Review on Benefits and Risks of Personalization and Solutions for Privacy Concerns

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Abstract: Personalization and its application in various fields have experienced a growth in significance over the last years. Personalization strategies are used extensively – especially by businesses which act in digital environments – to provide adequate information and offers for customers, based on their specific needs and preferences. By implementing personalization activities, businesses aim on the generation of a competitive advantage. Naturally, such activities do not come without implications in terms of risks and benefits for the business. The aim of this article is to provide a structured overview on the implications related to the utilization of personalization, to help the understanding of opportunities and threats for business practitioners. With respect to this research aim, we conducted a literature review and identified main risks and benefits. We identified groups such as customer satisfaction, increase of business key performance indicators and reducing problems of big data as positives results of personalization. Additionally, groups such as technological risks, legal constraints or privacy concerns are issues which can influence the business negatively. We finally, emphasize possible existing solutions in order to overcome privacy concerns of personalization.

Keywords: Information overload, Personalization, Legal concerns, Privacy concerns

1. Introduction

The process of personalization in order to reach personal desires of individuals, experiences a rise in importance. Especially with the development of the Internet, online places and technology, personalization has experienced a totally new rise in significance and occurrence. It has become a very important phenomenon creating not only technological values, but also economic values for marketing. Research has increased in various industrial branches and science including for example marketing, information science, computer science and management [1].

Generally speaking, personalization is the process of collecting and utilizing personal information about the needs and preferences of customers to create offers and information by the company, which perfectly fits the needs of the customers. These offers aim on generating specific reactions among the customers taking place on- and offline. Personalization is used worldwide, creating additional values among consumers. Due to the developments in (mobile) communication

technology, a significant rise in attention of personalization in research and application has been recognized. Reasons for this quick emergence in scientific fields were already anticipated by Murthi and Sarkar [2]. First, these authors see a competitive advantage, which is beneficial for businesses. Second, firms offer value-added services when reducing the huge amount of choices by utilizing personal information. Third, costs of personalization declined as the economics of collection, storage and processing of data have changed. Nevertheless, it is conceivable that businesses are not only exposed to possible benefits, when conducting personalization, but also to risks. A balanced consideration and structured overview of risks and benefits has – to our best knowledge – not been the focus of other research work. However it is relevant for businesses, which should be enabled to implement personalization in a meaningful way, having the benefits on the one side and risks on the other side. It is thus relevant to give a structured overview on common risks and benefits related with the concept of personalization.

To answer this basic research issue, we identify the known advantages (benefits) and disadvantages (risks) of personalization by conducting a traditional literature review and highlight the main issues. We analyzed and structured the results of the review to aid problem understanding for business practitioners. Subsequently, possible present solutions to overcome personalization constraints in regard to privacy issues are emphasized.

Our contribution is structured as follows: first, we give a short introduction into the topic. Subsequently, two recent applications for personalization activities are described to depict the implications for businesses and customers. Section 3 constitutes astructured elaboration of the different kinds of risks and benefits that come along with personalization. Section 4 draws on possible existing solutions to overcome personalization constraints regarding to privacy concerns before we conclude the findings in the last section.

2. Applications of Personalization

The area of music is one important example of the actual developments in terms of personalization applications. Special systems aim on promoting new music to customers, which is very difficult imagining the huge amounts of songs published each day. One system which intends to provide personalization music recommendations is Genius implemented by Apple iTunes. As stated in Apple.com [3], Genius has several fields of application e.g. Genius Mixes, Genius Playlists or iTunes Sidebar. The central element here is iTunes Sidebar. As far as it is turned on and one song or movie of the library is being played, it suggests similar songs or movies to the one selected. This recommendation of the iTunes Sidebar can be pre-listened/pre-viewed and purchased. One has to be aware of the fact that this stays in contrast to collaborative filtering because it fits into a content-based recommendation as the songs are selected according to similarities of the song being listened. This concept does not go without challenges as for example missing data, scalability or heterogeneity [4].

One outstanding emergence over the last years is the development of social networks. Alsoin these fields, personalization is used extensively. Social network providers contain huge amounts of data. According to Zhou et al. [5], online information and sources of knowledge, flood users every day, posing a new challenge of information overload. Recommender systems have been applied on social networks helping users to deal with information overload successfully. Data mining (Big Data) is an emerging research direction in this branch. "In the recent years, many research groups have invested much effort on Web personalization, trust and reputation, and recommendations, and have made many great achievements"[5].

