1 DISE: Dynamic Intelligent Survey Engine

Christian Schlereth, Goethe-University of Frankfurt

Bernd Skiera, Goethe-University of Frankfurt

Abstract

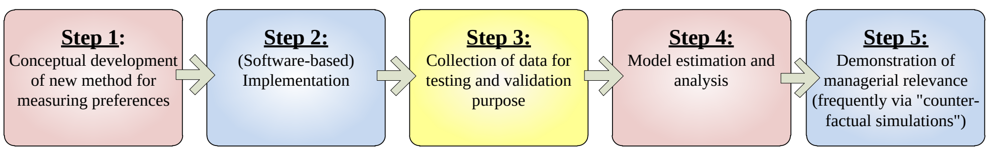
Knowledge about consumers' preferences is of utmost importance for many marketing decisions, but transactional data are frequently unavailable. Therefore, marketing researchers have developed ground-breaking methods that build upon stated preference data to measure consumers' preferences; these methods include self-explicated methods, rating-based conjoint analysis, and choice-based conjoint analysis. This article describes DISE (Dynamic Intelligent Survey Engine), which aims to enhance research involving the measurement of consumer preferences. DISE is an extendable, web-based survey engine that supports the construction of technically sophisticated surveys and that limits the effort that researchers must invest to develop new preference methods. We discuss the overall architecture of DISE, discuss how to implement and include new data collection methods, and finally outline how these new methods can be employed in surveys, using an illustrative example. We conclude this article with an invitation to researchers to join in the development of DISE.

1.1 Introduction

Knowledge about consumers' preferences and the resulting utilities is of utmost important for many marketing decisions, but transactional data (i.e., revealed preference data) are frequently unavailable, for example, in the case of a new product introduction (Wertenbroch & Skiera 2002). Therefore, marketing researchers have developed groundbreaking methods that build upon stated preference data to measure consumers' preferences. For example, marketing researchers have developed methods in the area of conjoint measurement, specifically rating-based conjoint analysis (Green & Rao 1971) and choice-based conjoint analysis (Louviere & Woodworth 1983), which are currently widely used in marketing as well as in other areas such as environmental and health economics. Other examples include multi-dimensional scaling (Green, Carmone & Smith 1989) or self-explicated methods (Srinivasan & Park 1997).

While the methods to measure preferences certainly differ, there is relatively solid agreement about the steps, as outlined in **Figure 1.1**, that any article should cover to have a strong chance of becoming published in a top academic journal:

Figure 1.1 Process for developing new methods to measure preferences



Research in this field, however, is difficult because the costs of conducting research are usually very high. Although Step 1 is "easy" to achieve because it "just" requires having a good idea, Steps 2-5 usually require knowledge from different fields and substantial financial resources.

In particular, Step 2 requires the development of web-based software for the new method because "paper-and-pencil" surveys do not allow for an individual adaptation of the survey and frequently require additional costs for the collection of data. Given the sophistication of the software for existing preference methods, software for new preference methods must fulfill very high standards for graphical user interfaces and response times. In addition, the software for new preference methods also requires a large number of standard functionalities, such as the implementation of relatively simple questions (e.g., "what is your age") with validation checks and error messages (e.g., is age a numerical value between 1 and 120), quota-management (e.g., 50% of the responses from men, 50% of the responses from women), and the opportunity to randomly assign different versions of a survey to respondents and compatibility with survey panels. These functionalities must have the same “look and feel" as the new method, to increase the quality of the responses.

Step 3 benefits from representative samples of at least 500 respondents per study (e.g., 50 respondents for a pretest, 3 versions of a survey with 150 respondents each), which currently can be easily collected via specialized survey panels. However, at approximately 8 € per respondent, the total cost for two studies with at least 500 respondents each culminates in approximately 8,000 € (=2*500*8€), which can be a relatively large amount, especially for junior researchers. At present, Step 4 requires having extensive knowledge of statistical methods such as Hierarchical Bayesian Methods, which demand a substantial amount of time to be properly implemented. Step 5 typically involves knowledge about optimization techniques, which are less known to Marketing academics.

Given these relatively high requirements and the risks involved in the development of such methods, it is not surprising to find that most existing research in marketing concentrates on Step 4, the development of models to analyze data. New stated preference measurement methods were primarily developed by senior researchers (e.g., Paul Green, Wharton; Seenu Srinivasan, Stanford) and at institutions that are well-known for having large research budgets (e.g., MIT and its senior researchers such as John Hauser and Glen Urban).

