Using association reasoning tool to achieve semantic reframing of service design insight discovery

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Developing a desirable service requires in-depth understanding of customers, but discovering customer insights has depended on designers' experiences. It is hard for novice designers and designers at enterprises with Goods Dominant Logic mindsets to do this well. A partial solution rests on challenging the core design practices of reframing and frame creation. This study presents an IT-based tool with the knowledge in ConceptNet (a machine-readable commonsense knowledgebase) to facilitate a variety of association reasoning methods in the reframing and frame creation process. The concept of insight depth is proposed for measuring the influential extent of insights. Our tool has also evidenced its utility on improving the quality of the reframing and frame creation process for experienced and novice designers.

Keywords: innovation, design practice, design process, system design, interdisciplinarity

In this post-digital age, not only startups but also existing enterprises make great efforts to innovate their products and services to gain more revenue. Only unceasing innovation can help enterprises keep up with market trends, or even more, create trends. Service design is a means to service innovation and is a process aiming to create new or improved (existing) services to make them more useful, usable, desirable for clients and efficient/effective for organizations. Discovering insights from customers and defining design challenges are keys to service design. At the end of the insight defining stage, there will be a clear definition of the fundamental challenge or problem to be solved in the following design stages (Design Council 2012). Consequently, if a problem is not defined with compelling insights, it is hard for customers to accept the design no matter how well the service is developed or delivered. This is connected to situations in which enterprises make service value propositions that are not what customers' desire and thus lose their customers as a result.

Meanwhile, both large enterprises and small businesses (SMBs) need a more efficient way to carry out new service development. Large enterprises with

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goods-dominant mindsets have existing business models for gaining revenue and most of them assume that they can continuously benefit from such models, and often keep doing things as they always have. Large bureaucracies also often make big companies slow to make decisions about new service development. In contrast to large companies, SMBs have faster decision-making time and are also usually more adventurous. Thus, it is much easier and they are more willing to carry out service innovation, but they have less resources, including manpower and capital, to put into innovations (Lindegaard, 2011).

For the above reasons, we conclude that there are two aspects that cause the gap between knowing the importance of service design and doing it well. First, for the aspect of management, enterprises should shift their mindsets from Goods Dominant Logic (G-D logic) to Service Dominant Logic (S-D logic) and focus on designing good experiences for their customers. However, enterprises are usually accustomed to selling what they think customers' need, instead of discovering what they need. However, there is not a good way to help enterprises discover insights from customers. The second problem is the lack of tools. Although some studies have been devoted to the expertise of designers (Cross, 2004; Paton & Dorst, 2011), it is hard for novice designers and designers at enterprises with G-D logic mindsets to discover insights from customers. A partial answer rests on challenging core design practices of reframing and frame creation. However, relevant tools to support and analyze the framing of design activities are rare.

In this study, we argue that there should be an IT-based tool to facilitate the process of discovering the design insights of designers, no matter if they are experienced or novice designers. We also present a tool using the commonsense knowledge in ConceptNet to facilitate a variety of association reasoning methods for the reframing and frame creation process of service design insight discovery. The knowledge used in the system comes from ConceptNet, a famous commonsense knowledge base developed by Liu and Singh (2004a, 2004b) at MIT.

To this end, we outline the related theoretical standpoints which we pursue in this study (Section 1). Section 2 and 3 discuss the basic concepts. Section 4 then presents the design of our tool, followed by its evaluations and discussion of results (Section 5). The conclusion is then provided in Section 6.

1 *Characteristics of service design*

Firstly, we review the theoretical foundation of service, which is essentially different from goods. Secondly, we review the fundamental design steps and the challenges of reframing and frame creation. We subsequently close this section by providing the background knowledge of the proposed tool design.