Today, one realizes a growing commitment of academic research on personalization, especially in the fields of online personalization, marketing and social networks. Research focuses

on personalization application like the two examples mentioned above. What is especially important is a growing commitment in the research area of personalization from a human-centered view. Privacy concerns in personalization are one research area, where the customer stands in the middle, not various technological implications and innovations. This is especially important if research aims on contributing to problem-oriented research streams, where the acceptance and focus on human behavior is relevant.

3. Structuring Main Benefits and Risks of Personalization

In this section, the benefits and risks of personalization based on a conducted traditional literature review are structured and described. At the beginning of this section we provide a definition of personalization, which we emphasize in this contribution. Subsequently, an overview of main relevant academic contributions dealing with benefits (see Table 1) and risks (see Table 2) of personalization is given and describe in more detail.

The analysis is conducted based on the following definition of the concept of personalization: Adomavicius and Tuzhilin [6] define: "personalization tailors certain offerings (such as content, services, product recommendations, communications, and E-commerce Web sites) to consumers (such as customers and visitors) based on knowledge about them, with certain goal(s) in mind". Gauch et al. [7] differentiate personalization into explicit and implicit. Explicit personalization relates to direct communication with users whereas implicit personalization relates to special agents, which are utilized to observe the user, catch his browsing history and save the relevant data. These two theories serve as determination of personalization for the rest of this contribution.

Based on the literature review, four main benefits and four main risks of personalization can be emphasized: Personalization is utilized to enhance customer satisfaction and consumer loyalty. It provides the opportunity to reduce big data issues and raise key performance indicators of businesses. Finally, also challenges in E-Commerce can be overcome. Nevertheless, various risks can be identified: Mainly, risks related to privacy concerns of customers; risks based on the underlying technology and legal challenges. Additionally, also the phenomenon of echo chambers can be experienced.

Table 1: Literature on Benefits of Personalization

Benefits	Sources
Customer Satisfaction & Consumer Loyalty	[8][14]
Reducing Big Data Issues	[9-12]
Raise Business Key Performance Indicators	[13]
Overcome Challenges in E-Commerce	[14]

Risks	Source
Privacy Concerns	[15-19]
Echo Chambers	[20]
Technological Risks	[21-22]
Legal Challenges	[23-27]

3.1 Benefits

Personalization strategies and personalized services may help facing and overwhelming the problem of information overload and mass customization. This chapter aims at giving a short overview on different advantages of personalization: customer satisfaction and consumer loyalty, big data, key performance indicators and problems in e-commerce.

3.1.1 Customer Satisfaction and Consumer Loyalty

Personalization in the area of marketing and E-Commerce tends to increase customer retention. If these impacts on customer satisfaction and consumer loyalty are known in detail, the process of personalization can be efficiently improved and adapted to consumer needs and preferences. Successful personalization strategies guarantee unique values and benefits for each customer. Concentrating on customer loyalty and increasing the profits is hence more important than gaining market share through acquisition of new customers. Nevertheless, it is a long-term relationship based on customer satisfaction that can be achieved when fulfilling individual needs and preferences through personalization. Successful personalization is based on several elements. The first one is a detailed collection of user information that is then analyzed by Customer Relationship Management (CRM) tools in order to support selling operations. Only if customers are seen on an individual level, it is possible to propose special and individualized offers to them. The longer a customer is interacting with the firm's website, the more accurate information can be collected and subsequently analyzed. Proposals for personalized offers can then improve customer loyalty and hence increase the profits. Trust is an important element when focusing on personalization in the fields of marketing and hence on consumer loyalty. Customers should believe that a service provider "will not take advantage of the relationship to enrich himself at the customer's expense, and will deliver what is required by the customer, not just what is convenient for the firm" [8]. Personalization hence helps marketers and businesses to enhance customer satisfaction, create additional consumer loyalty and thus to improve the binding of the customers.

