Bridging Research and Practice in Design: Reflections of the Project on Value Construction with Virtual Possessions

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Abstract: Design researchers in academia often face the situation where they should achieve both scholarship and practitionership. It is particularly relevant when they undertake corporate-sponsored research projects. As a way to smoothly bridge research and practice in design, we show how design researchers in academia can conduct a project that both advances research and produces an output that a corporate sponsor can operationalize. We introduce an industry-academia collaboration project regarding value construction with virtual possessions. We highlight the procedure and the tools used for transforming research outcomes into useful design resources: *insight extraction card*, *opportunity matrix*, and *concept delivery card*. We discuss barriers to the process and the impacts of our tools. Our investigation into the way the design researchers accomplish meaningful results of research and practice with the process and the tools can help to harmoniously integrate research and practice in design.

Key words: practice based research, research through design, design tools, corporate sponsored design research. Co-design

1. Introduction

Due to the pragmatic nature of design, design researchers in academia often face a situation in which they should achieve both scholarship and practitionership [1]. Pursuing practitionership is fundamental in design academia, as the number of designer-researchers who are trained as practitioners and who are now conducting research is growing. They are interested in combining their skills in design practice with research. In the meantime, as the number of and demand for design PhD programs grow, the need to improve scholarship in the design discipline is increasing. Design researchers in academia need to advance design as an academic discipline through high-quality research outcomes. This situation requires new professional models and methods which efficiently contribute to both design research and practice at the same time.

As in other disciplines, challenges exist in pursuing the objectives of design practice and research together. In general, research aims to strengthen the body of knowledge. Scientific approaches are used, as reliability, validity, and rigor are the main criteria for evaluations. On the other hand, the goal of practice is to create new successful products or services. The difference in these objectives makes combined contributions in a single project difficult to achieve. Recently, the design research community attempted to address this. As a result, research models, such as those associated with practice-based research, constructive design research, and research through design, are all gaining attention. However, these models are largely discussed in specific design fields, such as in the interaction

design and service design fields. It is also considered that the models must be further formalized to be accepted within and outside of the design research community [5, 19].

One of the opportunities through which design researchers in academia can generate knowledge and pragmatic results that are beneficial to the industry is to conduct corporate-sponsored projects that are aimed at the development of new products or services. The number of such projects is increasing, as corporations seek a better understanding of diverse phenomena associated with their target users and related contexts in a complex society. Companies can gain insight into new product directions with less investment. Universities, too, welcome such projects for economic and educational reasons. Design researchers also want to use their practice skills and to provide participating students with an awareness of professional practice.

However, it is difficult to balance creating academic achievement and satisfying the expectations of the sponsoring corporation. When the project focuses on the pragmatic side, it is difficult to generate new knowledge. When the project focuses on research contributions, the results may not provide direct benefits to the sponsoring corporation. Sponsoring corporations often do not want to publish the research results in order to keep the ideas confidential. In the design research field, it can be said that the research model and tools are in their infancy for making combined contributions to both academia and industry.

Meanwhile, corporate-sponsored research is accomplished by a multi-disciplinary team that consists of members from industry and academia. The two parties have different cultures. As the project problem becomes complex and involves greater challenges, it has become common for multi-disciplinary parties to collaborate in a geographically, professionally and culturally dispersed environment. In a typical new product development project, applied social scientists, designers and engineers work together to understand users and associated trends in society, to identify people's needs, and to create new concepts. This formation requires effective tools to share results at different stages of the project and requires the outcomes of different disciplines.

In this paper, we attempt to answer the question of how design researchers in academia can undertake corporate-sponsored user research and new product development projects that both advance research and produce output that can be operationalize by corporate sponsors. This is based on our experience of working on an industry-academia collaboration project accomplished by a globally distributed, multi-disciplinary, multi-cultural team. We present the tools used in the project for transforming research outcomes into useful design resources. We illustrate the procedures and tactics we applied and discuss the lessons, impact and issues that resulted. Our approach to bridging research and design is explained in the three stages of the project: 1) understanding how users work in the real world while building design knowledge, 2) applying research outcomes to developing design concepts, and 3) describing the linkage between design research and design concepts. In addition, we present the tools that were used at each stage, specifically the *insight extraction card*, *opportunity matrix*, and *concept delivery card*. We discuss lessons learned from the project experience and the impact of the tools in pursuing scholarship and practitionership during the project.

