

Towards designing individual value-oriented decision support for selecting internet-based services

Verena Dorner¹, Stefan Morana¹, Alexander Maedche¹, Christof Weinhardt¹

Abstract: Including individuals' value systems is seldom considered in the current body of decision support research, although individuals' values have a strong impact on decision-making. We propose that adapting decision support to include individuals' values increases decision quality and decreases decision effort. We propose to extend decision support for choosing internet-based services such that services are matched not only regarding individuals' preferences for search and experience attributes, but that services also match their value systems. By helping users identify these matching services, we aim to enable them to participate in greater parts of digital life in accordance with their individual values. In this research-in-progress paper, we introduce the conceptual foundations and describe a preliminary research design. The results will serve as a guideline for designing value-based decision support in the next step of our research project.

Keywords: individual values, design, decision support, internet-based Services

1 Introduction

Since the number of internet-based services keeps multiplying, and business models often rely on the (re)sale and analysis of personalized data, the question of how users can keep control over their digital life in terms of its coherence with their individual value system [Sc92] becomes more and more important. Specifically, choosing from an ever-larger range of internet-based services increases decision time as well as effort, results in different cognitive-affective responses from different individuals [RG14], and increases the likelihood of information overload which in turn has adverse effects on decision quality. Decision support systems (DSS) support individuals in their decision-making. DSS provide decisional advice [TA01] to enable faster, better, and easier decision making [LD00]. They also serve to decrease cognitive effort [SC12] and avoid information overload [LS12] during decision-making. Most research on the behavior of users in DSS and the design of DSS focuses on decision tasks and decision objects described in terms of search and experience attributes [XB07]. One dimension of decision-making that is usually not addressed is how decision tasks and objects relate to the user's individual value system. Anecdotal real-life evidence indicates, however, that individual value systems play a large role in shaping decisions. This is particularly interesting in the domain of internet-based services, with successful services such as instant messaging services WhatsApp and Snapchat as well as online social networks like Facebook. For instance,

¹ Karlsruhe Institute of Technology, Institute of Information Systems and Marketing, Fritz-Erler-Straße 23, 76131 Karlsruhe, {firstname.surname}@kit.edu

individuals with a high demand of self-direction [Sc92], may require a high degree of control over their personal data and refuse to use such services as gather huge amount of personal data. If such alternatives are not readily available, participation in certain parts of digital life may be restricted. This reduces the benefits of such services both for the individual and – especially in the instance of services that rely on network effects – for other service users. Assuming that preferences for values can be expressed and measured similarly to (performance) attributes of decision objects, the DSS needs to be extended to add individual values to the list of relevant attributes describing a service. In this research-in-progress paper, we present key conceptual foundations and a preliminary research design addressing the research question. In our overall research project, we aim to understand, **first**, whether and how explicitly including individual values as decision criteria results in different cognitive-affective responses and possibly decreases effort (despite increasing the number of attributes) due to increased (potential) coherence of service and value system in cases where services matching the individual’s value system exist. **Second**, we intent to develop design guidelines for integrating individual value attributes into DSS for internet-based service selection.

2 Conceptual Foundations

We base our understanding and measurement of individual values on the popular Theory of Universals in Values [Sc92] which takes values to be “*conceptions of the desirable that influence the ways people select action and evaluate event*” [SB87]. Universal values arise from basic underlying goals (e.g. fulfilment of biological needs, welfare and preservation of groups) and can be classified in ten dimensions placed on a circle: Power - Achievement - Hedonism - Stimulation - Self-Direction - Universalism - Benevolence - Tradition - Conformity - Security - Power. The positions on the circle indicate whether values are compatible (close proximity) or conflicting (opposing) in terms of how they “*guide [...] perceptions, preferences, and behaviors*” [BD16]. While these values are universal across individuals and cultures, individuals differs with regard to the relative importance they accords each value [BB15]. In addition, the decision situation must be accounted for: different situations lead to large and systematic differences in individual decision-making. We base our research on recent research that identifies eight situational cues that affect individual behaviour most strongly [RG14]. Research in DSS has developed a number of methods for measuring preferences for decision objects and attribute weights [SD15]. However, these methods focus on experience and search attribute, not values.

3 Preliminary Research Design

For the overall research project, we follow the design science research (DSR) approach [HM04] in order to derive guidelines, in the form of design knowledge, for the design of value-based decision support for selecting internet-based services. In a first step, we address the first part of our research project in a laboratory experiment and intend to

conduct a field study in a later stage of the research project. For the laboratory experiment, we develop two DSS for service selection (treatments) which participants use in a between-subject repeated measures experimental design. One system lets the participants enter self-reported weights for values based on a classical approach (such as TRADEOFF [KM91]), the other based on the principles of a product configurator [SD15]. Participants are then asked to rate a set of 10 services on a scale from 1 (worst) to 10 (best). The services are shown in an ordered list based on participant input.

The participants use the DSS multiple times for choosing different services shown in randomized order within treatments. We choose different services because specific situational characteristics elicit different cognitive-affective responses from different individuals [RG14]. We use within-subject design because we hope to be able to identify cross-situationally stable effects of individual values on choice behavior. One such situation is the choice of a fitness app, which includes strong situational cues for positivity (potentially enjoyable experience), negativity (potentially frustrating, e.g. fitness goals are missed) and duty (e.g., adherence to training plan). Another is the choice of a dating app, which includes strong cues for mating (potential romantic partners are present), sociality (potentially develop close personal relationships), adversity (potentially being criticized or rejected), and deception (potentially untruthful statements, pictures etc.). A third situation is the choice of a brain-training app that includes strong cues for intellect (cognitive effort is required). After each situation, participants are asked to fill in the DIAMONDS standardized questionnaire [RG14] and the NASA TLX [HA06] for measuring cognitive effort. In both treatments, participants are asked to fill in the Universal Values standardized questionnaire [Sc92] prior to the experiment and indicate their satisfaction [BH01] with the DSS after the experiment.

4 Expected Contribution

With this research, we intend to shed light on how explicitly including individual values as decision criteria reduces effort, increases decision quality, and satisfaction. We compare two attribute weight elicitation methods in order to determine which requires less user effort. Following the DSR approach, we aim to derive valuable design knowledge for integrating value attributes into DSS for service selection as next step. In addition, we hope to be able to identify types of users that exhibit similarities in their behavior and link these similarities back to idiosyncrasies in their values.

In our future work, we plan to investigate ways of increasing the usability of the DSS by collecting information on individual value systems automatically. Manual input is time-consuming and tends to reduce perceived usability and usefulness of information systems. One possible solution to this issue is applying machine learning techniques to users' search and choice histories [RF10]. We plan to evaluate the DSS, including such solutions, in a field study, where we can supplement users' observed behavior and inputs with contextual data such as current location or travel status. A field study setting will also afford us the

opportunity to examine to which degree prices and users' willingness-to-pay [ZS13] as well as perceived quality [VS15] affect the selection of internet-based services.

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