3.1.2 Reducing the Problem of Big Data

The mass of data constitutes a certain challenge for businesses. There is a need for smart algorithms to reduce the abundance of the resulting data. Only by accurate search parameters a reasonable data output for these amounts can be guaranteed leading to useful information. This is one task of personalization; it tries to overcome the problem of big data and filters only relevant information for business on the one hand and for customers on the other hand. One clearly recognizes the need for personalized systems in order to provide customers the information that is tailored to their needs [9]. The digitization process in general and big data in particular advances personalization. Goldhammer [10] states, that this new evolution of data, the huge confrontation with big data and the control over this development, is called "the new oil of the information age."Rutherford and Botha [11]highlight the positive impacts that personalization may have: alleviating information overloads and describing the additional benefits in E-Commerce. The ultimate goal is to filter unnecessary information out of the research results and perfectly provide only the information the user wants and needs. Parekh [12] also states that personalization contributes positively to overcome the information overload. He concentrates on content personalization and states that a user can set his personal settings. According to his point of view, it is the user who has to react actively, not the system itself. Various authors [9-12] come to the same conclusion that personalization is a useful tool in filtering information and reducing big data flows.

3.1.3 Raise Business Key Performance Indicators

The traditional parts of economic success, as for example turnover, profit, gross margin or customer-lifetime-value, are naturally important indicators for the performance of the business. Riemer and Totz [13] investigate the impacts of personalization on customer retention by means of switching costs. Switching costs or switching barriers are used in microeconomics or marketing in order to describe to costs of customers when changing the supplier or service provider. Following [13], switching costs are divided into direct switching costs, opportunity costs and sunk costs. By the construction of switching barriers for customers, personalization contributes valuable to the rise of business key performance indicators.

Direct switching costs are financial charges used for actively looking for new providers or vendors. Examples would be negotiation and arrangement costs as well as costs for building new relationships. Personalization strategies decrease the competitive comparability, as the assessment of other providers' product aspects becomes time consuming.

Another part of switching costs is opportunity costs. Opportunity costs are lost revenues resulting from the fact that existing opportunities for the use of resources are not taken into account. The customer's net-benefit is increased by personalization, as in case of a migration the net-benefit would be totally lost.

The third part of switching costs is sunk costs. Sunk costs are costs that have already arisen and cannot be undone. This includes costs that have resulted in pay-outs, as well as those future costs that will incur irrevocable. Its central feature is that they can be influenced neither in the present nor in the future. In case of migration, the customer would lose all investments and must again provide information to a new vendor, which is very expensive. Riemer and Totz [13] describe that sunk costs lead to a declinein the spending of money for new relationships with other firms. Hence, it can be said that the willingness to migrate to other providers and vendors decreases with an increase in switching costs and with an increase in customer loyalty and relationship. Personalization is hence utilized to save costs.

3.1.4 Overcome Challenges in E-Commerce

The personalization process aims at providing personal product recommendations depending on various criteria as for example the customer's purchase behavior. For marketers in E-Commerce sectors, it is therefore necessary to create recommendation techniques. Goy et al. [14] describe the usage of so-called "dynamic taxonomies" which goal is to gradually reduce the search space of an E-Commerce website. The idea behind this approach is, that the user knows better about his preferences and that the system should not try to find his preferences on its own. Other E-Commerce providers use the feature "products similar to products already bought" or "customers who bought" as for example Amazon. As the sector of E-Commerce has experienced a non-deniable evolution over the last decades, many nations have adopted special laws and regulation in order to put a certain control on it and regulate, which beneficial approaches of personalization can be legally utilized by businesses which are active in E-Commerce.

3.2 Risks

Although personalization has many positive effects, one has also to take disadvantages into account. Risks and possible threats will be elaborated in the following parts. Table 2 shows a short overview on the existing literature that constitutes the basis for this chapter.

3.2.1 Privacy Concerns

When discussing the research area of personalization, it becomes clear that users often are uncomfortable to share private information with websites. User profiles are created through special algorithms representing the user's personal interests. The information can be based on the browsing history, emails or other kind of user-related data. Items that can be found frequently are regarded as being interesting to users. Xu et al. [15] propose to create a hierarchical user profile according to the items' frequency of occurrence. The information delivered to the consumer is personalized and coordinated to his personal interests. Anton et al. [16] prove that privacy concerns of personalized web search have experienced an increase, which might be the result of an intensification of online advertising and E-Commerce.

Privacy risks and concerns need to be treated seriously. Taking the example of social networks, a user can be confronted with the situation that embarrassing information is dispensed directly to friends or colleagues. Another example, which is given by Toch et al. [17] is Facebook's personalization attempt in 2007 when Facebook introduced a feature called "Facebook Beacon". This feature permitted third parties to get access to user profiles in order to deliver individualized information, offerings and advertisements. Due to a strong public opposition because of private information exposure, Facebook had to retract it a few weeks later.