2. Related Work: Relationship between design research and practice

In the design research domain, there was discussion on the nature of scholarship and the practionership of design. The connection between the two has also been discussed for some time. Archer explained that *practitionership* is concerned with identifying a set of requirements, conceiving a way of meeting those

requirements, resolving problems and delivering results [1]. *Scholarship,* on the other hand, produces new knowledge or understanding. These distinctions regarding the different contributions of design and the integration between research and practice were pointed out by Norman [10]. He pointed out that the gap is caused by the difference of the knowledge and skill sets required for both parties. Most research is focused upon problems and difficulties, while practitioners want to hear about the benefits and the new product directions to pursue. Sanders also pointed out that conflict and confusion within the design research space are evident in the turf battles between researchers and designers, although there is a growing emphasis on collaborative projects between industry and the universities [16].

Regarding the connection between research and practice in design, some considered that the research may have different degrees of practice characteristics. For example, Buchanan suggests that design research may be *clinical, applied* or *basic,* depending on the type of problem being addressed [2]. *Clinical research* is directed toward an individual case or to specific design problems, as its name suggests. *Applied research* is directed toward general problems found in various products or situations. *Basic research* focuses on understanding the principles related to fundamental problems. This explanation about the relationship between research and practice resembles that of the medical field, which contributes to each other for the development of the discipline. Although differences exist, we can learn from the interactions between research and practice seen in the medical field to build a bridge between research and practice in design.

Several design researchers put emphasis on the fact that design research contributes to both constructing a knowledge framework about design as an independent discipline and to supporting professional design practice. Owen's model is appropriate for explaining the closely linked relationship between the realms of research and practice [13]. According to this, design research embraces both knowledge-using and knowledge-building processes. Therefore, Owen argued that design research should not be thought of as being limited in form, particularly to the classical forms of scholarly and scientific research, and explained that design research is also part of the processes of knowledge-using and knowledge-building in the service of inquiry. The benefit of Owen's model is that it explains the continuous flow from design research to practice, and vice versa, and accordingly reveals the possibility for reducing the gap between design research and practice through diverse knowledge processes.

Despite the close relationship between research and practice in design, it is difficult to find ways to make good connection or smoothly transfer the outcomes between research and practice. One of the research models for integrating research and practice in design is Research through Design. It is mentioned in Frayling's classification of art and design research: *research into art and design, research for art and design*, and *research through art and design* [4]. He explained that *research through design* is an approach that produces artifacts to stimulate research and provides an appropriate conduit for research findings. It is now being recognized as a good way to make a unique contribution to interdisciplinary disciplines, such as Human-Computer Interaction (HCI) by applying the practical skills and expertise of designers [1, 7]. Recently, Koskinen et al. introduced constructive design research as a way that practitioners can contribute to research so that the results of the research can contribute to both research and practice [8]. They explain that the practice-based research can be fit into three types: the lab, field and showroom frameworks.

Sanders introduced generative research that is conducted in order to generate ideas or to uncover new product opportunities [15]. She differentiated *evaluative and experiential research*. She argued that generative research

can fill the gap between information as an outcome of research and inspiration as a resource for practice. She thought that design research needs to cover both research focusing on the informational approach, which is useful for analytic thinking, and design research focusing on the inspirational approach, which is useful for a designer's exploratory thinking.

