrics and e-Identity (e-Passport) in the European Union: End-user Perspectives on the Adoption of a Controversial Innovation, University of South Australia, Australia, Grace Ng-Krulle, Paul Swatman, Felix Hampe, Douglas Rebne

2. Information Appliances Supporting Cooperation Awareness in Collaborative Business Processes, Fraunhofer FIT - Cooperation Systems, Germany, Wolfgang Gräther, Wolfgang Prinz

3. Secure and Open Market Platforms for Telematic Services, Furtwangen University, Michael Schäfer, Achim Karduck

Session 2: Customer-Supported Activity Coordination

1. Customer-Driven Process Management in Value-Added Networks Using an Architecture for Collaborative Business, Institute for Information Systems (IWi) at the German Research Center for Artificial Intelligence (DFKI), Germany, Otmar Adam, Pavlina Chikova, Anja Hofer, Dominik Vanderhaeghen

2. Collaborative Business for wholesaler: model to manage wholesaler stock based on customer relationships management, Eidos Solutions Germany, Gennadi Roshizki, Amadou Sienou

Session 3: Mobile and context-aware collaborative systems

1. Extending the Integrated Grocery Supply Chain: connecting with Australian primary producers via mCommerce, University of South Austalia, Australia, Nhiem Lu, Paula Swatman, Paul Daly

2. Customer Profiles and Enhanced Identity Management, University of Applied Sciences Basel, Switzerland, Daniel Risch, Petra Schubert

3. Multimedia and Internet-Based CRM-Portal, Furtwangen University, Germany, Fritz Steimer

Session 4: Usability within Customer Relationship Management

1. Internet Marketing Possibilities of CRM within the UK Small Enterprises, University of Surrey, UK, Lisa Karen Brown, Deemple Tailor, Philip Seltsikas

2. Exploring end-user perceptions towards mandated deployment of PDA–based health information systems within Ambulatory Care, [1]University of Wollongong, [2]Flinders University [3]University of South Australia, [4]TACT, SESIH, Wollongong, Australia, Jason Sargent[1], Lois Burgess[1], Joan Cooper[2], Carole Alcock[3] and Dr. Damian Ryan[4]

3. Measuring Electronic Service Quality Gaps in the Australian Wine Industry, Flinders University, Australia, Robyn Davidson

4. Are You Being Served? – Exploring the Role of Customers as Employees in the Digital World, Dave Oliver[1], Celia T. Romm Livermore[2], Neveen Awad Farag[2, 1]Central Queensland University, Australia, [2] Wayne State University, USA

Session 5: Intellectual Asset Management

1. Collaborative Information Syndication for eAntarctica, Furtwangen University, Germany, Florian Buhl, Achim Karduck

2. Teaching Without a Text: The Next Digital Revolution?, University of Denver, USA, Donald McCubbrey, Richard Scudder

3. Perceptions of Faculty and Students: Implications for Online Course Providers Southeastern Louisiana University, USA, Rusty Juban, Josie Walker, Randall Settoon, Dawn Wallace

4. Community Based Electronic Guidebooks, University of Zurich, Switzerland, Marco Prestipino

Customer Profiles, Personalization and Privacy

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Abstract

CRM has become a buzzword in almost every company and organization during the last few years. The approach of a customer-centred view is neither new nor supremely innovative. What is it that makes managers and scientists talk about Customer Relationship Management? It is most of all the belief in the potential of computer-based CRM. The possibility of electronically gathering, storing, analyzing and using customer-specific data is rather tempting. On the other hand, users are sometimes not willing to disclose as much information as desired or needed by the vendor to establish and improve CRM. Besides the hesitation of customers to convey personal data, rather strict privacy laws exist – at least in European countries. The scope of this paper is to give insight into our current research by showing how customer profiles can be generated from various customer data, how privacy concerns influence the gathering and use of this data and how identity management can contribute to bridge the gap between customer profiles and privacy concerns in the future.