Kobsa [18]identified four reasons why data privacy gained importance in the late 1990s: First, personalization and its systems moved from offline to online. Websites were created in a user-friendly way collecting private data on user profiles. Second, there are more sources of user data available today. Third, analyzing this user data that has been collected has become more powerful. Finally, privacy regulations have arisen imposing a variety of restrictions on Internet providers. Additionally, Toch et al. [17]divided the new privacy challenges into three dimensions: social-based personalization, behavioral profiling and location-based personalization.

Wang et al. [19] investigated a different approach to privacy concerns of Americans, Chinese and Indians. According to the result, American users tend to have more concerns than their Chinese and Indian counterparts. Another difference can be found in the type of information, because privacy is considered differently among diverse cultures.

3.2.2 Echo Chambers

The Echo Chamber Effect was described by Weinberger [20] in 2004. This effect is based on the well-known phenomenon that people like to surround with people who share related views or even the same point of view. Since the rise of the Internet, some people tend to mainly reside in those online communities in which their own views are represented. In other terms, they listen to their own echo.

This can result in a situation where, after a while, people believe that almost all other persons or at least the nice and reasonable, share their own views. This sounds relatively harmless - nevertheless, the implications need to be assessed critically. The consequence may be that people are fixed to their own views, because they tend to believe that a majority is thinking in the same way, which approves their individual opinion and view. Weinberger [20] states that the Echo Chamber Effect on the Internet is not that frequent. He convincingly explains that the milder form has always existed: in the selection of the papers and television broadcasts that people read and see [20]. The huge challenge of avoiding echo chambers is to become proactive by looking for other information sources and opinions.

3.2.3 Technological Risks

Zhang [21] describes a technological approach towards the risk of personalization, where "behavior-based personalization can hurt the profits of competing firms". Following this contribution, behavior-based personalization constitutes a peril because the result is price discrimination between firms ending in an even more intensified price competition. Behavior-based personalization influences companies' profits in a negative way.

The question one might pose is, if behavior-based personalization brings benefits for firms or not. Fudenberg and Tirole [22] for example find that this form of personalization has an impact on the price sensitivity, namely that it is reduced through personalization. Following Zhang [21], behavior-based personalization influences companies' profits in a negative way. But regarding it from a consumer's point of view, personalization can have a positive influence on them. Firms' profits on the other hand are harmed because of strengthened competition.

3.2.4 Legal Concerns

Finally, the importance of privacy laws in the online sector has risen – not only because of the application of personalization by businesses. Online advertising consists nowadays more and more of personal advertising, so that certain Internet users respond annoyed because of the personal information which is known about them. Special technologies to collect the online history of a user and analyze the online behavior are utilized. Especially the European Union contributes in harmonizing legal standards throughout the member countries. The directive on data protection has been amended and intensified recently.

"Directive 2002/58/EC of the European Parliament and of the Council of July 12[th]2002 on the processing of personal data and the protection of privacy in the electronic communications sector" provides, in Article 5, the confidentiality of communications in the context of public communications networks. Article 5 (3) specifically refers to the use of electronic communications networks to store information or to gain access to information stored in the terminal equipment of a subscriber or user with reference to the use of cookies. In the center of the so-called "EU telecoms reform" was the Data Protection Directive on privacy and electronic communications, including article 5 (3). This section was changed resulting in a tougher regime for cookies.

Number 66 of the reasons of the Directive 2009/136/EC constitutes that "Third parties may wish to store information on the equipment of a user, or gain access to information already stored, for a number of purposes, ranging from the legitimate (such as certain types of cookies) to those involving unwarranted intrusion into the private sphere (such as spyware or viruses). It is therefore of paramount importance that users be provided with clear and comprehensive information when engaging in any activity which could result in such storage or gaining of access".

In practice, it is already attempted to implement the above-mentioned policy requirements according to its prerequisites. The amendment of the directive constitutes a new handling of cookies and hence a new handling of personalization in the fields of marketing. The discussion about greater transparency and security in online targeting should be continued on a European level based on the previous proposals [23].