Despite the close relationship between design research and practice, it is still considered difficult to bridge research and practice in a single project by generating both independent design knowledge and outcomes that can be operationalized by commercial partners. Although a few consulting firms develop customized methods and tools that directly transfer research outcomes into new product and service ideas, there is a lack of methods and tools that are reported in the design research community. In this paper, we introduce an industry-sponsored project that had both research and practice goals. In the next sections, we introduce the details of the project and our approach to bridging research and practice in design as well as the tools used to transfer early research findings to new concept proposals that can be operationalized by the sponsoring company.

3. Bridging design research and practice in an international collaboration project on value construction with virtual possessions

The design research outcomes from academic fields sometimes should be transformed into understandable and usable formats for design practitioners. We argue that researchers should make a traceable connection between basic knowledge gained by academic approaches and practical insights that are applicable to the market. In this process, practical circumstances should be counted as important factors that drive the transformation. The researchers should also use appropriate language showing impact and vision to communicate with the practitioners. In order to show how this transformation from research outcomes into useful design resources can be made, we will use our tools to illustrate the process of understanding users in the real world with regard to building design knowledge, applying research outcomes to design practice and describing the linkage between design research and design concepts. We used this process in an actual design project.

3.1 Project background and outline

The purpose of the project we completed was to investigate ways to increase values for virtual possessions and generate relevant design concepts. To conduct this project, three academic partners and a commercial company collaborated. The project team noticed that today, people are amassing ever-larger collections of virtual possessions, as interactive technologies continue to become woven into the fabric of everyday life. Virtual possessions include formerly material things that are increasingly becoming immaterial (e. g., books, music, photos and tickets); things that never had lasting material forms (e. g., electronic message archives, social networking profiles, game avatars and social networking badges); and metadata traces that document people's interactions with digital devices and services (e. g., photo location information, music playlist histories, automatic and manual photo tags and credit card-purchase histories). In that sense, several researchers have begun to explore people's practices with their virtual things in the past few years [7, 9, 12, 17, 18].

However, to date, studies of virtual possessions remain separate from those governing practical design activities. If we wish to design for virtual possessions, which involve complex phenomena, we need both sides collaborating and integrating. Comprehensive research is essential for explaining how people use virtual things, and reflective design practice could integrate this evidence-based knowledge into new designs.

Our project team started investigating how technologies and services get adopted within different local settings and, in particular, how these processes shape young adults' value construction. Thus, we conducted in-home interviews with 48 young adults at sites in South Korea, Spain and the United States (U. S.) to understand how people construct value for their virtual possessions. Then, we had weekly online meetings and held a design workshop for extracting insights and design knowledge related to this. After that, based on our research results, we generated design concepts that are applicable to design practice.

We produced two types of outcomes from this project. The first was the academic research outcome; we published a paper in the ACM SIGCHI Conference on Human Factors in Computing Systems [11]. This paper illustrated our findings on how people perceive and construct values related to both their virtual and physical possessions. For example, it reported that young adults live in unfinished spaces and often experience a sense of fragmentation when trying to integrate their virtual possessions into their lives. It provided one of the first cross-cultural studies exploring young adults' value-construction practices in terms of virtual possessions, advancing our current understanding of how this fits into the context of the design community. The second outcome was a number of design concepts and associated scenarios for the industry partner. These were proposals for new services that would support people's organizing, creating and sharing of virtual possessions. These results are expected to support further service developments for our client. During the project period, we tried to bridge two outcomes. In the remaining sections, we explain how the design research outcome could be transformed into design concepts and discuss some tools we developed for this transformation.

3.2 Procedure, barriers and tools

Our tools and lessons are explained in three project stages: understanding users in the real world and building design knowledge, applying research outcomes to developing design concepts, and describing the linkage between design research and design concepts.

1) Understanding users and building design knowledge

The field research method in the first phase was a series of interviews conducted in participants' homes that lasted about1.5–2 hours. Local researchers who had a native understanding of the relevant language and culture conducted these interviews, and they aimed to understand each participant's orientations toward his or her material possessions, locally stored virtual possessions and online virtual possessions.