1 Introduction

Many successful companies have moved their focus to customer needs, believing that customer retention and satisfaction assures business continuity and lasting profit. Focusing on customer needs requires a certain degree of understanding the customers. It seems that ICT can contribute to easily gathering, storing, analyzing and using customer data. Many attempts in this area show that technology is not sufficient and that excessively collecting customer specific data has often a smack of spying and sniffing around (Gentsch 2002, 175). Over the last years privacy concerns grew and ended up in pressure groups like CASPIAN (“Consumers Against Supermarket Privacy Invasion and Numbering”), inglorious decorations like the “Big Brother Awards” (e.g. http://privacy.org.au/bba/) or requests for boycotts (e.g. www.boycottgillette.com) (Thiesse & Fleisch 2005, 1126). Other effects of careless data collection activities are intentional false statements which lead to bad data quality and therefore useless customer profiles (Treiblmaier & Dickinger 2005, 193). The importance of privacy and security aspects in the field of CRM has been pointed out in a recent survey by Salomann et al (2005). The authors draw the conclusion that knowledge from, for and about customers is a mission-critical factor (Salomann et al. 2005, 68/69).

Therefore this paper shows a practical and theoretically founded approach to bridge the gap between the potentials and pitfalls of applying customer data.

In the following paragraph, we discuss the process of how to model, build up and use customer profiles. In chapter 3 we will address the area of conflict between legal requirements and the clashing motivations of companies and customers. Chapter 4 outlines the potentials and restrictions of Digital Identity Management. Finally, we will provide a glimpse into the future of the issue of this paper and our own research.

This paper represents ongoing research at the University of Applied Sciences Basel (UASB) in the field of personalization and customer profiles.

2 Customer Profiles and the Customer Profile Life Cycle

A customer profile is a set of data describing specific characteristics of a customer. The content of customer profiles ranges from name, street, postal code and e-mail-address to purchased items and visited web pages. Depending on the origin or use of the profile, various classifications of data have been established (e.g. Holland 2004, 103, Kobsa et al. 2001, 5, W3 Consortium 2002). This paper follows the classification shown in Table 1 by Schubert (1999, 109/110).

Profile	**Content**
Explicit profiles	
Identification Profile	user name, role, contact information, personal browser settings, address, payment information, IP-address, etc.
Preference Profile	self-revealed preferences (product meta data)
Socio-economic Profile	self-categorization in predefined classes (age, gender, hobbies, etc.)
Ratings	three types of ratings: of products, of reviews, of pages [scale e.g.: I like it – not for me]
Relationships	Relationships to other users/customers [e.g. “soul sisters”]
Reviews/Opinions	Plain text, images, videos and other material
Implicit profiles	
Transaction Profile	transaction log, product purchases linked to product meta data (purchases, inquiries, payment, etc.)
Interaction Profile	click stream (pages viewed are linked to product meta data [preference categories])
External data	Information procured from other sources [e.g. weather report, local news, events, credit rating]

Table 1: Different types of profiles (following Schubert 1999)

We will differentiate between input and output profiles. The term input profile refers to data that is actually stored while the user interacts with an application. Output profiles refer to data that is extracted and edited by processing algorithms for information use.

To better illustrate the usage of customer data, we chose the example of personalizing websites throughout this paper as well as in many of our research projects.

2.1 Customer Profile Life Cycle and Personalization

The basis of personalization is to learn something about the customers and to use this information to tailor products or services to the needs of the individual. On a technical level personalization therefore can be reduced to four steps (cf. Figure 1):

Step 0 – Modeling Customer Profiles (Requirements Analysis)

Step 1 – Data Input

Step 2 – Data Processing

Step 3 – Information Use

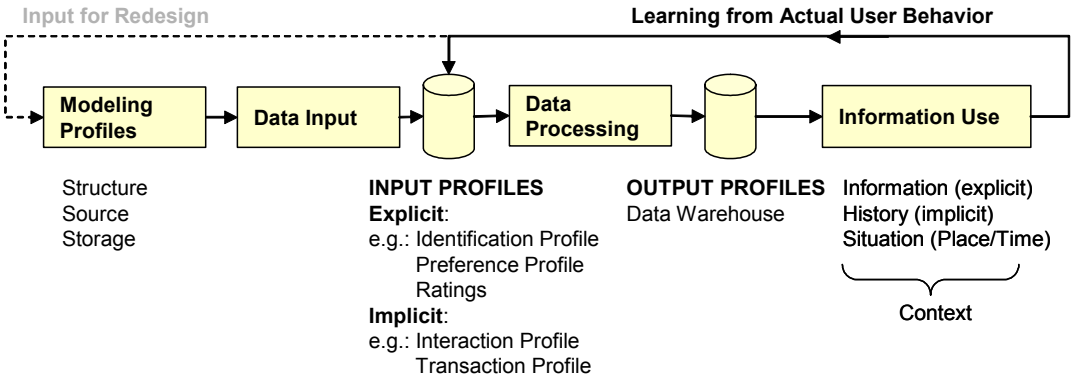

Figure 1: Customer Profile Life Cycle (following Schubert/Leimstoll 2002, 21)

