4. Imitation analysis: Early prediction of the market demand for major innovations\(^6\)

4.1 Introduction

The challenge of how to predict the market demand for an innovation prior to its introduction in the market, i.e. when there is little or no data available, is one of the main challenges facing the forecasting community (Meade and Islam, 2006). This key topic has been studied from different disciplinary angles. Economists and econometricians have studied the market conditions that foster innovation and how to measure them (Shumpeter, 1942; Mansfield, 1968; Kamien and Schwartz, 1975; Allen and Fildes, 2001). Sociologists and psychologists have tried to pinpoint the unique characteristics of the innovators and thereby predict adoption (Engel, Blackwell, and Miniard, 1990; Foxall and Goldsmith, 1994; Rogers, 2003). Consumer researchers measured the reaction of potential customers to product concepts and thereby tried to estimate the future demand for the final product (Morwitz, Steckel and Gupta, 2007; Franke, von Hippel, and Schreier, 2006; Moore, 1982). Judgmental forecasters look at the ways that experts make decisions and try to improve the quality of their assessments (Lawrence, Goodwin, O’Connor, and Önköl, 2006).

In this article a new approach to make pre-market predictions of customer demand for major innovations, namely “imitation analysis”, will be elaborated on with case studies. Following Tornatzky and Klein (1982) adoption is defined as acquiring (i.e., buying or hiring) and using the innovation. An innovation can be defined as a new product, service, process, or type of organization (Trott, 2002; Tidd, Bessant, and Pavitt, 2001). This article will focus on product and service innovations. “New,” in this case, means new-to-the-customers rather than new-to-the-company because we focus on predicting the customer behaviour. Various typologies have been proposed to distinguish the degree of newness of product innovations (Veryzer, 1998; Garcia and Calantone, 2002). In this article, the focus will be on major innovations because these involve particularly high risks and are difficult to predict. In contrast, minor innovations are products that maintain or gradually shift the existing consumption patterns and are therefore easier to predict.

In the next section existing methods are evaluated on the basis of their ability to predict the adoption of major innovations. In the third section, theories of social imitation are introduced and our ideas for using them as a means to predicting the market

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demand for major innovations are described. In the fourth section, the method we have developed is described and in the fifth section, the way it is used in practice is explained. The main focus of this paper, in the sixth section, is the illustration of two cases for which our method has been applied. In the final section we draw conclusions and discuss the managerial implications of the application of our method.

4.2 Existing methods

Many methods have been proposed to predict the adoption of innovations (Armstrong, 2001a; Meade and Islam, 2006). Taschner (1999), distinguishes three categories of methods: consumer, expert, and data analysis. The ability of each of these categories to predict the adoption of major innovations is discussed below.

The application of consumer research methods may encounter several difficulties and may even reduce the likelihood that an organisation will succeed in launching major innovations (von Hippel, 1986; Moriarty and Kosnik, 1989; Ortt, 1998; Tauber, 1974). The first difficulty is that major innovations initially appeal to very specific customer segments. When these segments have not yet been identified, consumer researchers tend to make use of a general sample of consumers; yet these people are very likely to produce a negative evaluation of the new concept. The second difficulty is that new behavioural patterns that result from major innovations tend to evoke consumer resistance, which gradually dissolves once the innovation is actually used. The relatively large consumer resistance to major innovations can tend to discourage their development. Finally, early in the development process it is difficult for potential consumers to infer the benefits of a major innovation. At this stage only rudimentary descriptions or prototypes, so-called early concepts, are available for consumer evaluation whereas a valid evaluation requires prolonged periods of actual use in order to experience the effects the new product will have on one’s daily life.

Similarly, there are difficulties experienced when applying experts’ opinions with regard to market developments for major innovations. The changed consumption patterns that come with major innovations in many cases also changes the structure of consumer segments in the market. Experts can not simply extrapolate the existing segments and their preferences to the new situation. Furthermore, experts tend to be prone to bias and inconsistency, both of which damage forecasting accuracy and they tend to place too much trust in their own predictions (Brenner, Koehler, Liberman, and Tversky, 1996; Arkes, 2001). As a result, experts have a bad record in predicting the adoption of major innovations.

Finally, the third category of methods for predicting market adoption, data analysis, also suffers from crucial difficulties when applied to major innovations (Armstrong,
Because of the shift in customer behaviour, past data regarding the diffusion of predecessors of the innovation can no longer be extrapolated to indicate the future adoption of such a major innovation. Analogies with similar products in other markets (such as other countries) can be made but any differences in consumer patterns will reduce the quality of the forecasts.