One of the biggest hurdles was the fact that these interviews ended up collecting large amounts of data. Because all of the interviews were recorded and researchers took field notes and documentary photographs for each one, our study produced several sets of handwritten field notes, more than 70 hours' worth of audio recordings and several hundred photographs.

To efficiently manage all of this raw data, we developed a common template to share meaningful results. We used a spreadsheet with a series of items such as file number, picture name, participant name, participant characteristics, object name, information about the object and meaning. The audio recordings were transcribed and divided into relevant segments in the spreadsheet. By using this template, our extensive amounts of audio, video and photo data could be reduced to a manageable level (48 Microsoft Excel files in total) and made available to be used as references for insights or applications. Another barriers to this procedure were sharing interview data with other local and remote project members and extracting insights collaboratively. Because people from three different countries separately worked to glean data from each of the 16 users of every country, it was difficult to

extract insights together. The interview data indicated an average of more than 30 issues related to the meaning of these possessions to the interviewees. To effectively share the massive quantities of data across different sites, we needed a simple results presentation template for preliminary analysis.
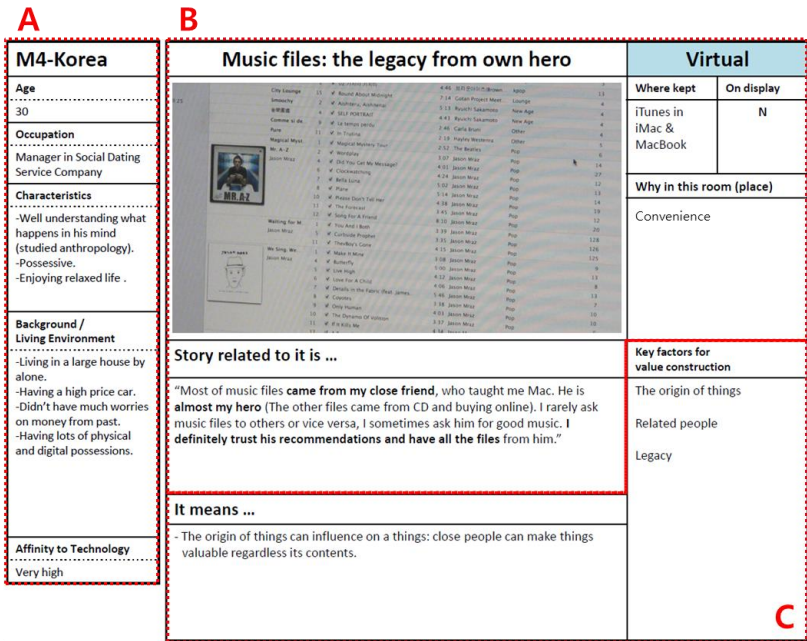

Figure 1. Insight extraction card

In order to understand the results of the user interviews efficiently, we created an *insight extraction card* for the interview data (Figure 1). This card consisted of three parts: a user profile, an explanation of meaningful things, and a preliminary analysis of why and how people use possessions to construct value. Because not every member of the project team could participate in the interview sessions due to geographical limitations, we tried to help everyone involved by giving detailed information.

Figure 1 shows an example of one of these *insight extraction card*s. Section A, a user profile, contains information about personal characteristics, living environment and technology intimacy. According to Hofstede, cultural differences influence people's perceptions as well as their behavior [6]. To aid in exploring both the differences and common patterns related to possessions, depending on the various cultures, we included cultural perspective in our user profiles for the team members in the different countries. Also, we tried to express the personal characteristics and living environments of the users in detail as basic personal information. Finally, we noted the users' technological affinities to see how this might influence the results for virtual possessions.

Section B gave an explanation of meaningful things on several different levels. We attached photos of users' meaningful possessions and then explained the stories behind those possessions. The interviewer who visited a given user's house quoted the user's interview and highlighted important parts that might reveal how the possession was valued. We wrote a title for each interview case with the name of the possession and the most important issues that arose during the interview (e. g. music files: the legacy of a hero, 7-year-old blog that I seldom use, digitalized business cards for efficiency in work). Also, we marked whether the possessions were virtual or physical and wrote about how spatial issues affected each possession's value constructions. Through various explanations, we intended to deliver effectively what meaningful things were and how their value had constructed even to people who were excluded in each interview.