This article describes DISE (Dynamic Intelligent Survey Engine). The major concept in DISE is to enhance the research involving the measurement of consumer preferences. It supports Steps 1-3 outlined in **Figure 1.1** and limits the effort that researchers must invest to develop new preference methods. DISE has already been instrumental in developing new methods for the measurement of consumer preferences and has been used since 2007 by more than 30 companies, professors, Ph.D. students, and post-docs across more than 10 European universities.

In the remainder of this paper, we first present the basic concept of DISE and then, we detail its implementation. Next, we discuss the overall architecture, discuss how to implement and include new data collection methods, and finally outline how these new methods can be employed in surveys. We outline the use of DISE in an illustrative example of a self-explicated approach, which was recently proposed by Netzer & Srinivasan (2011). We finally conclude this article with an invitation to researchers to join in the development of DISE.

1.2 Basic concept of survey-platform DISE

DISE is web-based software built with the basic goal of providing researchers with a powerful environment to develop new methods for measuring consumer preferences. DISE was intended to be as flexible as possible in the creation of surveys while avoiding being restricted to the technical capabilities of commercial survey platforms. As such, DISE supports steps 1-3 of **Figure 1.1** and offers an acceptable range of new and advanced data collection methods, as follows:

- Ranking-, Rating-, and Choice-Based Conjoint Analysis (Green & Rao 1971; Louviere & Woodworth 1983; Schlereth, Skiera & Wolk 2010)
- Mouselab (Johnson et al. 1989)
- Best-Worst Discrete Choice Experiment for Cases 1, 2, and 3 (Flynn et al. 2007; Louviere et al. 2008; Louviere & Islam 2008)
- Self-Explicated Approach (SEA, such as the constant sum method, see Srinivasan & Park 1997)
- Adaptive Self-Explicated Approach for Multiattribute Preference Meas-urement (ASEMAP, see Netzer & Srinivasan 2011)
- Improved Adaptive Self-Explicated Approach for Multiattribute Preference Measurement (IASEMAP, see Schaaf et al. 2011)
- Dual Response (Brazell et al. 2006)
- Reduced Dual Response (Schlereth & Skiera 2011)

In addition to these augmented stated preference methods, DISE also contains all of the basic functionalities that are required for creating and distributing high-quality surveys. These functionalities include the following:

- All of the basic data collection methods, such as constant sum, textboxes, radio buttons, or spectrums, which are used together with advanced data collection methods.
- Definition of quotas for the sampling of respondents.
- Multilingual user interface.
- Ability to conditionally show questions depending on previous responses.
- Ability to create different versions of a survey and to assign respondents randomly to one of the versions.
- Ability to integrate survey panel providers.

Because of its architecture and implementation, DISE can be easily extended to include completely new preference methods or modifications of existing preference methods.