In their paper „Motivating Human-Agent Interaction: Transferring Insights from Behavioural Marketing to Interface Design“ Spiekermann and Paraschiv (2000) point to the fact that personalization of user interfaces depends on the intensity of the interaction with the user interfaces. The more information about preferences is available from the user the better the computer can react. The benefit that a customer can take from an EC service depends largely on the readiness of the customer to actively provide information (q.v. chapter 3). If a customer provides false information, the recommendations derived from this data tend to be useless.

Spiekermann and Paraschiv investigated motivations of a user to provide data. They mainly identify the following functionalities that can lead to demotivation if they are missing:

1) Learning through user interaction (“feedback process in the profile life cycle”)
2) Adaptation to the experience level of the customer (“customer literacy”)
3) Recommendations from the whole set of data (“large database of interlinked profiles”)

The main reason for demotivation is the missing “learning” from user interaction. Figure 2 provides an overview of the technical requirements for implementing such a learning cycle and finally interacting in a personalized manner.

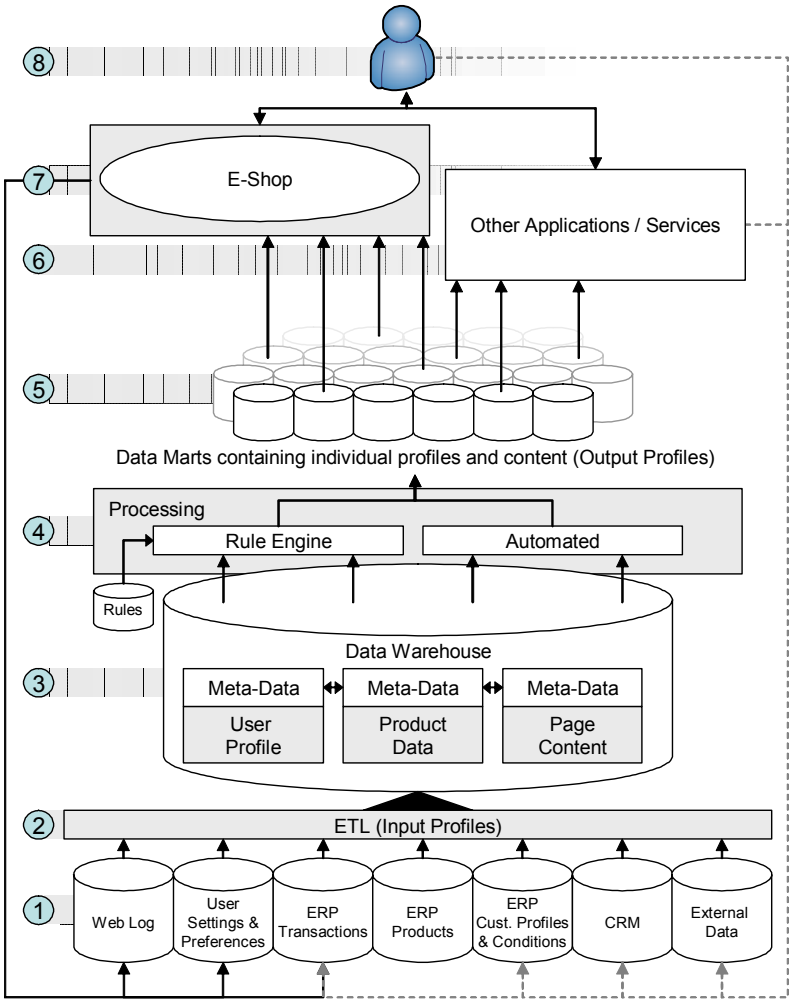

Figure 2: A technical view on personalization

The process of personalizing a website/e-shop as shown in Figure 2 starts with the interaction between the user (No. 8) and the EC application (No. 7). The user also interacts with other applications or services of the company (No. 6, e.g. call centre, store) or external sites and services (e.g. market surveys). Data generated from these interactions is represented by the dashed line on the right. Data generated by the interaction between user and e-shop is represented by the solid line on the left. User related data is usually stored in different data bases and heterogeneous formats (No. 1). Data objects that contribute to a better understanding of individual user needs have to be identified (input data). This data objects are (E)xtracted from the original source, (T)ransformed into a pre-defined structure and finally (L)oaded into a centralized data warehouse for customer profiles (No. 2). This data warehouse contains data about user profiles, products and page content as well as information about this data, called metadata (No. 3). In order to really use customer profiles in an e-shop or in other applications the information has to be processed (No. 4). This can be done using two different approaches: Rule-based processing working on an if-then base and automated processing applying data mining approaches for discovering previously hidden patterns (cf. knowledge discovery in databases - KDD). The results of the processing algorithms are stored in easy-accessible and well-structured data marts containing individual profiles and content (No. 5). The content of these data marts (output profiles) can be used as input for all kinds of applications (No. 6 and No. 7) and can contribute to improve user interfaces and services.

In the following paragraphs we take a closer look at the four steps of the customer profile life cycle.

2.2 Step 0 – Modelling Customer Profiles (Requirements Analysis)

