Chapter 4

Research Model, Hypotheses, and Methodology

This chapter deals with the research model. In the first step the problem statement of the work is defined. Based on that, the research questions and the research model are elaborated. Thereafter, the hypotheses are summarized. The chapter ends with a section that deals with methodological aspects.

4.1 Problem Statement

The majority of research literature regarding recommender systems deals with this topic from the viewpoint of computer science. The focus is on the underlying algorithms for generating recommendations [KSS03, SKKR00, BS97, Bur02, SVA97, Run00]. The existing research concerning the marketing perspective (e.g. the influence of recommendations on consumers decisions) is still scarce [SN04, HK04, HM03, CLA+03, HT00].

The book strives to identify the underlying psychographic factors of consumers that determine: (1) the interest in personalized recommendations, (2) the interest in engaging actively in virtual communities of transaction located at online purchase environments by submitting product-related ratings and comments,
and (3) the interest in *product–related opinions of other consumers* in virtual communities.

Virtual communities are important for recommendation applications, especially if collaborative filtering is applied for recommending products and services. As mentioned in Section 3.5.2.3, collaborative filtering is an approach which applies *similarities between users' tastes and preferences* for recommendation purposes. The basic idea behind collaborative filtering approaches is that items are recommended to the active user, which other users liked in the past (user-to-user correlation) [SKR01]. Especially when using explicit data acquirement, it is important to have a lively community organized at the online purchase environment in order to learn preferences of consumers for recommendation purposes.

However, when collaborative filtering is applied, the following problems arise (for a detailed description see Section 3.5.2.3):

- A critical mass of community members is required.
- If explicit methods of data acquirement are employed, the members must be willing to submit product–related ratings.
- The members of the community must generally have a positive attitude towards the opinions of other members, because recommendations are based on them.

Consequently it is of interest, which psychographic factors of consumers are tangent to the problem areas mentioned above. The following section deals with the research questions based on these problem areas.

### 4.2 Research Questions and Model

The central research question of the book is: *Which psychographic factors are of major importance for the acceptance of online product recommendations*
and the commitment to participate in the virtual community of an e-vendor by submitting ratings and comments of products?

The author tries to address this question by applying the opinion leadership theory in the context of online book recommendations. The author has chosen books as the product class because of the following reasons:

- Books are the most prominent product category sold over the Internet worldwide and in Austria [AIM05]. Hence, it is more likely that the respondents of the survey have experience in buying books and with book recommendations respectively.

- Books are a product class where subjective tastes and preferences are of high importance for the buying decision. As a consequence, word-of-mouth and virtual communities are important facets in this product category.

- Selling books over the Internet is a typical application domain for recommender systems based on collaborative filtering or summarization of community opinion.

Opinion leadership is a well-established and well-researched concept in marketing [BME01, MG95]. The term "opinion leadership" was introduced to scientific debate by Lazarsfeld et al. in 1944 [LBG44]. The study of the 1940 presidential election examined the influence of relatives, friends, and coworkers on voting decisions. The concept was applied to the field of consumer decisions by Katz and Lazarsfeld in 1955 [KL55]. Empirical evidence of the importance of opinion leadership was fostered by King and Summers in 1970 [KS70].

In the field of consumer decisions opinion leadership is understood as the exertion of an unequal amount of influence by consumers in the purchase behavior of others [FGE96]. In general, opinion leadership stimulates interpersonal communication ("word-of-mouth"). One aspect of this process is that opinion leaders tend to give recommendations to other consumers ("advice giving word-of-mouth"). With the application of recommender systems e-commerce vendors try to mimic or support this process by the use of information systems. Hence, it seems suitable to apply the opinion leadership concept to get...
a better understanding of online recommendations and community activity in e-commerce environments.

Consequently, the question arises which underlying factors determine opinion leadership. Marketing literature has identified involvement with the product category as an important factor of opinion leadership [RRS98, FP87, RD71]. Product involvement is often viewed as the long-term interest in a product class based on the centrality to important values, needs, or the self-concept [Blo81].

Figure 4.1 summarizes the already empirical tested background theory of the book. Product involvement positively affects opinion leadership and opinion leadership itself has a positive influence on word-of-mouth [RRS98].

\[ \text{Involvement} \rightarrow \text{Opinion Leadership} \rightarrow \text{Word-Of-Mouth} \]

Figure 4.1: Background theory of the book

The research model shown in Figure 4.2 adapts the basic research model towards e-commerce applications and includes the interest in online-product recommendations. Word-of-mouth is specified as the interest to contribute product-related comments and ratings to the virtual community of an e-vendor. Acceptance of recommendations in general is defined by the interest in receiving personalized online recommendations by an e-commerce application. Further, the opinion seeking concept is added to the model. Opinion seeking occurs, when individuals search out for advice from other consumers when making a purchase decision with respect to a certain product class [FGE96].

Because some inadequacies regarding the involvement variable have been identified in literature [RRS98], the unidimensional approach to product involvement is substituted by the multifaceted construct of product involvement proposed by Kapferer and Laurent. According to these authors, involvement is a multifaceted construct along five dimensions [KL86]. It consists of the perceived importance and risk of the product class, the subjective probability of
making a mispurchase, the symbolic or sign value, the hedonic value of the product class, the hedonic value of the product class and the interest in the product class.