4.3 Market demand through social imitation

Consumer analysis methods to assess the potential of innovations often rely on explicit user requirements or user evaluations. However, recent research in cognitive and social psychology highlights the sub-conscious nature of many decisions (e.g. Dijksterhuis, Bos, Nordgren, and van Baaren, 2006). It may be useful, therefore, to look for ways of assessing the adoption of new behaviour which can take account of both explicit (conscious) factors and those which influence sub-conscious processes. Recent developments in a broad range of research fields, including cognitive neuroscience, developmental biology, evolutionary anthropology and economics, point to the role of imitation in the adoption of new behaviours. For an overview of this work see Hurley and Chater (2005), who conclude that “imitation remains the default social behaviour.” Relevant to this paper is that some authors on imitation (e.g. Dawkins, 1976; Dennett, 1995) highlight three ways in which a behaviour can stimulate people to imitate it: (1) by encouraging people to try to copy the behaviour at least once (also known as the “fecundity” of the behaviour), (2) by enabling people to be able to copy the behaviour accurately (fidelity), and (3) by encouraging people to keep exhibiting the behaviour (longevity).

Based upon the general principles of imitation theories we propose that (1) the behavioural component of the adoption and use of new products can be analysed by applying the notion of imitation, by assessing the capacity a product-related behaviour has to be imitated in a particular population, and (2) the market demand for major innovations can be predicted by assessing the “match” between a product-related behaviour and a person or homogenous group of people. This match describes the extent to which the people are stimulated to imitate that behaviour.

If we decompose innovative product concepts into a number of behavioural elements it becomes possible to estimate the probability that a person with certain personality traits will imitate these behavioural elements and, as a consequence, will adopt the new product. This new method makes it possible to assess the likelihood of new product adoption by different market segments and to do this very early in the development process, before any working prototype is available (Langley, Pals and Ortt, 2005).
Relating imitation to the adoption of innovations is not a new phenomenon. Many authors have proposed that imitation plays a central role in the spread of new products (e.g. Tarde, 1890; Bass, 1969). However, there has as yet been no clear attempt to link the findings of imitation research from areas outside of innovation management to the concept of imitation as used in relation to the adoption and diffusion of products. Many models of innovation diffusion have been based on that of Bass (1969) without providing explanations of how that imitation process comes about. They still require past data to extrapolate or to match curves and as such their applicability to innovations may be called into question. They make the assumption that those past data, to a large extent, provide a description of the new situation; an assumption which is particularly problematic for major innovations.

4.4 Instrument development

The instrument described here calculates the likelihood of imitation occurring when a type of person is confronted with the behaviour relating to the adoption and use of a new product, or service.

4.4.1 Product characteristics

The first step in the development of the instrument is to identify the relevant characteristics of the product-related behaviour which could have an effect on imitation. Product characteristics were collected from innovation diffusion literature in general (e.g. Rogers, 2003; Calantone, Chan, and Cui, 2006), from the theory of Social Learning (e.g. Bandura, 1977), Social Identity Theory (e.g. Hogg and Abrams, 1988; Tajfel and Turner, 1986), and Memetics (e.g. Dawkins, 1976; Heylighen, 1998). If we take “complexity” as an example (Rogers, 2003) it seems logical that for many types of people a high complexity inhibits imitation, while for other people who are focussed on other issues (for example, computer hobbyists searching for the newest programs) a high complexity may have no inhibiting effect on their adoption of the new program. The result of this selection is a list of 14 product characteristics potentially affecting imitation behaviour (see Table 4.1).

As a basis for the instrument, we link these 14 product characteristics which can affect imitation behaviour to the three conditions for the successful imitation of a behaviour, described in the theory of Memetics: fecundity, fidelity and longevity (see above for an explanation of these terms). Taking “complexity” as an example again, it may affect fecundity, as people may not even show interest in an apparently complex new product, as well as fidelity, as many people may prove incapable of carrying out the complex behaviour. Whilst for longevity, complexity may have less of an impact.
Table 4.1
The product characteristics which can influence the likelihood that the behaviour related to the use of the product will be imitated. These characteristics were used in the development of the instrument.