Up to now, customer profile models have always been defined for one particular application of the profile models – for one particular system. In the future it will become increasingly interesting to make user profiles available for different applications in the same application area or even in different application areas (q.v. chapter 4). Some research work currently focuses on (organizationally and technically) separating the customer/user profile storage from the applications which are using it. This allows for the accumulation of customer information gathered in different places. This initiative represents a marketing viewpoint as e.g. taken by Microsoft Passport. It leads to an increased level of control for the customer regarding her profile (Koch & Wörndl 2001). Some work about abstract modelling of user profiles and user profile servers can be found in (Fink & Kobsa 2000).

Furthermore the products in the product catalogue have to be annotated using a chosen category with appropriate attributes. The annotation of products or information objects is a prerequisite to the matching of preferences with specific purchase transactions or interactions with the Web site (pages viewed).

2.3 Step 1 – Data Input

The techniques for capturing customer profile information vary and require the active engagement of the customer at different degrees. We can distinguish between asking the customer (fill-in-profile, explicit feedback or ratings) and watching the customer, analysing the data using data mining or web mining (click stream or transaction analysis).

There are different possibilities to acquire information about the interests of a user: (1) user maintains profile (explicit information input), (2) the system monitors the user in her browsing or shopping behaviour and determines her interests from using information clustering techniques, (3) usage of external data.

1) Explicit information input (also called “reactive approach”)

One way to gather data is to explicitly ask the customer to fill in her preference profile. This can be done by selecting preferences from an ontology provided by the Web site or by explicitly rating products or information items from which the likes and dislikes can be derived. Examples for services offering personalization based on explicit information inputs are MyYahoo and the Amazon Recommendation Centre.

Besides the use of explicit customer inputs for the derivation of interests, this information can additionally be made available to other customers. Examples for this procedure are the acquisition and publication of explicit ratings and comments about products on the Web site.

2) Recording customer activity (also called “non-reactive approach”)

Shops usually record transactions in a database. This can be done both online and offline. Large offline retail shops like Safeway, Migros or Coop have introduced membership card programs to identify customers during their purchase transactions and to keep an identified log on their transactions (e.g. Migros Cumulus card). In addition to

information about transactions, online shops store information about the browsing behaviour of customers. Page visits can be tracked and the time a customer spends on a particular page can be stored.

Customers can even help to establish a new categorization scheme by interacting with a company. If specific products are simultaneously bought by a number of customers one could suspect that they serve a similar purpose and that it would make sense for other clients to know about the existence of the other product when buying one of the products from this cluster. An example for this “community-enabled categorization scheme” can be found at Amazon in the section “Customers who bought this book also bought …”

3) Usage of external data

External customer related data refers to data that (a) is stored in other than the e-commerce applications or (b) comes from external sources (e.g. market surveys). This data contributes to a better understanding of market tends and therefore the behaviour and preferences of the customer.