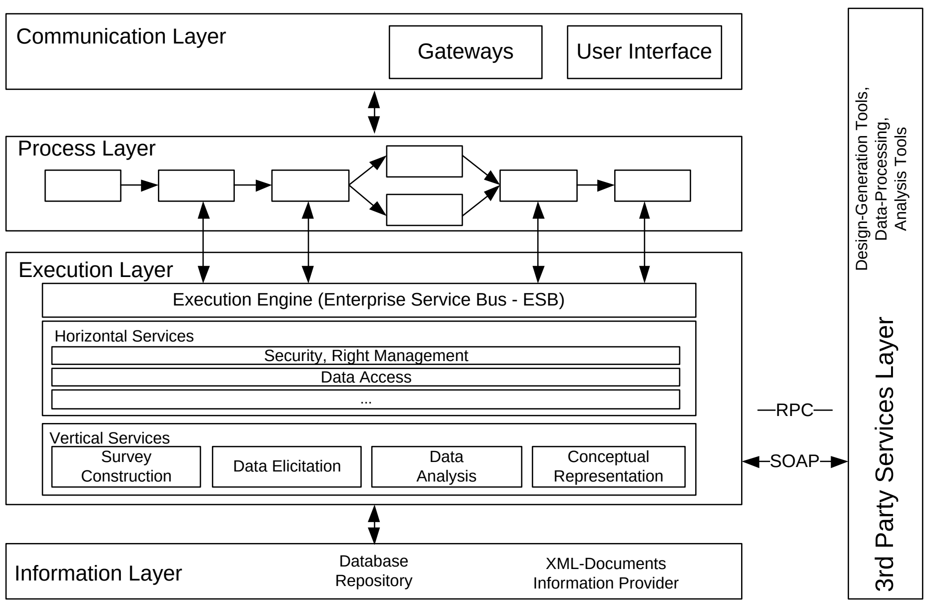
1.3 Realization of DISE

1.3.1 Architecture

Figure 1.2 presents the architecture of DISE, which builds upon the service-oriented architecture of IBM (Arsanjani et al. 2007). The basic concept behind using a service-oriented architecture for DISE is to create a set of principles and methodologies for designing and developing data collection methods and surveys in the form of interoperable services. This architecture reduces the complexity (Berbner et al. 2005), which DISE realizes by loosely coupling services and decoupling them from the underlying technologies. This strategy results in all of the services being autonomous, reusable, and semantically coherent software components that encapsulate the business functionality of each data collection method. As a result, each data collection method is a separate component. The functionality of each component is then accessible through well-defined interfaces. Therefore, services can be exchanged, maintained, and improved separately from each other.

DISE distinguishes three types of users: first, the developer, i.e., the person who implements new data collection methods and adds them to DISE; second, the researcher, i.e., the person who employs the data collection methods in their survey; and third, the respondent, i.e., the person who answers the questions in a survey.

Figure 1.2 Architecture of DISE



The "Communication Layer" generates a multi-lingual and web-based user interface for the researcher and respondents and serves as a gateway for the researcher to access the results. A strict separation between the application logic for the respondent when entering information and for viewing the survey allows the appearance of the survey to be adapted to the company's corporate design.

The "Process Layer" ensures that the services are executed in the correct order. Use cases specify this order. The "Process Layer" accesses the services of the "Execution Layer" via standardized interfaces. The services of the "Execution Layer" are divided into "vertical services" and "horizontal services". Vertical services handle the business logic of specific survey processes (e.g., the execution of choice-based conjoint analysis), and horizontal services provide generic functions, such as database access or the provision of security solutions.

The "Information Layer" provides the required databases and applications in the form of proprietary software components (such as DLLs). Finally, the "3rd-party Service Layer" enables the integration of third party software so that outsourcing services to experts in different areas is easily accomplished. For example, the generation of optimal choice designs for choice-based conjoint studies must be based on sophisticated mathematical and statistical knowledge (Street, Burgess & Louviere 2005; Yu, Goos & Vandebroek 2011). Implementing insights from the literature could be too cumbersome and time-consuming, if the new data collection method is not intended to provide a contribution to the literature, because well-tested software, such as Sawtooth or NGene, already exists.

1.3.2 Implementation

DISE is written in C# and ASP.net (Microsoft .Net 4.0 framework). These languages rely on the extensive functional .NET Framework, which supports XML processing within web services. Additionally, to clearly separate the look of the survey from its functionality, DISE utilizes the .Net Master Page concept, which enables a strict separation of the layout from the appearance of the website and provides native support to specify a survey in different languages.

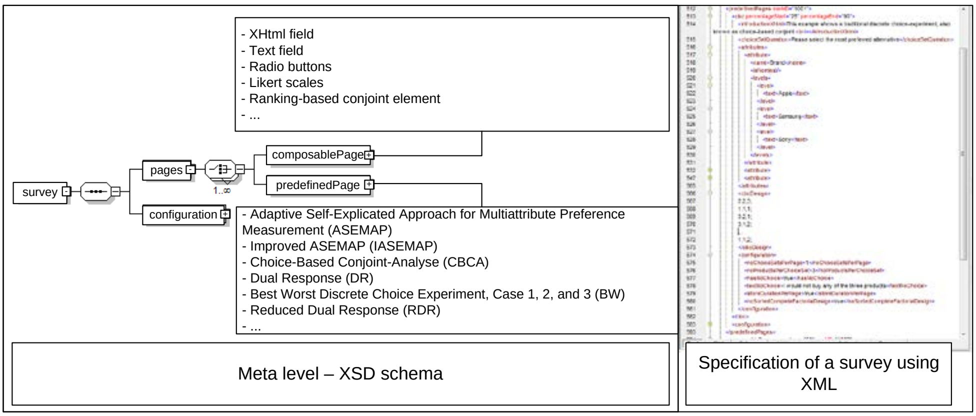
DISE uses XML-techniques to create a survey. XML is the abbreviation for Extensible Markup Language (XML) and is a set of rules for encoding documents in a machine-readable, but also human–readable, format. XML emphasizes simplicity, generality, and usability.