<table>
<thead>
<tr>
<th>PRODUCT CHARACTERISTIC</th>
<th>DESCRIPTION</th>
<th>RELATED CONCEPTS FROM THE LITERATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Availability of resources</td>
<td>The ease of acquiring all things necessary for expression of the behaviour.</td>
<td>Trialability (Rogers, 2003)</td>
</tr>
<tr>
<td>2. Benefit for the group</td>
<td>Relative advantage to a whole group of people (e.g. family, club or neighbourhood)</td>
<td>Group utility (Heylighen, 1998)</td>
</tr>
<tr>
<td>3. Benefit for the individual</td>
<td>Relative advantage, either practical or social (e.g. social esteem)</td>
<td>Utility (Heylighen, 1998); Relative advantage (Rogers, 2003); Offering important benefits, Superior value proposition (Cooper, 2005); Reinforcement control (Bandura, 1977)</td>
</tr>
<tr>
<td>4. Combination with other behaviour</td>
<td>The ease with which the new behaviour can <em>fit in</em> with existing behaviours.</td>
<td>Coherence, Conformity (Boyd and Richerson, 1985; Heylighen, 1998); Compatibility (Rogers, 2003); Conformity to in-group norms (Hogg and Abrams, 1988)</td>
</tr>
<tr>
<td>5. Distinctiveness</td>
<td>Phenomena that are distinct, unusual or contrasted from existing behaviours.</td>
<td>Distinctiveness, Novelty (Heylighen, 1998); Retention processes (Bandura, 1977); Intergroup differentiation (Hogg and Abrams, 1988)</td>
</tr>
<tr>
<td>6. Ease of use</td>
<td>The simplicity of carrying out the behaviour (c.f. complexity).</td>
<td>Simplicity (Heylighen, 1998); Complexity (Rogers, 2003); Motoric reproduction processes (Bandura, 1977)</td>
</tr>
<tr>
<td>7. Financial attractiveness</td>
<td>The price of purchase, price of repeat use, expected and actual savings.</td>
<td>Economic factors (Rogers, 2003); Better value (Cooper, 2005)</td>
</tr>
<tr>
<td>8. Inherent frequency</td>
<td>The degree to which the behaviour stimulates its host to repeatedly express it, e.g. by rehearsal</td>
<td>Self-reinforcement (Heylighen, 1998); Reinforcement control (Bandura, 1977)</td>
</tr>
<tr>
<td>9. Intrinsic persuasion</td>
<td>The degree to which the behaviour urges its host to maximally spread it to others.</td>
<td>Self-justification, Proselytism (Heylighen, 1998)</td>
</tr>
<tr>
<td>10. Intrinsic sociability</td>
<td>The extent to which the behaviour is itself social, or forms part of a social situation.</td>
<td>Expressivity (Heylighen, 1998); Attentional processes (Bandura, 1977); Categorisation (Hogg and Abrams, 1988)</td>
</tr>
<tr>
<td>11. Observability</td>
<td>The extent to which the behaviour can be perceived.</td>
<td>Observability (Rogers, 2003); Attentional processes (Bandura, 1977)</td>
</tr>
<tr>
<td>PRODUCT CHARACTERISTIC</td>
<td>DESCRIPTION</td>
<td>RELATED CONCEPTS FROM THE LITERATURE</td>
</tr>
<tr>
<td>------------------------</td>
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</tr>
<tr>
<td>12. Reach</td>
<td>The number of people who come into contact with the behaviour, including via publicity.</td>
<td>Authority, Publicity (Heylighen, 1998); Observability (Rogers, 2003); Referent informational influence (Hogg and Turner, 1987)</td>
</tr>
<tr>
<td>13. Simplicity of the process</td>
<td>The extent to which the steps necessary to carry out the process are precise and unambiguous.</td>
<td>Simplicity (Heylighen, 1998); Complexity (Rogers, 2003); Motoric reproduction processes (Bandura, 1977)</td>
</tr>
<tr>
<td>14. Stability of the process</td>
<td>Phenomena that are always carried out in the same way.</td>
<td>Invariance (Heylighen, 1998)</td>
</tr>
</tbody>
</table>

### 4.4.2 Market segment characteristics

Traditional market segmentation is based on either behaviour or socio-demographics (Wedel and Kamakura, 2002). An example of a behaviour-based segmentation is when a telecom company divides its customers into those who have a high, medium or low phone bill; those who make the most calls will often be considered to be a better target group for innovations. An example of a socio-demographic segmentation is when a supermarket chain decides to locate a new store based on information about the average age, income and education level of people in a particular district. An area with relatively well-educated, high income families will be expected to frequent supermarkets with a higher value assortment. Diverting from these traditional approaches, we choose a psychographic segmentation as this allows us to gain an insight into the mechanisms of imitation as described in imitation theories. In personality psychology, the Big Five is a widely accepted personality model consisting of 5 dimensions (Norman 1963; Tupes and Christal, 1961; Digman, 1990). Many researchers agree on the basic influence of these dimensions, although there are a number of different labels in use, including a version based on the acronym, OCEAN, which stands for Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism (John and Srivastava, 1999). A number of similar approaches have been combined to produce the Abridged Big Five Circumplex (Hofstee, de Raad, and Goldberg, 1992; Johnson and Ostendorf, 1993). The target group traits used by SUMI are based on dimensions from a number of these models, including the Big Five, and are shown in Table 4.2.
Table 4.2

*The market segment characteristics which can influence the likelihood that the product-related behaviour will be imitated. These characteristics are taken from the field of personality psychology (see text) and were used in the development of the instrument.*