Within the European Union, various authors focused their research on the influence on laws of German speaking countries [24-27]. Especially the conflict of personalization strategies with basic privacy laws constitutes a central element in their findings. Referring to the definition of personalization, one now realizes the importance between implicit and explicit personalization. The distinction is important not only for transparency for the user, but also for legal handling of this issue. The development of different acts in the fields of telecommunications clearly shows the emphasis that is put on the involvement of users when it comes to personal data. The different legal

regulations follow the distinction in implicit and explicit personalization, as users have to confirm the use of personal data, for example for location-based services. This is very often combined with special treaties or general terms and conditions.

4. Possible Solutions for Privacy Concerns

Research on possible solutions in the fields of personalization and especially to overcome privacy concerns of personalization is an ongoing process, especially because the continuous emergence of new technological possibilities as well as a constant change in user behavior. The achievements up to now must be considered as a first important step towards better and safer personalization. Two fundamental solutions which have been scientifically developed so far to reach this aim are pseudonymous and client-side personalization (see Figure 1).Whereas the first one focuses on a pseudonym so that the system cannot track the user, the latter describes the abandonment of storing personal data at the server.
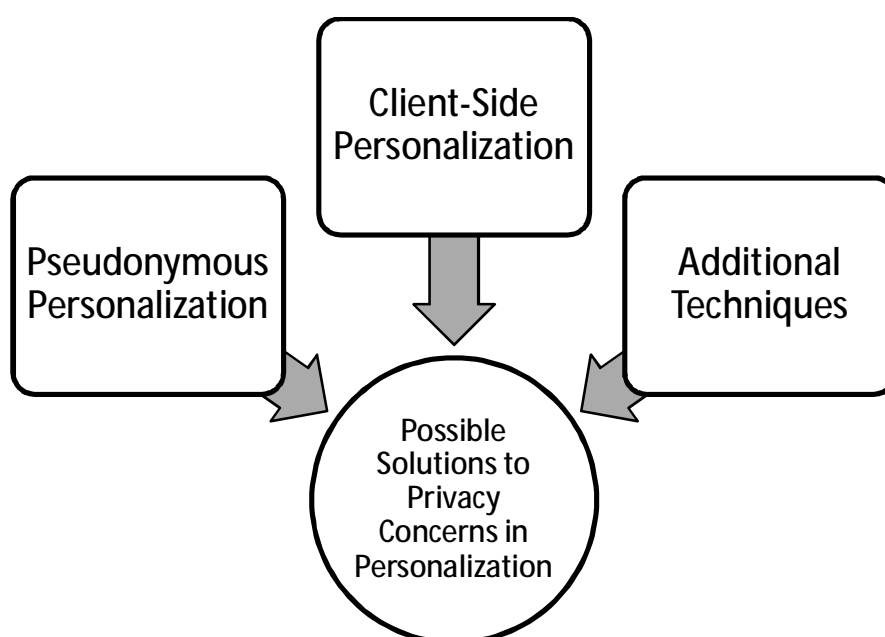

Fig. 1: Solutions for Privacy Concerns in Personalization

Regarding pseudonymous personalization, the system needs to be arranged in a way that a special pseudonym is tracked across various sessions. Personalized service is then provided, but with the difference that the system does not know the personal identity behind the pseudonym. Besides the advantage that personalization hides the identity at all, in many countries, privacy laws are not applicable when the interaction is anonymous. Even if the objective is clear and advantageous, it is hard to realize. If for example any kind of payment service is involved, personal data of the transaction parties are needed, at least by a third transaction service provider. Additionally, other data sources on the Internet can reveal a person's identity even if he uses pseudonyms [17].

Kobsa [18] names the following characteristics that are vital to run pseudonymous personalization: unidentifiable for neither the personalized system nor third parties, linkable for the personalized systems to specific users, unlinkable and unobservable for third parties. In order to realize this concept successfully, a user needs a pseudonym. Generally speaking, maintaining an

account anonymously is very hard, as one has to reveal personal data when it comes to transactions of payments and other procedures similar to that, but still, it constitutes one element contributing to safer and individually more accepted personalization.

Another solution is client-side personalization. The core element of this concept is an abandonment of storing personal data at the server side of companies and store data at the client side as for example at personal computers or mobile devices. The process of personalization itself then takes place at the client-side as well. A client-side approach has two major advantages[18]. On the one hand, the privacy concern becomes smaller since most of the data is not stored at the server. There is no control from the server over any data of users. On the other hand, users might be more inclined and might disclose more data as the process of personalization takes place locally on their own devices.