Preliminary analysis was added in Section C. We expected that the preliminary interpretation would be helpful for the other team members in extracting in-depth insights and assessing each interview situation at a glance. We interpreted the meanings of users' quotes from multiple perspectives and described key factors for value construction. This preliminary analysis converted the fragmental information of the interview results to general design knowledge by repeating multiple interpretations. After reorganizing our interview data, we conducted a five-day face-to-face workshop for sharing the interview results. The *insight extraction card* played an important role during this workshop. Country-specific teams used them to present their own preliminary analyses of the interview data. The cards made it possible to efficiently explore a large amount of raw data. It was possible for the researchers to refer to their *insight extraction card*s as research sources. Because the entire process of converting raw data from user studies to preliminary design knowledge was presented as part of the extraction cards, researchers could quickly and easily understand the results.

The *insight extraction card*s also helped to us to conduct the next stage of the knowledge synthesis process. After sharing our interview data, we conducted affinity diagrams based on the insights we had discussed. This enabled us to produce design knowledge for seven value construction properties of possessions: *curation, memorable moments, self-development, extended self, social relationships, physical aesthetics* and *utility*. These properties, along with fieldwork data, were further used to inspire designers and generate service concepts.

2) Applying research outcomes to design practice

The second phase of the project was to generate service design concepts for our client. Academic research often neglects real-world situations and instead focuses on specific issues that are directly related to the initial research questions [10]. In this project, however, we had to create viable service ideas for the client based on our interpretations of the research outcomes. We tried to create various ideas for design possibilities resulting from the knowledge of value construction processes that we had gained.

Interest Areas of Client

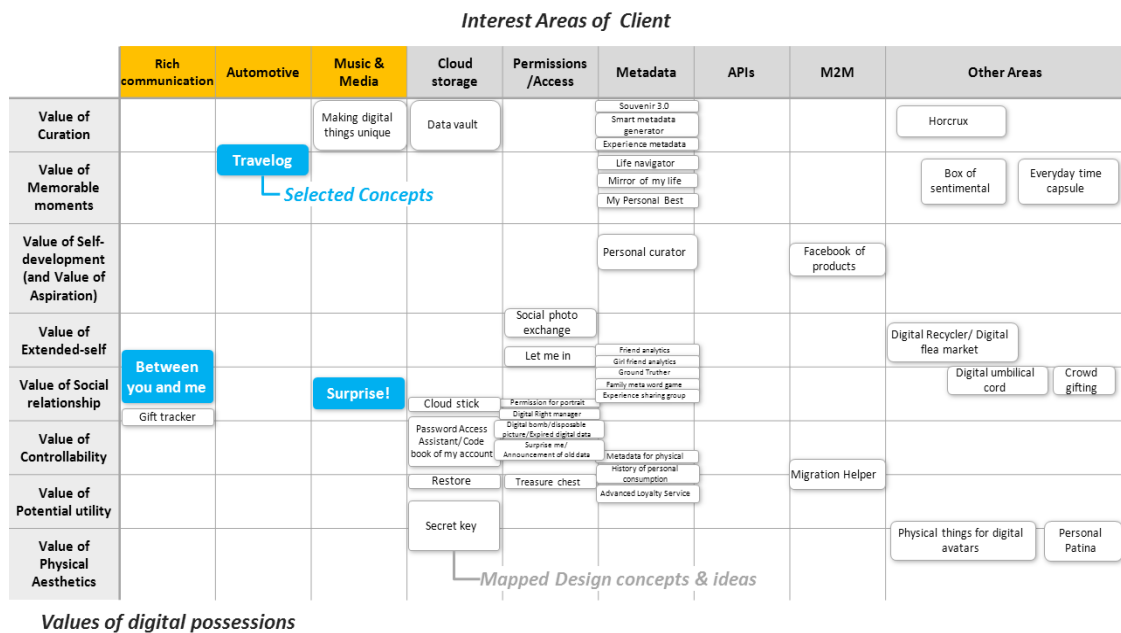| Values of digital possessions	Rich communication	Automotive	Music & Media	Cloud storage	Permissions /Access	Metadata	APIs	M2M	Other Areas	
Value of Curation			Making digital things unique	Data vault		Souvenir 3.0; Smart metadata generator; Experience metadata			Horcrux	
Value of Memorable moments		Travelog (Selected Concepts)				Life navigator; Mirror of my life; My Personal Best			Box of sentimental	Everyday time capsule
Value of Self-development (and Value of Aspiration)						Personal curator		Facebook of products		
Value of Extended-self					Social photo exchange; Let me in	Friend analytics; Girl friend analytics; Ground Truther; Family meta word game; Experience sharing group			Digital Recycler/ Digital flea market; Digital umbilical cord	Crowd gifting
Value of Social relationship	Between you and me; Gift tracker		Surprise!							
Value of Controllability				Cloud stick; Password Access Assistant/Code book of my account	Permission for portrait; Digital Right manager; Digital bomb/disposable picture/Expired digital data; Surprise me/Announcement of old data	Metadata for physical				
Value of Potential utility				Restore	Treasure chest	History of personal consumption; Advanced Loyalty Service		Migration Helper		
Value of Physical Aesthetics				Secret key					Physical things for digital avatars	Personal Patina