<table>
<thead>
<tr>
<th>PERSONALITY CHARACTERISTIC</th>
<th>DESCRIPTION</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Openness to new experiences</td>
<td>The extent to which a person is inclined to try new things, possibilities and theories, as opposed to sticking to what is practical, tried and tested.</td>
<td>Openness, Originality, Openmindedness (Hofstee, et al., 1992; John and Srivastava, 1999)</td>
</tr>
<tr>
<td>2. Conscientiousness</td>
<td>The extent to which a person operates carefully and systematically, as opposed to spontaneously or apparently chaotically.</td>
<td>Conscientiousness, Control, Constraint (Hofstee, et al., 1992; John and Srivastava, 1999)</td>
</tr>
<tr>
<td>3. Extraversion</td>
<td>The extent to which a person does things with others and gains their energy and motivation from the outside world, as opposed to being more independent and internally focused.</td>
<td>Extraversion, Energy, Enthusiasm (Hofstee, et al., 1992; John and Srivastava, 1999); Gregariousness (Hofstee, et al., 1992); Energy orientation (Myers and McCaulley, 1985); Sociability (Digman, 1990)</td>
</tr>
<tr>
<td>4. Agreeableness</td>
<td>The extent to which a person dedicates time and energy to provide a positive experience for others, as opposed to being self-centred.</td>
<td>Agreeableness, Altruism, Affection (Hofstee, et al., 1992; John and Srivastava, 1999); Understanding (Hofstee, et al., 1992)</td>
</tr>
<tr>
<td>5. Rationality</td>
<td>The extent to which a person uses logical reasoning and objective information to make decisions, as opposed to being emotionally driven.</td>
<td>Emotional stability (Hofstee, et al., 1992); Judging (Myers and McCaulley, 1985)</td>
</tr>
<tr>
<td>6. Conformity</td>
<td>The extent to which a person subscribes to popular attitudes and norms, as opposed to holding less popular standpoints.</td>
<td>Conformity (Hogg and Abrams, 1988; Bikhchandani, et al., 1998)</td>
</tr>
<tr>
<td>7. Ambition</td>
<td>The extent to which a person is driven to succeed and achieve ever increasing goals, as opposed to being stoical and content to settle with one’s current state of being.</td>
<td>Ambition (Digman, 1990)</td>
</tr>
</tbody>
</table>

4.4.3 *Generic match between product characteristics and personality characteristics:*

Our aim is to develop a generic model to assess the ‘match’ between product and consumer characteristics in order to predict the likelihood that imitation will occur. For the version of this model used in the case studies described below, a panel of three experts, chosen on the basis of their expertise and experience in both product development and market segmentation, was asked to make logical deductions for the generic match between each product characteristic and each personality characteristic.
1. They were asked to estimate the effect, in general, of a product characteristic \((i)\) on (a) the fecundity \((\text{FEC}_i)\), (b) the fidelity \((\text{FID}_i)\), and (c) the longevity \((\text{LON}_i)\) of that behaviour.

2. They were asked to estimate, in general, for consumers with each personality characteristic \((j)\), the specific effect of each product characteristic \((i)\) on (a) the fecundity \((\text{FEC}_{ij})\), (b) the fidelity \((\text{FID}_{ij})\) and (c) the longevity \((\text{LON}_{ij})\) of that behaviour.

Estimations were given on a 5-point Likert-type scale (strong positive effect; positive effect; no effect; inhibiting effect; strong inhibiting effect). The scores were collated and through discussions a consensus was reached. These consensus scores form the generic expert model which is used to assess the likelihood of imitation occurring for specific product-market segment combinations (see below). In our notation we use upper-case letters for generic variables and lower-case letters for variables relating to a specific product-market combination. As an example of a generic match, the effect of the product characteristic, ‘distinctiveness’, was estimated to have a positive effect on fecundity, in general \((\text{FEC}_{\text{distinct}} = 0.75, \text{on a 5-point scale between 0 and 1})\), whilst having a strong positive effect on fecundity for people with a high degree of ‘openness to new experiences’ \((\text{FEC}_{\text{distinct open}} = 1.0)\).

### 4.5 Instrument use

To apply the instrument to a specific product-market combination the following process is carried out. First, each product characteristic \((\text{feci, fidi, loni})\) of the new product is scored on a 5-point Likert-type scale, by interviewing people with sufficient knowledge of the product. Secondly, for a particular market segment, each personality characteristic \((\text{perj})\) is scored on a 4-point Likert-type scale, by interviewing people with sufficient knowledge of the market and intended target groups. A 4-point scale is used in this case to avoid neutral segments. Thirdly, the expert model is used to calculate the effect on imitation for each product characteristic–market segment characteristic match \((\text{imitij})\), as follows:

\[
\text{imit}_{ij} = (\text{FEC}_{ij} \times \text{feci} \times \text{perj}) + (\text{FID}_{ij} \times \text{fidi} \times \text{perj}) + (\text{LON}_{ij} \times \text{loni} \times \text{perj})
\]

As an example, for a specific new product, the product characteristic, ‘distinctiveness’, was estimated to be high for fecundity \((\text{fec}_{\text{distinct}} = 0.75, \text{on a 5-point scale between 0 and 1})\), whilst a specific homogeneous market segment was estimated to have a low ‘openness to new experiences’ \((\text{per}_{\text{open}} = 0.33, \text{on a 4-point scale between 0 and 1})\). Assuming zero effect for fidelity and longevity, the effect on imitation of the

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7 As we use a different procedure than the standard methods for market analysis, the interested reader may find it useful to refer to the clarification starting on page 18.
combination ‘distinctiveness – openness to new experiences’ ($imit_{distinct\ open}$) is $(1 \times 0.75 \times 0.33) + 0 + 0 = 0.258$.