DISE distinguish two types of XML-files. First, an XSD-schema file contains a meta-specification of all of the data collection methods that are implemented by the developers. This document contains instructions on the specification of all of the data collection methods. Developers use this specification to outline for researchers the possibilities for configuring these methods. The second file is the survey-XML. This file is developed by the researcher and specifies the sequence of questions that the respondents receive in a survey.

Figure 1.3 illustrates the use of XSD-Schema and XML in the context of a choice-based conjoint analysis. The XSD schema divides survey pages into two classes: the ComposablePages and the PredefinedPages. PredefinedPages are predefined survey processes such as choice-based conjoint analysis or self-explicated methods that extend over one or more survey pages. These pages contain various types of questions (e.g., formation of rankings or choice sets) or even evaluation services, which allows for instant execution of additional methods to analyze the collected data. For example, an evaluation service could dynamically analyze a respondent’s answer in a survey and automatically adjust the subsequent choice sets in a choice-based conjoint analysis. Survey pages can combine all of the data collection methods in the ComposablePages.

In DISE, researchers directly specify a survey in XML. Even though this specification might seem complicated and not user friendly, most researchers who used DISE for their own studies recognize that this approach substantially speeds up the creation of a survey. The reason for this speed-up is that the researcher gains flexibility, especially when changing and rearranging large parts of the survey. In addition, it is simple to create different versions of the survey or to reuse large parts of it in other surveys, and the specification. The whole survey creation is supported by the rich functionalities of common XML-editors; linking the survey-XML-file to the DISE-XSD-schema file within the XML-editor simplifies the creation because the XML-editor will then automatically propose the possible data collection methods and configuration settings to the researcher.

Figure 1.3 Use of XSD-schema and XML for specification of surveys

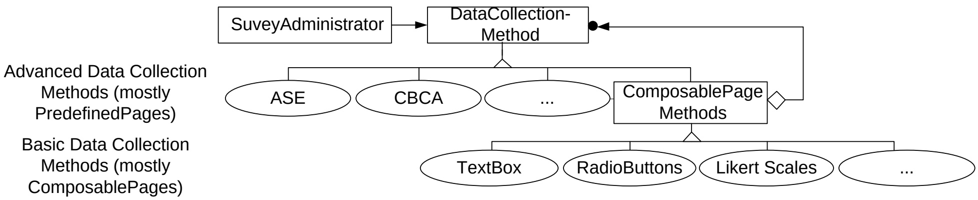


1.3.3 Integration of additional preference methods

The architecture of DISE was designed to make it easy to integrate new data collection methods. Technically, this integration is possible through the use of well-defined design patterns, which are a set of guidelines and reusable solutions to well-known problems in software engineering. DISE especially makes use of the Composite Pattern (Gamma et al. 2005), as shown in **Figure 1.4**. This pattern treats all of the data collection methods uniformly and connects them with the Enterprise Server Bus (see **Figure 1.2**) through interfaces, which are the same for all of the methods.

A developer who aims to extend DISE with a new data collection method must implement a set of common functions (see **Table 1.1**). For example, for a data collection method that belongs to the class of Predefined Pages, the set of common functions consists of those listed in **Table 1.1**. To reduce the implementation effort for new data collection methods, DISE provides a rich library of functionalities that are frequently used (e.g., calculation of arithmetic means, matrix operations, or regression operations).

Figure 1.4 Link between data collection methods from PredefinedPages and ComposablePages



After implementing a new data collection method, developers add its specification to the XSD-schema-file in such a way that the new data collection method will be accessible to the researcher. Whenever this new method is used, DISE delegates the actual execution to its respective software components and controls its execution (e.g., the interpretation of a correctly configured data collection method).