2.4 Step 2 – Data Processing

Particularly data collected from watching the customer (transaction or browsing histories) usually is not suitable to be used in information filtering algorithms directly. For this reason different data mining or web mining techniques are used to cluster and filter data. In these processes, a customer usually is classified in different stereotypes or (interest) groups. The derived information is stored in the customer profile for further processing. Data mining techniques can be applied to extrapolate trends noticed in the (large) database. This information can be used to improve and personalize the individual offer which a company presents to a client (Fischer et al. 1999). Unfortunately, as mentioned above, it can also be used to share customer data among a community of buyers without the customer’s permission (q.v. chapter 3).

Opportunities for personalization range from customization of the application interface to the customization of the product bundle itself. Virtually every information-based product can be tailored to the customer's needs. In addition to data mining, data processing is also about interactively learning from past interactions.

There is already a broad range of methods and tools for filtering information of which the full text query is the most simple and most commonly used one. Work in information filtering is mainly presented under the labels “information retrieval” and “knowledge management”. For the personalization of Web content and online-shops, there are integrated software packages available, such as One-to-One (Broadvision), Dynamo Relationship Commerce Suite (Art Technology Group), Personalization Manager (Net Perceptions) or ADAPTe (ResponseLogic). Taking a look at the general methods that can be used for personalization, one can distinguish between content-based filtering and collaborative filtering (Goldberg et al. 1992; Resnick & Varian, 1997).

Content-based filtering is based on annotating content objects (documents) with meta information or deriving the meta information automatically from the content of the objects themselves. A query specifies which values the meta information of matching documents should have. The comparison can be done directly, through affinity measures like vector space models or though neural networks. The shortcut of content-based methods is that the indexing (annotation with meta information) is an extra effort

that has to be invested. Additionally, when using automatic measures, the results are usually not sufficient when the query is targeted at “quality” of information, e.g. for books that may please a specific user.

In contrast to content-based filtering, collaborative filtering tries to match users with a similar taste. Customer profiles can provide personalization functions without a specific customer having an extensive history of transactions. Based on information of like-minded people “matching” documents are recommended. The basic idea is to electronically support the principle of the “word of mouth”. There are two forms, the first being interactive collaborative filtering where people interact directly (we will address this later when talking about community communication for customer support) and automatic collaborative filtering where users rate items and the system automatically calculates correlations and recommendations.

2.5 Step 3 – Information Output

In his book “Die Multioptionsgesellschaft” (the multi options society) Gross [1994] addresses the problem of today’s individuals who are confronted with too many options. In marketing, the existence of different variants of a product is usually seen as a possibility to differentiate one’s own products from competitors’ products. For the pragmatic customer the obligation to specify her wishes can be an obstacle. Say Peppers and Rogers (1997, 135): "[...] but for the busy customer who wants just what he wants, choice can actually prove to be a stumbling block to purchase." Personalization based on transaction and preference profiles enables a customer-specific selection from the wide range of options. The "burden of choice" is taken from the customer. Imagine a customer has already configured and bought a car, which also pleases another customer with similar taste – it is easier for the second customer to just order “the same configuration” than to run through the whole selection process again. Even if the customer wants to make some adaptations it is easier to start with the recommendation of a more or less fitting configuration than to start from scratch.

Following Glazer (2000) customers expect the following three features in electronic shops:

1) Comfort
2) Participation
3) Anticipation

All three issues can be addressed by personalization as described above.

In a brick-and-mortar setting most business customers are not aware of one another. The same applies today in basic electronic shopping environments. Clients are carriers of information that could be shared with others for the benefit of all interested parties. Uniting buyers in a virtual community of buyers, harnessing the potentials of the underlying IT-infrastructure, can help to exploit community knowledge. The technical challenge is to declare a strong semantic infrastructure for the product lines and map the semantics to the buying community, in order to achieve:

1) Accurate trapping of historical buying activity, by individual and by (implied) buying group (demographics)
2) Accurate predictive models of future buying behaviour, again by individual or by the implied group, and

3) Iterative mechanisms to correct semantic weaknesses within and across product lines.