The total effect on imitation of each product characteristic ($imit_i$) is a summation of the generic effect it has on imitation ($FEC_i$, $FID_i$ and $LON_i$) and the specific effect it has in combination with each market segment characteristic ($imit_{ij}$):

$$imit_i = FEC_i + FID_i + LON_i + \sum_{j=1}^{7} imit_{ij}$$

and the total effect on imitation of the complete product-market combination⁹ ($imit$) is calculated as:

$$imit = \sum_{i=1}^{14} imit_i$$

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**Figure 4.1. Example of the output generated by SUMI.**

Note: On the horizontal axis are the product characteristics. On the vertical axis are the SuMI match scores ($imit_i$), indicating the relative contribution of each product characteristic to the overall likelihood that a specific market segment will adopt a new product-related behaviour.

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⁸ $FEC_{distinct\ open}$ is the generic match between the product characteristic, ‘distinctiveness’, and the market segment characteristic, ‘openness to new experiences’. This has the value 1.0 as previously determined. For this specific product-market combination, fecdistinct was given the value 0.75, and peropen was given the value 0.33. For clarity in this example, we assume that ‘distinctiveness’ has no effect on either fidelity and longevity, so that $fid_{distinct}$ and $lon_{distinct}$ have both been given the value 0.0

⁹ There is as yet no specific weighting factor per product characteristic built into the model, apart from the fact that some product characteristics have an effect on more than one of fecundity, fidelity and longevity.
Figure 4.1 is an example of the graphical results for every individual product characteristic. On the horizontal axis are the 14 product characteristics divided into the three phases of imitation: fecundity, fidelity and longevity. On the vertical axis are the match scores generated by the SUMI instrument. The dotted line is a measure of the “sensitivity” of the target group for each product characteristic. This is generated by identifying the optimum scores on the product side and is fixed for a particular target group. The bars are the match scores for each product characteristic – target group combination ($imit_{ij}$). The distance between the top of a bar and the target group sensitivity line indicates that improvements to the product for that product characteristic will have a positive effect on the likely adoption of that product by the target group in question. The kind of output in Figure 4.1 can be used for detailed analysis. The product characteristics where target group sensitivity is high and the match is low (circled areas) represent the best possibilities for improvement.

The process of a SUMI analysis consists of four steps, taking as a starting point the generic model described above:

1. The process starts with a series of interviews during which as much information as possible is gathered about the new product and about the envisaged target group(s). People to talk with during this stage are product developers, product managers, marketing directors, marketers, etc. The emphasis is on factual information and the people interviewed are not asked to provide specific scores for the analysis, due to the possibility of bias.

2. During the next phase this information is translated into the input variables used by the SUMI instrument and quantified. In most cases a number of variants of a product are analysed for a range of target groups.

3. In the next phase of the analysis the SUMI instrument is used to calculate the match results (see above). Results are calculated for the total effect on imitation ($imit$), the effect on imitation of each product characteristic ($imit_{i}$) and the effect on imitation for each product characteristic – market segment characteristic match ($imit_{ij}$).

4. The process is concluded with a workshop with stakeholders, during which the results are presented and discussed. Discussion may be focused on:
   - Identifying the market segments with the highest potential for imitation.
   - Focusing the marketing communication on specific issues important for each segment, e.g. based on the product characteristics with the biggest effect on imitation (highest scoring $imit_{i}$).
   - Improving the product design, e.g. by highlighting the characteristics with the most room for improving the imitation potential (product characteristics with the biggest difference between the calculated $imit_{i}$ and its highest possible score)
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- Modelling the market demand, i.e. the overall chance of imitation occurring (e.g. by calculating the overall effect on imitation, \( \text{imit} \), for a range of market segments)\(^{10}\).

Two case studies in which the SUMI instrument was recently applied are now presented. In the first case study, the focus is placed on the marketing issues such as identifying the best market segments and determining the best issues for the marketing communication. In the second case study, the focus is on product design and the effect of innovative functionality on the market demand.

4.6 Case studies

4.6.1 Case 1: Broadcast TV on a mobile phone

Relevant market situation:
There are currently a number of techniques being employed in the Netherlands to enable video images to be seen on portable devices (UMTS video streaming, iPod video, portable DVD players, DVD on a laptop, etc.), but the possibility of watching broadcast TV on a mobile phone, the so-called DVB-H (Digital Video Broadcast for handheld devices), is a new addition with some important differences. DVB-H was due for release around nine months after our analysis was carried out.