The author assumes that the symbolic or sign value and the hedonic value facets of product involvement influence the opinion leadership behavior. Furthermore, a positive relationship between the risk of a mispurchase facet and opinion seeking is assumed. Additionally, it is hypothesized that opinion seeking behavior has a positive effect towards the interest in reading product-related comments and ratings. Finally, it is assumed that the participation in a virtual community (i.e. reading and submitting product-related comments and ratings) has a positive influence towards the interest in personalized online recommendations.

Figure 4.3 presents the extended research model, where the influence of further psychographic and sociodemographic factors is examined. Domain-specific innovativeness reflects the tendency to learn about and adopt new products (or innovations) within a specific domain (i.e. product class) [GH91]. It is assumed that domain-specific innovativeness has a positive influence on the interest in recommendations. Impulse buying tendency is a further psychographic determinant found in the extended model. It refers to the degree to which an individual is likely to make unintended, immediate, and unreflective purchases.
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(i.e. impulse purchases) [WJB97]. A positive influence towards the interest in personalized online recommendations is expected. A further psychographic factor found in the extended model is skepticism towards advertising. This factor is defined as a general tendency toward disbelief of advertising claims [OS98]. Because personalized online recommendations can be understood as personalized kind of advertising, it is assumed that skeptic persons have a lower interest in recommendations. The influence of privacy concerns and experience with online shopping is also investigated in this extended model.

In addition, the influence of demographic factors (e.g. age, gender, income) are investigated. Table 4.1 summarizes the hypotheses that are derived from the extended research model and are investigated in this book.

Besides the influence of psychographic and sociodemographic determinants on the acceptance of recommendations and community activity, the following research questions are addressed in this book by means of exploratory research:

- **Does the delivery of recommendations affect impulse buying behavior?**
- **How important are product-related reviews that originate from different
## 4.2. RESEARCH QUESTIONS AND MODEL

### Table 4.1: Research hypotheses

<table>
<thead>
<tr>
<th>No.</th>
<th>Hypothesis</th>
</tr>
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<tbody>
<tr>
<td>H1</td>
<td>The higher consumers assess the hedonic value of books, the more likely they tend to engage in opinion leading.</td>
</tr>
<tr>
<td>H2</td>
<td>The higher consumers assess the symbolic sign or value of books, the more likely they engage in opinion leading.</td>
</tr>
<tr>
<td>H3</td>
<td>The higher consumers assess the risk of making a mispurchase, the more likely they engage in opinion seeking.</td>
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<tr>
<td>H4</td>
<td>The more consumers engage in opinion leading, the more likely they are interested in writing book-related reviews in virtual communities of e-vendors.</td>
</tr>
<tr>
<td>H5</td>
<td>The more consumers engage in opinion seeking, the more likely they are interested in reading book-related reviews in virtual communities of e-vendors.</td>
</tr>
<tr>
<td>H6</td>
<td>The more consumers are interested in writing book-related reviews, the more they are interested in reading reviews of other consumers.</td>
</tr>
<tr>
<td>H7</td>
<td>The more consumers take part in a virtual community, the more they are interested in personalized book recommendations.</td>
</tr>
<tr>
<td>H7a</td>
<td>The more consumers are interested in writing book-related reviews, the more they are interested in personalized book recommendations.</td>
</tr>
<tr>
<td>H7b</td>
<td>The more consumers are interested in reading book-related reviews, the more they are interested in personalized book recommendations.</td>
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<tr>
<th>No.</th>
<th>Hypothesis</th>
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<tbody>
<tr>
<td>H8</td>
<td>The higher the impulse buying tendency of a person, the higher the interest in personalized book-recommendations.</td>
</tr>
<tr>
<td>H9</td>
<td>The higher the privacy concerns of a person, the lower is the interest in personalized book-recommendations.</td>
</tr>
<tr>
<td>H10</td>
<td>The higher the online shopping experience of a person, the higher the interest in personalized book-recommendations.</td>
</tr>
<tr>
<td>H11</td>
<td>The higher the skepticism towards advertising of a person, the lower is the interest in personalized book-recommendations.</td>
</tr>
<tr>
<td>H12</td>
<td>The higher the domain specific innovativeness of a person, the higher is the interest in personalized book-recommendations.</td>
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### Demographic Hypotheses

<table>
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<tr>
<th>No.</th>
<th>Hypothesis</th>
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<tr>
<td>H13</td>
<td>Gender influences the interest in personalized recommendations.</td>
</tr>
<tr>
<td>H14</td>
<td>Gender influences the interest in writing book-related reviews.</td>
</tr>
<tr>
<td>H15</td>
<td>Gender influences the interest in reading book-related reviews of other consumers.</td>
</tr>
<tr>
<td>H16</td>
<td>The older persons are, the lower is their interest in personalized book-recommendations.</td>
</tr>
<tr>
<td>H17</td>
<td>The older persons are, the lower is their interest in writing book-related reviews.</td>
</tr>
<tr>
<td>H18</td>
<td>The older persons are, the lower is their interest reading book-related reviews of other consumers.</td>
</tr>
<tr>
<td>H19</td>
<td>The higher the educational level of persons, the higher is their interest in personalized book-recommendations.</td>
</tr>
<tr>
<td>H20</td>
<td>The higher the educational level of persons, the higher is their interest in writing book-related reviews.</td>
</tr>
<tr>
<td>H21</td>
<td>The higher the educational level of persons, the higher is their interest in reading book-related reviews.</td>
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</tbody>
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sources (e.g. other consumers, critics, trusted third parties) for the decision process of the consumers?