Table 1.1 Most important functions that must be implemented in any data collection method

public abstract PollElements Type;	Design-time: To specify the type of data collection method, such that it can be linked to the entries in the XSD-schema-file
public abstract string BuildTable();	Design-time: Creates all required database entries when a new survey-XML-file is uploaded
public abstract void BuildControls(…);	Execution of the data collection method: Renders all questions on a survey page
public abstract int Progress(…);	Execution of the data collection method: Calculates the progress percentage that should be shown to a respondent at the current state of the survey
public abstract bool IsValid(…);	Execution of the data collection method: Tests whether the responses are meaningful and fulfill a set of specified rules (e.g., that a number between 1900 and 2011 was entered as a response to the question: “What’s your year of birth?”)
public abstract string Update(…);	Execution of the data collection method: Reads all responses and stores them into the database

public abstract void Estimate(…);	After execution of the data collection method: Optional function that is called after completing the data collection method

1.3.4 XML-example of choice-based conjoint analysis

Choice-based conjoint analysis (Louviere et al. 2000; Fritz, Schlereth & Figge 2011; Schlereth & Skiera 2012) is currently an important data collection method for measuring customer preferences in a variety of disciplines, such as marketing, psychology, or health care. Choice-based conjoint analysis has a firm foundation in sociology and behavioral research and explains actual purchasing behavior very well (Swait and Andrews 2003).

The respondents repeatedly choose their preferred alternative in a choice set (see **Figure 1.5** for an example of a choice set), which is modeled on real decision-making situations. A choice set consists of several alternatives, which are described by their attributes and levels. Thus, in every choice set, trade-off decisions must be made between different attractive combinations of attribute levels, which in turn allows for conclusions to be made about the preferences of the respondents.

Figure 1.5 Example of choice set

1 Please select the most preferred alternative

Brand	Samsung	Apple	Sony	I would not buy any of the three products
Storage capacity	8 GB	20 GB	8 GB	
Price	299 €	100 €	100 €	
	○	○	○	○

Subsequently, we outline how to implement a choice-based conjoint experiment, which contains 9 choice sets, in DISE. The XML-code shown in **Table 1.2** is taken from the DISE demonstration survey (http://www.dise-online.net/demo.aspx). First, the researcher specifies the type of data collection method and indicates the range in the percent of progress that is indicated to a respondent. Then, the researcher provides an introduction, which should explain the subsequent task to the respondent.

The specification of choice sets consists of three steps. First, all of the attributes and levels must be specified. These specifications can contain formatted text and even pictures. Second, the researcher includes the choice design that should be employed in this study. These designs can be generated easily with software such as NGENE or Sawtooth or with well-defined methods such of those of Street, Burgess & Louviere (2005). Including the design by simply pasting the respective matrix is convenient because DISE combines the design and the attributes as well as the levels and creates the respective choice sets. Finally, the researcher must add some simple configurations, such as how many choice sets per page should be shown, how many alternatives form a choice set, and whether a no-choice option should be included.

Table 1.2 XML-code of a choice-based conjoint analysis

<predefinedPages>	Type of the question (here
<cbc percentageStart="25" percentageEnd="90">	choiceSet)
<introductionXhtml>This example shows a traditional discrete	Some introduction text
choice-experiment, also known as choice-based con-	
joint.</introductionXhtml>	
<choiceSetQuestion>Please select the most preferred alterna-	
tive</choiceSetQuestion>	Here is the question
<attributes><attribute>	
<name>Brand</name>	Description of the attributes
<levels><level>	and all their levels
<text>Apple</text>	
</level><level>	
<text>Samsung</text>	
</level><level>	
<text>Sony</text>	
</level></levels>	
</attribute><attribute>	
<name>Storage capacity</name>	
<isNominal/>	
<levels><level>	
<text>20 GB</text>	
</level><level>	
<text>8 GB</text>	
</level><level>	
<text>1 GB</text>	
</level></levels>	
</attribute>	
<attribute>	
<name>Price</name>	
<levels><level>	
<text>100 €</text>	
</level><level>	
<text>120 €</text>	
</level><level>	
<text>299 €</text>	
</level></levels>	
</attribute></attributes>	
<cbcDesign>	
2,2,3;	Design used in the choice-
1,1,1;	based conjoint study
3,2,1;	
3,1,2;	
2,3,2;	

3,1,3; 3,1,2; 2,2,1; 1,1,3; 1,3,2; 2,3,1; 3,1,3; 3,2,1; 3,3,2; 2,1,3; 3,1,1; 2,2,3; 1,1,2; </cbcDesign> <configuration>	
<noChoiceSetsPerPage>1</noChoiceSetsPerPage>	How many choices-sets should be shown per page?
<noProductsPerChoiceSet>3</noProductsPerChoiceSet>	How many alternatives has a choice set?
<hasNoChoice>true</hasNoChoice>	Also show a no-choice option?
<textNoChoice>I would not buy any of the three products</textNoChoice>	Text of no-choice option
</configuration> </cbc> </predefinedPages>	End

1.4 Demonstration of DISE

1.4.1 Access to and sample survey

A demonstration of the advanced data collection methods can be accessed at the following site: http://www.dise-online.net/demo.aspx. The questionnaire used in this demonstration also contains all of the basic data collection methods (e.g., constant sum, textboxes, radio buttons, and spectrums), which are typically used together with these advanced methods.