Specifics of the new product:
The broadcast TV service enabled by DVB-H is due to become one of the functionalites of a new type of mobile phone. Through a simple menu the customer will have access to a number of TV and radio channels. The service which we analysed includes 10 TV channels (6 basic and 4 optional) and 2 radio channels providing a mix of news, sport and entertainment.

Description of the new product-related behaviour:
The new behaviour to be carried out by users of the new service is as follows:
- Acquiring the service: The customer goes to a shop and buys a handset with the ‘Mobile TV’ service included.
- Implementing the service: The customer repeatedly downloads (or updates) the most up-to-date TV-guide onto the mobile phone, chooses a channel and watches TV.

Behaviours with which the new behaviour would have to compete are watching videos in one of the earlier mentioned ways (UMTS video streaming, iPod video, Portable

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\(^{10}\) As this article focuses on case studies we do not at this point pay explicit attention to the predictive validity of the method. For a discussion of this topic and an analysis of a broader range of cases in which we compare the predictive validity of our approach to other, generally applied approaches, the interested reader is refered to chapter 6.2.2.
DVD players, DVD on a laptop, etc.), watching TV at a fixed location or enjoying other sorts of entertainment on the move (reading a newspaper or book, looking out of the train window, etc.).

**Specifics of target group:**
For this analysis we used a segmentation on the basis of four studies between 1997 and 2001 in the Netherlands (Dekker, Lampert, and Spangenberg, 2003). They plot target groups based on two axes: socio-economic status (low – high) and categories of values (traditional – modern – post-modern). In this way we can distinguish between six different target groups.

**Our client’s question:**
For this study the client, who intended to develop and launch the service described above, had two specific questions:
1. which of the market segments shows the highest potential for the new service?
2. what should the focus be for marketing communication? In other words, are there special features of the service that can have a positive effect on the target group that can be emphasised in the marketing campaign?

Due to the innovative nature of the product, traditional methods of forecasting market demand were deemed insufficient. The marketing experts were unsure as to which segments to aim at or which message to promote. Consumers could not be relied upon to accurately estimate their likely future usage patterns or to say which elements of the new product may encourage or hinder their future needs, wants or desires in relation to the innovation.

**Method:**
For the standard SuMI process we refer to the description that has been presented in earlier in this paper. For the gathering of the relevant data we interviewed four people from the product development and the marketing department of the company in question. These people were also present during the final workshop together with the manager who gave the assignment.

**Results pertaining to the client’s question:**
Very much can be said about the results of this analysis. For the purposes of this paper we restrict ourselves to the aspects relating to market segments and the marketing communication. Figures 4.2 and 4.3 represent the SuMI scores of the highest and the lowest scoring target group respectively. As already explained in Figure 4.1, the highest bars (imit) represent the best matches between product and target group. The largest white areas between bars and line represent the relative weaknesses or possibilities to improve the product. The results for the other four target groups lie between these two extremes. The overall SuMI match scores (imit, i.e. all bars added together) range between 27.75 and 53.25 for the six different target groups. According to a
benchmark of earlier analyses, SUMI match scores \((imit)\) of 40 or higher denote successful product-market combinations. The market segment “high socio-economic status / modern values” will be most likely to adopt the new service. All three groups with a “low socio-economic status” have a relatively low SUMI match score, as does the segment labelled “high socio-economic status / post-modern values.” This indicates a lower likelihood that these segments will imitate this behaviour and we take this to mean that there will be a lower demand for the new service from these segments. This represents an answer to the first of the client’s questions, to identify which of the market segments have the highest potential for this new service. This helps the product developers and marketers to understand who the target group can be, what type of people they are and therefore it helps in choices like the type of mobile devices to promote, the type of offers to make, etc.

Figure 4.2. SUMI match scores \((imit)\) for mobile television (DVB-H) for the market segment “high socio-economic status / modern values”.

Note: The solid circles indicate the main strengths of the product in this target group, the dotted circles indicate the weaknesses, or rather the things that can be improved to make the match better (see text). The total of the match scores \((imit = 53.25)\) is an indication for a high level of adoption in this target group.
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Figure 4.3. SUMI match scores (imiti) for mobile television (DVB-H) for the market segment “low socio-economic status / traditional values”.

Note: There are no real strengths of the product for this target group, the dotted circles indicate the weaknesses, or rather the things that can be improved to make the match better. The total of the match scores (imit = 27.75) is an indication for a low level of adoption in this target group.

From the detailed results for the highest scoring market segment it is possible to see which product characteristics have contributed the most to their high chances of copying the new behaviour (i.e. the product characteristics with the tallest bars in Figure 4.2). The strong points of the service, according to the SUMI analysis, are:

1. **Benefit for the individual**
   Both social and non-social benefits add to high demand. The new service meets existing user needs in a new and efficient way. In the short term, having TV on the mobile phone may give this segment social status within their peer group.