Mapped Design concepts & ideas

Figure 2. Opportunity matrix

One of our key tools for exploring concepts and further refining them was the *opportunity matrix* (Figure 2), which helped us to generate initial ideas related to people's value construction with digital possessions. This tool

also supported exploring design areas appropriate for our client. In the *opportunity matrix*, current and potential service areas were plotted along the X-axis. In our case, we covered service areas related to our client's interests in communication, entertainment, automotive and potential design issues (such as cloud storage, metadata and application programming interface). The value construction processes we found during the previous stage were plotted along the Y-axis. We then filled out the matrix by generating and mapping relevant design ideas.

Opportunity matrix has some advantages by comparison with existing methods and tools that try to connect design concepts and user needs. For instance, *value opportunity analysis* is generally used in design process. By using it, designers account for several attributes that are considered useful and valuable for users in creating a new product [3]. With this tool, designers can compare design concepts based on several attributes, such as emotion, ergonomics, technology and quality. These attributes can be applied either to the product as a whole or to certain features of the product. Through analyzing ideas by using attributes, designers can choose the optimum idea and get a better understanding on other ideas. However, in *value opportunity analysis*, the attributes and evaluation are not based on research outcomes or design knowledge but rather on a designer's personal experience.

Meanwhile, the *opportunity matrix* supported designers to consider several issues much more broadly by generating ideas related to sparsely populated spaces on the map. In addition, it was possible to integrate similar design ideas into a single and more concrete design concept. Eventually, we could suggest new possibilities for the client because our design knowledge and service areas indicated opportunities. For our client, this tool made it possible to figure out the overall distribution of the design concept ideas in order to guide design activities. The client could actively participate in the design process after understanding which directions seemed promising and could guide design team members in developing more ideas that focused on certain areas of the map.

3) Describing the linkage between design research and design concept

From the results of our research, with reference to the *opportunity matrix*, we were able to derive several service concepts. In order to evolve into more definitive and feasible ideas, we combined a group of similar concepts and complemented them. We narrowed these down to three final concepts, which met the requirements of the client and fit with the early research outcomes.