DISE is available at www.dise-online.net. Here, researchers can login and create their own surveys. If you are interested in a test-account, please contact the first author, Christian Schlereth (schlereth@wiwi.uni-frankfurt.de). DISE supports integration with survey panel providers, and more than 50,000 respondents have already participated in studies that use DISE. Thus, DISE has proven that it fulfills all of the requirements that professional software must fulfill, including the requirement that involves handling more than 100 respondents per hour.

1.4.2 Illustration: adaptive self-explicated approach for multiattribute preference measurement

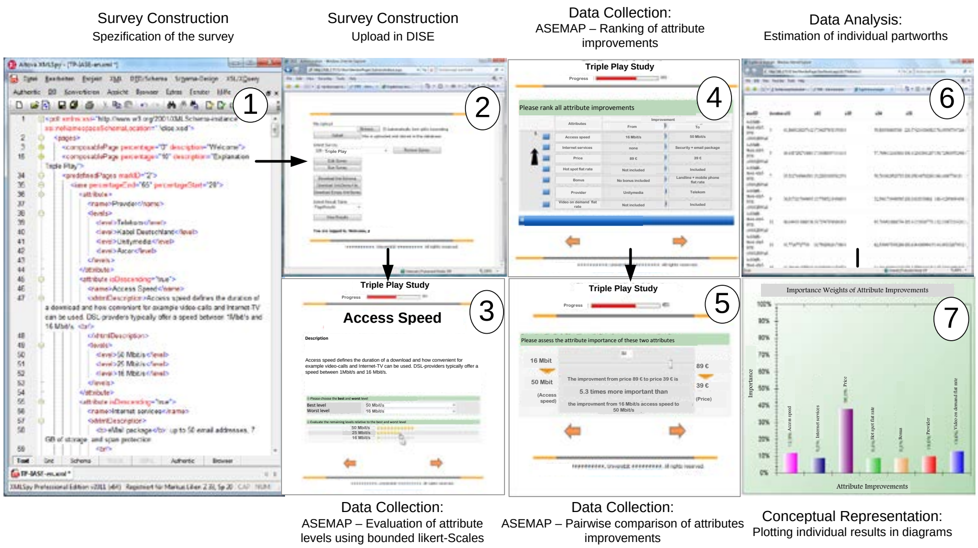
Self-explicated approaches offer a popular preference measurement method that is compositional in nature (e.g., Scholz, Meissner & Decker 2010). Respondents directly evaluate the desirability of each attribute level (stage 1) and the importance of the attributes (stage 2). The combination of both evaluations determines the utilities for the products. Because self-explicated approaches impose less of a cognitive burden than conjoint analysis when the number of attributes is high, self-explicated approaches are standard methods for complex products (Park, Ding & Rao 2008).

Recently, Netzer & Srinivasan (2011) published a new preference method called Adaptive Self-Explicated Approach for Multiattribute Preference Measurement (ASEMAP), which differs from existing approaches because two steps are used for the evaluation of an attribute's importance. Netzer & Srinivasan (2011) focus on stage 2 of the evaluation process and propose a method for managing a high number of attributes and avoiding the weaknesses of the rating and constant-sum methods. In stage 1, they ask respondents to evaluate all of the levels of each attribute on an 11-point rating scale. In stage 2, respondents first rank the attributes and then divide 100 points, multiple times, across several two-paired attributes. The combination of the ranking method with constant-sum paired comparisons removes the assumption of equal differences in the importance weights between the ranks.