2. **Distinctiveness**
   When people would use the new service what they do is very different from other things people do on current mobile phones or from other forms of watching TV or video. The behaviour is eye-catching, especially the fact that most devices have to be turned by 90 degrees to meet the standard screen size ratio of the TV image.

3. **Combination with other behaviour**
   Using the new service combines well with many existing behaviours. It can be used at many different times and locations, whilst doing different things. Besides that, other functionalities are available on the same device (phone, SMS, calendar, camera, etc.). A question mark on this point is the effect that the added demand for battery power may have on the standard use of the mobile phone.
4. **Reach**

When the new service would be used, a relatively high number of people would be confronted with the new behaviour. This is because the usage situations will be typically public places; once you are at home, the normal TV will remain dominant.

5. **Simplicity of the process**

The use of the new service is like normal TV – turn it on, choose a channel and watch.

We advised our client to target the “high / modern” market segment and to emphasize the strong points mentioned above in the marketing campaign. In particular we see the 90 degree turn of the mobile device as a highly specific and visible element of watching mobile TV which, if used in mass advertising, could accelerate its market adoption. We also advised some changes in the design based on the weaknesses, but due to space restrictions they are not described here. It is interesting to note that these results were obtained without a working prototype, very early in the development cycle.

4.6.2 **Case 2: A mobile friend-network service**

In this second case, SUMI is applied to forecast the market demand for another innovation with the emphasis this time being on insights into how the product design affects market demand, instead of the marketing focus of the first case study.

**Relevant market situation:**

Friend-network internet sites offer users the possibility to be in contact with their friends and acquaintances and also to get in contact with other people. Users enter their name and can enter more information about themselves, such as the type of relationship they are in, their home town, phone number, interests and hobbies, etc. They also specify which other users of the service they know. A user can specify if personal information is accessible to their friends, the friends of their friends, or everyone. Friends can look at the information, pictures, etc. and send messages to each other. Other possibilities include joining in interest groups, placing job offers and dating. These sites are becoming increasingly popular; in the Netherlands the main friend-network internet sites (Schoolbank.nl, Cu2.nl, Hyves.nl, web-log.nl, erolog.nl) claim to have millions of users. This is intriguing considering the fact that, for the users to benefit, they have to publish a good deal of personal information about themselves. We may have expected there to be resistance to publishing this information due to the perceived danger of its misuse or the effect on privacy. As yet the main friend-network internet sites are intended for use from the PC such that information is laid out for a big screen. However, there are related websites which are migrating to mobile use. Examples are Flickr mobile (http://www.flickr.com/mob/) and Blogger (http://www.blogger.com/). Other websites involve the use of presence information as
an integral part of their functionality, e.g. MSN (http://messenger.msn.com/) with which users can see if their contacts are online via a fixed line, online via a mobile or offline. From all these examples we can see that although various elements of the new service are available, the new service itself will offer a unique combination of functionality. The combination of an existing friend-network with mobile use and presence information can be classified as being an innovation.

Specifics of the new product:
The new service which has been analysed had not been built at the time of the analysis and no prototype was available. For the purposes of the analysis we had only a description of what was intended to be produced, which is summarised below.

An existing mobile friend-network service will be expanded to include (1) moblogs and (2) presence information. Moblog functionality offers the user the chance to input information to their personal profile from their mobile phone. This may be short text messages, photos or video clips. This offers the users the chance to keep their personal information up-to-date and to show their friends, for example, where they are, what they are doing and the interesting things they see. They will also be able to use their mobile phone to view friends' information and read messages that others post on their personal site. This will allow for more real-time communication as a part of the friend-network internet service. For mobile phones, the layout will be adapted in order to make the viewing on a very small screen possible. In particular, graphical elements and photos will be shown in miniature. The presence information is a part of the personal information about a user and it shows whether they are logged into the friend-network site, and if so, if that is via a PC or a mobile phone.

Description of the new product-related behaviour:
Any customer with an internet-enabled mobile phone can make use of the new service. The new behaviour which users will carry out is as follows:
- They enter the appropriate website address on the mobile phone and view content on the friend network site.
- There is an option to install an application on the mobile phone to make content uploading more simple. The user selects the appropriate make and model of mobile phone on the website and an SMS is sent to the user, who follows a link to install the application. When that friend-network application is running on the mobile phone, text messages, photos and videos made on the mobile phone can be sent to the friend-network server via a single click.
- Current users of the friend-network service will see new mobile communication options appear on the web pages which they view on a PC: voice, chat, SMS and video telephony as well as presence information.
Our client’s question:
The question which the analysis was intended to answer can be summarised as follows: Which elements of the basic design of the concept need to be improved, so as to optimise market potential?
Again in this case, the traditional forecasting methods were considered to offer insufficient insight. Extrapolating the success of the PC-based friend-network service to the new mobile situation was judged to be unreliable and there are no other similar services which have combined usage on both PC and mobile phone in the way that is hoped for this innovation.

Method:
The standard SUMI process was followed (see above).