Collaborative filtering is exactly about using information provided by other customers to improve the offer for an individual customer (cf. Figure 3).

Peppers and Rogers (1997) call sub-communities of customers with similar taste "affinity groups". By linking affinity groups with recorded purchase transactions of a big numbers of customers a knowledge bases emerges which can be used for the prognosis of future buying behaviour of individuals. Based on the buying behaviour of the respective peer group, customers receive recommendations for future purchases without even the need to look at a broad range of products.

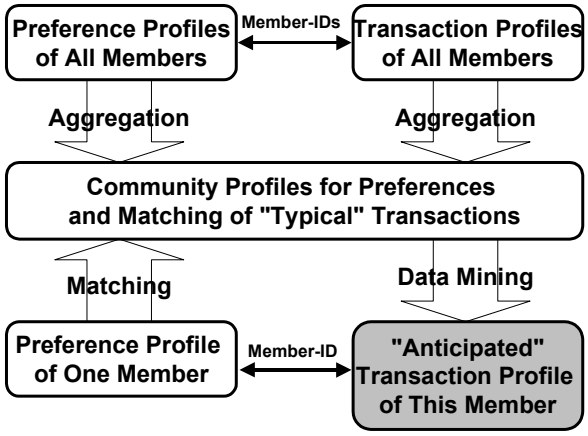

Figure 3: Collaborative Filtering: Building Affinity Groups (Schubert 2000, 7)

Preference and transaction profiles can also support buyers regarding recurrent purchases. Once individual settings (such as preferred airplane seat, choice of menu, kind of rental car, etc.) have been stored any future transaction can consist of only one "confirmation click" of the compiled product.

3 Privacy and Customer Profiles

The previous paragraphs provided an overview of possibilities, intentions and approaches in the field of customer profiles. In this section we will have a closer look at privacy concerns.

There are three main aspects that are important for the discussion about privacy and customer profiles: (1) The willingness of the customer to share data, (2) the willingness of the company to gather data and (3) legal requirements.

We assume that **the willingness of customers** to disclose personal data with a company is determined mainly by two factors: expected benefit from disclosure (BEFDI) on the one hand and concerns in terms of privacy and anonymity on the other.

The degree of user anonymity in the interaction between a user and the provider of a software application may range from onetime buying at a kiosk (full anonymity) to applying for a job with CV, picture and certificates (personal information disposed). The potential BEFDI for the user increases with the amount of data conveyed to the vendor. The BEFDI is mainly based on motivational aspects. The importance of the BEFDI for revealing data has been shown by (Treiblmaier & Dickinger 2005, 201).

The BEFDI is also directly related to another issue: the so called “cold-start problem”. The cold-start problem refers to situations in which applications can not provide sophisticated services (output) because of insufficient input profiles (Koch & Möslein 2005, 4/5). This causes the dilemma that the benefit from disclosure remains low until the user has provided sufficient information and the user is not willing to disclose personal data because of low benefit.

The concerns in terms of privacy and anonymity in general are based on the inability of effectively controlling stored data and the missing transparency about what is done with it. Ackermann and Cranor demonstrated that visitors of a banking website would be willing to provide information about income, investments and investment goals in order to receive customized advice more often (58%) if they did not have to provide their names and addresses (35%) (Ackermann & Cranor 1999, 5).

The willingness and needs of a company are theoretically determined by the intended use of the customer data. There is no logical requirement to collect data that is not used to either fulfil an order or for customer retention or acquisition programs. The assumption that most companies store more customer data than they will actually use was stated by Peppers and Rodgers (Peppers & Rodgers 1997, 361).

The increasing amount of data stored in companies can be traced back to the ever simpler and faster methods of computer-based gathering of data. A vivid example is website logfiles. As shown in chapter 2, storing data from various sources is only one – probably the simplest – step in building up and effectively using customer profiles. Piller et al. state that knowing for what and how customer data and information can be used is more important than knowing how it can be gathered and processed (Piller et al. 2003, 238).[1] Unfortunately most companies still seem to follow a “more is better”-approach and therefore start the customer profile life cycle (Figure 1) right in the middle.