Netzer & Srinivasan (2011) had to develop software to implement their new method for measuring preferences. This development process was cumbersome and delayed the research progress. The same method is currently also accessible in DISE, and its implementation was relatively easy. The specification is similar to the specification in a choice-based conjoint analysis (see Section 1.4). **Figure 1.6** demonstrates the usage of ASEMAP in a simplified example of Triple Play offering (i.e., an offer by telecommunication companies, which combines Internet, telephone, and IP-TV services). First, a researcher specifies all of the attributes and their levels in the XML-file and then adds some simple configuration settings (1). A design is not required because the result will be created adaptively, using the observations from previous questions. Then, the researcher uploads the survey-XML-file to DISE and sets up all of the required databases and web-pages (2). Thereby, DISE uses the XSD schema to analyze whether the survey specification is valid and well-formed to ensure that it is executed correctly.

During data collection, respondents are asked in several sequential steps to evaluate the product characteristics using double-bounded Likert scales (3), a ranking (4), and pairwise comparisons (5). In real-time, DISE estimates and stores the parameters of the utility function of the respondent in the database (6). These estimates then allow for the importance weights of the product attributes to be determined and presented (7).

Figure 1.6 Development of new preference methods (here, the Adaptive Self-Explicated Approach: ASEMAP)



1.5 Future of survey-platform DISE

Because the data quality of any analysis strongly depends on the quality of the collected data and thereby on the data collection process, we would like to work towards developing new or improved survey-based data collection methods. All of the currently offered data collection methods in DISE are summarized at the following site: http://www.dise-online.net/demo.aspx.

We intend to continuously extend the functionality of DISE. Possible extensions could be (but are not limited to) the following:

- Development of an innovative new data collection method or improvement of an existing method (see, for example, Individually Adjusted Choice-Based Conjoint, proposed by Gensler et al. 2011)
- Integration of new adaptive design techniques (see, for example, Polyhedral Methods for Adaptive Choice-Based Conjoint Analysis, proposed by Toubia, Hauser & Simester 2004)
- Real-time data-analysis for the individual adaptation of a survey (see, for example, Reduced Dual Response, proposed by Schlereth & Skiera 2011).
- Integration of decision aids in discrete choice experiments (e.g., integration of a bill amount calculator for metered pricing plans). The motivation for this extension is

that the comparison of alternatives in a discrete choice experiment is sometimes very difficult. In this case, decision aids that are accessible at any time during the survey could not only help the respondents to better compare the alternatives but also better deliver important information about respondents' certainty in their choices, which could allow the estimation of utility functions to have a higher validity (see, e.g., Schlereth 2010).

In addition, we invite other researchers to participate in the development of DISE. One example of this participation could be that we offer our knowledge and routines for Step 2 ("soft-ware-based implementation") of **Figure 1.1** as well as Step 5 ("optimization"; see, for example, Schlereth, Stepanchuk & Skiera 2010). Then, researchers could concentrate on Step 1 ("development of a new idea") and Step 4 ("analysis of data"). Performing Step 3 and writing the paper would be accomplished together. Thus, the idea is to leverage our investment into the development of DISE with new ideas for measuring consumer preferences.

Literature

[1] Arsanjani, A., Zhang, L.-J., Ellis, M., Allam, A., and Channabasavaiah, K. (2007), "Design an SOA Solution Using a Reference Architecture," https://www.ibm.com/developerworks/library/ar-archtemp/.

[2] Berbner, R., Grollius, T., Repp, N., Heckmann, O., Ortner, E., and Steinmetz, R. (2005), "An Approach for the Management of Service-oriented Architecture (SoA) based Application Systems," Paper presented to the Enterprise Modelling and Information Systems Architectures (EMISA), Klagenfurt, Austria, 2005.

[3] Brazell, J.D., Diener, C.G., Karniouchina, E., Moore, W.L., Séverin, V., and Uldry, P.-F. (2006), "The No-Choice Option and Dual Response Choice Designs," Marketing Letters, 17, 4, 255-268.

[4] Flynn, T.N., Louviere, J.J., Peters, T.J., and Coast, J. (2007), "Best-Worst Scaling: What it can do for Health Care Research and How to do it," Journal of Health Economics, 26, 1, 171-189.

[5] Fritz, M., Schlereth, C., and Figge, S. (2011), "Empirical Evaluation of Fair-Use Flat Rate Strategies for Mobile Internet," Business & Information Systems Engineering, 3, 5, 269-277.

[6] Gamma, E., Helm, R., Johnson, R., Vlissides, J.M., and Larman, C. (2005), Design Patterns: Elements of Reusable Object-Oriented Software, Boston: Addison Wesley.