Results pertaining to the client’s question:
The results obtained from the SUMI analysis were related to a set of different groups of consumers (market segments). Due to the up-to-date nature of the case in question and confidentiality agreements with the company concerned, we are unable to divulge the specific results pertaining to each market segment. However, we are able to discuss the results for two of the market segments which showed the highest match with the new service.

To answer the client’s question, we can look at the areas for improvement where the most advantage can be gained (see Figure 4.1, these are the characteristics with the biggest gap under the line):
1. Benefit for the individual
   The SUMI match score (imiti) for this product characteristic was 6.00 for the highest scoring market segment and 6.75 for the second highest, whilst the optimum scores were 18.00 and 24.00 respectively. Our interpretation is that this service is inherently about rich communication with your friends – more often, better quality, any place. However, according to the analysis, in order to maintain market interest in the longer term, people will need added benefit besides these social aspects. More non-social benefit for the individual is needed. This could be things like the use of the service as a top quality information source (e.g. via blogs), as an image database, etc.
2. Ease of use
   The SUMI match score (imiti) for this product characteristic was -3.25\(^{11}\) for the highest scoring market segment and -0.50 for the second highest, whilst the optimum scores were 8.00 and 7.00 respectively. Our interpretation is that like many services which add advanced communication functions, the complexity increases.

\(^{11}\) Negative match scores appear to indicate that this characteristic may cause the users to actively resist adopting the product.
Not only for this new service, but for many applications, a high priority should be given to solving the inherent mobile input/output problem. The application which is described above (see: “Description of the new product-related behaviour”) to enable simple uploading of content is a good step in this direction but, according to the SUMI analysis, as yet insufficient.

3. **Observability**

The SUMI match score (imiti) for this product characteristic was 0.63 for the highest scoring market segment and 2.50 for the second highest, whilst the optimum scores were 10.00 and 9.00 respectively. Our interpretation is that the main problem is that people can’t see what you’re doing. Although non-users may see others making use of the mobile friend-network, it will not be immediately apparent that the behaviour is related to this mobile friend-network. Solving this issue does not appear to be trivial.

### 4.7 Conclusions and discussion

The SUMI instrument carries out a form of imitation analysis, developed to fill an important gap in available methodology for forecasting the market demand for major innovations. The two case studies presented show that not only does this new instrument provide a prediction of the uptake of new services but that useful information can also be provided about which market segments show the highest potential, which issues the marketing communication should focus on and how the product design can be improved.

Of course, like any method of predicting the future, the SUMI results will not be 100% accurate. A relevant question is how the quality of imitation-analysis results in general and SUMI results in particular relate to that of other methods. A case study approach, as adopted in this paper, is not suited to answering this question in a statistically meaningful way. However, we can say that for the types of innovative new services described, the existing methods of predicting market uptake suffer from serious problems due to their implicit assumption that the use of the new services will be strongly related to the use of existing services. SUMI is an attempt to take a different approach and will undoubtedly suffer from its own inadequacies. We believe that by combining imitation analysis with existing methods of forecasting the adoption of innovations, organisations will gain the fullest picture as early as possible on which to base their innovation decisions.

The imitation theories presented in this paper are just part of an increasing body of work looking at the role of imitation in our lives. Due to the diverse origins of much of this research and the fact that many developments in the area are quite new, the level of awareness of these developments in the field of forecasting is low. This, despite the
fact that many forecasters use Bass-related models which generate coefficient of imitation values ($q$). For a recent attempt to develop a clearer understanding of the link between $q$ and product adoption, see Van den Bulte and Stremersch (2004).

The usefulness of the imitation analysis approach embodied by SUMI is increased because there is not simply a total forecast generated, but it is possible to deduce which issues have played the biggest role or could yet play a bigger role. The significance of this is highlighted in the two case studies in which questions relating to marketing communication and product design could also be answered along with the main question: what will be the market demand for the new product?

The two cases indeed highlight the typical way that forecasting methods are applied in practice; i.e. to aid innovation managers with their decisions. However, it can be interesting to consider alternative uses of the application of imitation analysis. For example, one possible approach could be to create imitation-disruption mechanisms, so as to reduce the potential of competing products. Another idea is to attempt to increase the awareness of consumers of their own sheep-like behaviour and to encourage them along the lines embodied by the trend referred to as ‘mass-individualisation’.

Further research in the area of imitation analysis is clearly required. Areas to consider include quantising the imitation effect of new services, validating the results of imitation analysis with other forecasting methods and building a set of longitudinal studies to track the diffusion of innovations from an imitation perspective. Another potentially fruitful avenue is to link our imitation analysis approach to calculations of the coefficient of imitation ($q$) in other models. This could allow such models to be applied even when existing data is scarce and curve-fitting is not possible. Added to this, it would allow for more meaningful adjustments of the values in the model. For example when a higher value of $q$ is needed, an imitation analysis approach could provide a basis for understanding how that increase can be achieved.

### 4.8 References