• What are the motives to submit product-related comments and ratings to virtual communities maintained by e-vendors?

• What benefits do customers expect from recommendations?

• Do the customers object methods of implicit data acquirement due to privacy issues?

• Which communication method (e.g. push vs. pull) is preferred for the delivery of recommendations?

• How do customers assess the interests and motives of e-commerce vendors regarding online-recommendations?

4.3 Methodology and Research Design

In the book a quantitative research approach is applied. As mentioned above, the research model is tested in the context of book recommendations. Hereby, consumers were asked to answer a standardized web-based questionnaire. The research model shown in Figure 4.2 (see Section 4.2) is verified by the application of structural equation modeling. Further, the psychographic determinants shown in Figure 4.3 in the lower box are tested by a regression analysis, because including all this factors in a structural equation model would have been overly complex. The demographic factors are verified by a regression analysis and Mann-Whitney tests (for gender-specific differences).

The following multi-item, self-report scales are used for the measurement of the psychographic factors:

• Impulse Buying Tendency as published by Weun, Jones, and Beatty in 1997 [WJB97]

• Scepticism towards Advertising as published by Obermiller and Spangenberg in 1998 [OS98].

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- Consumer Involvement Profiles (CIP) as published by Kapferer and Laurent in 1986 [KL86].
- Domain-Specific Innovativeness (DSI) as published by Goldsmith and Hofacker in 1991 [GH91].
- Opinion Leaders and Opinion Seekers as published by Flynn, Goldsmith and Eastman in 1996 [FGE96].

The original scales were translated into German. To avoid adulteration, the measures were translated by the author, retranslated by an independent translator and finally verified by an independent native speaker. These factors are measured along a seven-point Likert scale ranging from “totally disagree” to “totally agree”.

The rest of the scales used in the research model (i.e. interest in personalized book recommendations, interest in writing book-related reviews, interest in reading book-related reviews, experience with online shopping, and privacy concerns) were developed by the author of the book. In accordance with the scales taken from literature, a seven-point Likert scale was used for measurement.

In Figure 4.4 the research design of this book is illustrated. In the first step a literature research was conducted and the problem statement defined. Based on that, the research model and the corresponding hypotheses set forth in this chapter were elaborated. The next stage included the development of the web-based questionnaire. As mentioned a translation- and retranslation-process was initiated to reduce adulteration due to language aspects.

After a pre-test phase (which included six persons) the first survey was conducted. This survey was performed in collaboration with the Austrian bookseller A&M Andreas & Dr. Müller Verlagsbuchhandel (www.aum.at). According to the Austrian Internet Radar A&M is on position number eighteen of Austrian web-sites with respect to the range of coverage. 16% of the Austrian Internet users in the sample have visited this web-site “within the last four weeks” (starting from the time of questioning, survey period: 2005-09-15 to 2005-12-15, n=5000) [AIR05]. For comparison, the world’s biggest online
bookseller Amazon is on position number seven of Austria’s most visited websites with a coverage of 34% [AIR05]. The survey was conducted from July 8th 2005 to September 2nd 2005.

In the next step, an exploratory factor analysis was conducted. The goal of this analysis was to shorten the questionnaire for the next survey and to determine the items that should be included in the structural equation model. To avoid fitting the model to the data (which would happen if the structural equation model was calculated on the whole dataset), the dataset was split. 20% of the data was used for an exploratory factor analysis. In this context, the three items of the scale with the highest factor loadings were chosen to be included into the structural equation model (the calculation was based on the remaining
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80% of the data) and the construction of the questionnaire for the follow-up survey (i.e. the other items with lower loadings were removed from the original questionnaire).

The follow-up survey was conducted in cooperation with the biggest Austrian Internet service provider Telekom Austria AG (www.aon.at). According to the Austrian Internet Radar the Telekom Austria AG is on position number three of the Austrian web-sites with a coverage of 45%. The reasoning behind the follow-up survey was to analyze the two samples in regard to the differences. The results that stem from survey posted at the web-site of a bookseller are clearly of highest relevance for the purposes of this book, especially with respect to the composition of the sample. However, a survey posted at the web-site of an Internet service provider should be a good supplement, because the resulting sample is thought to represent the Austrian Internet population as a whole. To sum things up, the author assumes that the results derived from the first survey stand for typical Austrian “online shoppers with an interest in books”, whereas the results from the second survey stand for the “general Austrian Internet population”.