[7] Gensler, S., Hinz, O., Skiera, B., and Theysohn, S. (2011), "Improving Willingness-to-Pay Estimation in Choice-Based Conjoint Analysis," Working Paper.

[8] Green, P.E., Carmone, F.J., and Smith, S.M. (1989), Multidimensional Scaling, Concepts and Applications.

[9] Green, P.E. and Rao, V. (1971), "Conjoint Measurement for Quantifying Judgemental Data," Journal of Marketing Research, 8, 355-363.

[10] Johnson, E.J., Payne, J.W., Schkade, D.A., and Bettman, J.R. (1989), "Monitoring Information Processing and Decisions: The Mouselab System," Fuqua School of Business, Technical Report.

[11] Louviere, J. and Islam, T. (2008), "A Comparison of Importance Weights and Willingness-to-pay Measures Derived from Choice-based Conjoint, Constant Sum Scales and Best-worst Scaling," Journal of Business Research, 61, 903-911.

[12] Louviere, J., Street, D., Burgess, L., Wasi, N., Islam, T., and Marley, A.A.J. (2008), "Modeling the Choices of Individual Decision-Makers by Combining Efficient Choice Experiment Designs with Extra Preference Information," Journal of Choice Modelling, 1, 1, 128-163.

[13] Louviere, J.J. and Woodworth, G. (1983), "Design and Analysis of Simulated Consumer Choice or Allocation Experiments: An Approach Based on Aggregated Data," Journal of Marketing Research, 20, 4, 350-367.

[14] Netzer, O. and Srinivasan, S. (2011), "Adaptive Self-Explication of Multi Attribute Preferences," Journal of Marketing Research, 48, 1, 140-156.

[15] Park, Y.H., Ding, M., and Rao, V. (2008), "Eliciting Preference for Complex Products: A Web-Based Upgrading Method," Journal of Marketing Research, 45, 5, 562-574.

[16] Schaaf, R., Schlereth, C., Skiera, B., and Eckert, J. (2011), "A Comparison of Six Self-Explicated Approaches," Working Paper.

[17] Schlereth, C. (2010), Optimale Preisgestaltung von internetbasierten Diensten, Hamburg: Verlag Dr. Kovač.

[18] Schlereth, C. and Skiera, B. (2011), "Reduced Dual Response," University of Frankfurt, Working Paper.

[19] — (2012), "Measurement of Consumer Preferences for Bucket Pricing Plans with Different Service Attributes," International Journal of Research in Marketing, forthcoming.

[20] Schlereth, C., Skiera, B., and Wolk, A. (2010), "Augmented Methods of Ranking-Based and Choice-Based Conjoint Analysis to Estimate Willingness to Pay for Services under Two-Part Tariffs," Journal of Service Research, 14 (4), 443-459.

[21] Schlereth, C., Stepanchuk, T., and Skiera, B. (2010), "Optimization and Analysis of the Profitability of Tariff Structures with Two-Part Tariffs," European Journal of Operational Research, 206, 3, 691-701.

[22] Scholz, S.W., Meissner, M., and Decker, R. (2010), "Measuring Consumer Preferences for Complex Products: A Compositional Approach Based on Paired Comparisons," Journal of Marketing Research, 47, 4, 685-698.
[23] Srinivasan, V. and Park, C.S. (1997), "Surprising Robustness of the Self-Explicated Approach to Customer Preference Structure Measurement," Journal of Marketing Research, 34, 2, 286-291.
[24] Street, D.J., Burgess, L., and Louviere, J.J. (2005), "Quick and Easy Choice Sets: Constructing Optimal and Nearly Optimal Stated Choice Experiments," International Journal of Research in Marketing, 22, 4, 459-470.
[25] Toubia, O., Hauser, J.R., and Simester, D.I. (2004), "Polyhedral Methods for Adaptive Choicebased Conjoint Analysis," Journal of Marketing Research, 41, 1, 116-131.
[26] Wertenbroch, K. and Skiera, B. (2002), "Measuring Consumer Willingness to Pay at the Point of Purchase," Journal of Marketing Research, 39, 2, 228-241.
[27] Yu, J., Goos, P., and Vandebroek, M. (2011), "Individually Adapted Sequential Bayesian Conjoint-Choice Designs in the Presence of Consumer Heterogeneity," International Journal of Research in Marketing, 28, 4, 378 - 388.