During this process, the most concerned barrier was collaboratively generating ideas without losing directions about research outcomes or the main purpose of the project. In addition, smooth communication among the various project members was also an important issue. For this purpose, we documented each design concept via *concept delivery cards* (Figure 3). In *concept delivery card*s, we revealed a traceable linkage between the research outcome and the design concepts. Making a traceable linkage was supposed to have benefits in some ways. First, people engaged in the project could consciously develop the embryonic ideas along with research outcomes. Second, it was expected to help project participants (including project members who did not participate in all of the ideation processes) to clearly understand each idea considering backgrounds. Moreover, it was also expected to be helpful for inspiring practical designers by showing them the impact or vision of concepts based on research outcomes in a glance. Although the concepts we suggested are still not suitable for real service developments at present, they will become a good source of future design activities.

*Concept delivery card*s deliver the concept of each idea in a practical and efficient way. We set three requirements for *concept delivery card*s; where an idea came from within the research results, what kind of service

or product would be associated with it, and the expected values and profits for when the designs were actually realized.

This card largely consisted of four sections. Section A briefly describes each concept with a title, summary, detailed description and relevant images. A detailed description shows how users would use the service, including a series of experiential processes and a description of the value that users could obtain. Section B is a part showing the concept's linkage to the research results. We described key insights from the interviews, showing the potential value that each service could provide for users. Section C is related to the connection to practice for prospective applications. It is composed of a service domain part describing appropriate service categories where the concept could be applied; a digital possessions part showing the corresponding various digital possessions; and a situation part showing the environments of target customers who would theoretically use the service. The last part, section D, shows the flow of value and profits surrounding the service, from company to end user, both personal and financial.
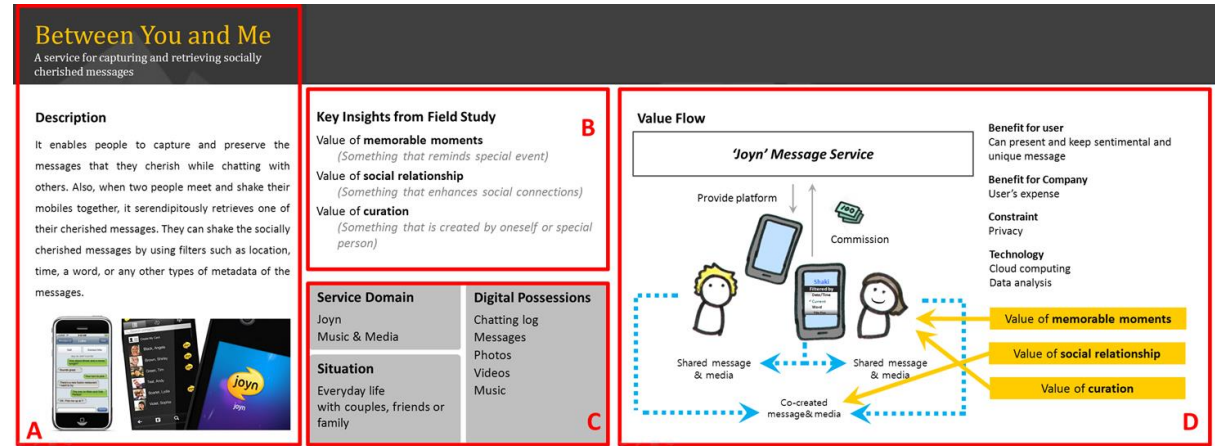

Figure 3. Concept delivery card

Value flow mapping, which is applied in Section D, was originally a lean manufacturing technique for analyzing the flow of materials and information required to bring a product or service to the market. At Toyota, where the technique originated, it is known as "material and information flow mapping" [14]. It is useful for easily grasping the profit stream surrounding the service among the stakeholders, including third parties, the company, and consumers. We modified the original value flow map to describe how virtual possessions would have more value through newly designed services. The dotted line shows the objects and services that potential users can receive from the service. The solid yellow line shows the values created while using this service. This value flow map helps to express both external (e.g. commercial value for the company) and internal values (e.g. content value to consumers).