But client-side personalization does not only bring advantageous effects, there are also some challenges that need to be faced. Typical personalization processes, as for example collaborative filtering, cannot be applied anymore, as they rely on an analysis of data from all users stored at the server side. This process has to be redesigned radically or replaced by another approach. Additionally, business rules that can be found in these program codes must be protected from disclosure. Summarizing, client-side personalization can be regarded as a solution which is still facing undeniable challenges. Thus, suitable tools have to be incorporated in this approach. Once that has been done, a huge step towards a minimized risk in personalization can be introduced [17].

A very new approach was introduced by Wang and Kobsa [28] that is based on a software product line architecture. This architecture aims at developing the variability in the privacy as well as personalization domains. It therefore constitutes a dynamic configuration of personalization strategies in use for each user respecting both the privacy norms and user's privacy preferences. Also Toch et al [17] aim at reconciling personalization and privacy concerns. Apart from the above-mentioned solutions, they also concentrate on other privacy-preserving techniques as distribution and aggregation. An especially interesting contribution to solutions is the inclusion of users themselves in terms of user feedback and user control. The intention of this approach is making users scrutable by making them understand and control of what is happening in a special user model and how it is maintained. Despite all, this approach is still limited due to consumers' lack of considering of these notions and due to the possibility of revealing personalization techniques by service providers.

Another different approach was effectuated by Kelley et al. [29] concentrating on the so-called user-controllable policy learning. This model also includes the user in an active way where a common policy is agreed upon by user and provider and feedback is given, which then leads to incremental policy improvements suggestions. The user then decides whether to accept this suggestion or not. In this way, the user keeps control and can still make some modifications. However, it is not totally clear that such architectures are capable of mitigating privacy concerns in the creation phase. Knijnenburg et al. [30] have shown that in recommender systems a tradeoff between the usefulness that is perceived by users and privacy concerns exist. Customers seem to provide more feedback when they have a better user experience and maintain their privacy. General answers for supervising data collection that are useful to personalization contain opt-out cookies and the "Do-not-track" mechanism for Internet usage tracking explained by Mayer and Mitchell [31]. The mechanism adds an HTTP header to express the user's intent to opt out of Internet tracking.

Beside these fundamental solutions to overcome personalization constraints in regard to privacy, additional solutions are available: distribution, aggregation, perturbation, obfuscation, user controls and feedback, and privacy-preserving location tracking. The main goal of these techniques

is an abandonment of data store in central repositories. They are used additionally together with client-side personalization, as recommendations have to be compiled.

5. Conclusion

This contribution highlights the importance of personalization. The literature focuses mainly on the technical side of personalization. Nevertheless, the risks and benefits for businesses as well as the implications for and acceptance by customers should more and more move to the center of future research efforts as additional knowledge about these issues provides valuable insights in processes and improvements for business performance when the resolution of technological issues are exploited.

This article contributes a review to the research area of risks and benefits of personalization as well as the approaches to the resolution of privacy concerns in personalization. It should give practitioners and experts an overview on personalization issues which need to be addressed when the implementation of personalization is planned or imminent. Academic research should put an emphasis on benefits and risks of personalization. As personalization constitutes a central process in marketing and online web communication a stronger focus on solutions will be necessary. After the literature review has been conducted, we came to the conclusion, that fields of benefits and risks as well as on solutions, which help to overcome the risks of personalization, still lack enough interest of academic research. Nevertheless, the existing literature constitutes a starting point for further research and development. Businesses acting in digital environments will make use of personalization in the future as a competitive advantage can be attained, but they will also need elaborated concepts of solutions for imminent risks.

It is without any doubt that the process of personalization will exist and develop. It will certainly experience a deeper anchorage in the fields that are mentioned in this paper, but it has also take the several challenges – also the human-side issues – into account. Only when doing so, personalization can be improved and hence constitute a lasting advantage for consumers and users. Today's huge amounts of data and the problem of increasing information will not foster a reduction of personalization, as this will be the major approach to reach the consumer with relevant information. It has to respect legal restrictions and the individual freedom of people with regards to personal rights. Comparing challenges and benefits, one will see that personalization is a useful tool and benefits will predominate. Personalization is a new trend and needs to be improved, but it is useful and will exist in the near and far future.

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