The need for **legal principles** concerning privacy was primarily discussed by Warren and Brandeis because of emerging technologies like instantaneous photographs and the spread of newspapers in the late 19th century (Warren & Brandeis 1890, 194). The “right to be let alone” (Warren & Brandeis 1890, 194) has been extended and adapted most notably to give consideration to the possibilities of emerging information and communication technology and the new ways of electronically collecting and processing sensitive data. The Swiss data protection (DSG 1992) law recognizes three types of customer data: (1) personal data, (2) especially worth protecting data and (3) personal profiles. A forth category that is not mentioned in the law is data not worth protecting such as the one that is open to the public (e.g. address data that is willingly published on a web site). Personal data is any data that can be linked to an individual. Data that is especially worth protecting is personal data relating to opinions, attitude or activities in terms of religious, ideological or political mindsets, health files, etc. A personal profile is considered a set of data that grants insight into substantial characteristics of a real world person.

Summing it up, we argue that privacy concerns within the boundary of legal principles are determined by motivational issues on the one hand and the perceived transparency

[1] Original citation: „Wichtiger als zu wissen, wie Daten und Kundeninformationen gesammelt und ausgewertet werden, ist es zu wissen, wofür und wie diese Informationen zu nutzen sind.“ Piller et al. 2003, 238.

in the use of the data on the other hand. Companies should therefore clarify which data is stored for what reason. The defined reason as well as the benefit from disclosure should convince the customer to provide accurate information for even better offers and services.

4 Digital Identity Management

Digital Identity Management deals with the representation of real world identities (individuals) in electronic environments (e.g. the WWW). While most people have only one single physical identity, most online users have various online representations like e.g. user accounts on gmx, wallmart, ebay etc.

As Koch & Möslein conclude, “the two important features of identity are 1) the process of verifying that a person is who he claims to be, and 2) identity as the sum of all information describing a specific person.” (Koch & Möslein 2005, 3)

The feature mentioned in 1) has broadly been addresses by publications in the field of identification. **Identification** in particular deals with the declaration of identity attributes (e.g. username, password, and fingerprint). The steps of **authentication** (verifying the identity by checking the submitted attributes) and **authorization** (granting rights to the user) are often subsumed to the term identification.

In the field of CRM identity is more often seen as the sum of all information describing one specific person. However identification is needed to verify the identity of a person, the sum of all information/data – also referred to as customer profile – can contribute to improve the knowledge from, for and about customers and to establish loyal relationships. Therefore identification is needed to enter an application (login) and customer profiles are needed to support the interaction (content, functions, and design) once the user/customer has been identified. Hence the volume of identification data is often very small (e.g. username/password) in comparison to customer profile data (cf. Table 1).

A promising advantage of Digital Identity Management in terms of identification is the possibility of only having few “identities” (at best only one identity) to access different services and thereby reducing accumulations of log-in attributes. This advantage is referred to as single-sign-on. From a theoretical point of view, combining identification and profile data to be used in different applications could contribute to solve the twofold problem of BEFDI and concerns about privacy and anonymity by: “giving control of identity information back to users (to solve the distrust problem) and allowing the reuse of identity information among the different personalization services (to solve the cold-start problem)” (Koch & Möslein 2005, 5).

However there are some serious restrictions to be addressed in practice, before a user will be able to really control and transfer all of his or her profile data. Namely the diverse and distributed data sources holding customer-related data within a company, the willingness of a company to give control of “its” data to the customer, the willingness of a company that a user transfers data to its competitors and, last but not least, the suitability of (a) the content and (b) the structure of the data to be used in different applications.

5 Conclusions and Further Research

This paper summarizes the preliminary status of our ongoing research in the field of customer profiles and personalization. In previous steps, the Customer Profile Life Cy-

cle was developed and theoretical appearances of customer profiles have been identified. However, more work has to be done in the field of applying customer profiles, use of customer data and privacy aspects.

Our research focuses on a practical approach in the field of customer profiles and personalization. Questions to be answered are for example: how do companies (global players as well as SMEs) gather, store, analyze and use customer data? What kind of data is stored and what part of this data is effectively used? What kind of data is required to understand and model user needs? How can this data be processed to get meaningful and useful information? How can user interfaces be individually adapted at the same focusing on user intention?

These and similar questions will be examined in an upcoming field study. Based on the results of this study a framework will be developed that demonstrates how the different kinds and classes of data can be used and maintained.

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