Overall, in our concept developing process, the concept delivery card was useful not only to clearly deliver a given concept but also to explain why that idea is good. Especially, Section B helped project members to think about the connections between the user study and the design concepts. It effectively explained where a certain design originated. It also helped to modify, develop or improve existing ideas without losing the initially intended value or goal. Section C was good for clients; it allowed them to easily connect their ideas to their industries and made new services feasible. By using Section D (the value flow map), it was possible to explain what kind of key values inspired a specific service. Because our main goal was helping users to enhance the value of their

meaningful possessions through services, that concept can now be better explained and relevant to the values grasped. For the clients, the concept delivery card is closely connected with the actual revenue structure. As a result, we could share opinions and effectively refine our initial ideas into three strong concepts.

4. Discussion

The project procedure shows how research outcomes could be transformed into design concepts with the tools. We learned that tools aid that transformation and the connection between the user study and concept generation. Main lessons from this project are in three parts. First, it was valuable to have a traceable linkage between design knowledge (or insight) established in the research activity and final concepts. Our tools let us describe how raw data are associated and converted to design implication and how that implication can be transformed into design concepts. By maintaining these linkages, it would be possible for design researchers to further study other themes. Moreover, design practitioners could get inspiration from research outcomes that show more detailed information about users and their contexts. In our experience, the *insight extraction card* not only allows us to explain effectively about the massive raw data but also it helps us in using and applying it to the next level; idea generation. By using the *insight extraction card* properly, we could generate various ideas based on the research outcomes including other parties. We could easily memorize examples of how other parties conducted the interview and visited the real environment because of well-organized information and its visualization. When we generate a certain idea, we recall the picture or the title of the *insight extraction card*. This means that the *insight extraction card* has played the role of an indicator of the real environment of users, so it allows designers to experience indirectly the interview situation. Instead of searching through massive data of video clips and excel sheets, we could effectively use the research outcome and apply it in the idea generation process.

Second, we realized that when interpreting results, researchers could account for practical circumstances, such as target users and target service areas for the sponsoring corporation with the tools. Because research outcomes usually are conducted without considering a real-world situation or with a practical goal [10], it causes problems in communicating with practitioners and showing how research outcomes will be applied. Through using the *opportunity matrix* and *concept delivery card*, we could deliver the practical design ideas that are connected to research outcomes. This process and the tools that are used during the process help researchers to count the practical requirements and constraints.

Another important lesson from our project case was that both the academic and practice party could find the new design and business opportunities in using the *opportunity matrix*. Academic parties, including us, got a chance to realize the limitation of practice in terms of technological limitation, the interest and the vision of the company, and others that represent whether the ideas is translatable for practice or not. Also, the practice party could find new business opportunities based on the empty space of the *opportunity matrix*, as the empty space means that needs of users, but time is needed in order for it to be translated in practice. Finally, the space means the new business possibility for the design practice of market.

5. Conclusion

In this paper, we demonstrated a case study of a corporate-sponsored research project and tools used for bridging research outcomes and design practice. These are useful for design researchers and practitioners who

need a fundamental understanding of people and the ability to apply research outcomes to design practice. We emphasized making a clear connection between basic knowledge from academic research and practical insights that are applicable to the market. For an actual design project, three tools for transforming research outcomes into useful design resources were suggested: the *insight extraction card*, *opportunity matrix* and *concept delivery card*. Because the tools we proposed were intended to meet our project objectives, each might be modified depending on the different purposes and conditions of other projects.

To see the impact of the design concepts produced from our project, we may require long-term evaluation from the business perspective. Regarding the ways to collaborate in a globally distributed, multi-disciplinary and multi-cultural environment, we might be directed to study how dispersed teams with cultural and language barriers make sense of and draw out meaning from research findings. In case of our project, four different parties with different cultural and professional backgrounds collaborated. Because we had different cultural and academic backgrounds that played different roles in the project, it was difficult to manage the collaboration process from research to design. Also it might be an important issue that balancing two different goals of final outcomes. In academic perspective, it is important to publish the result but practice may have difficult issues regarding their company confidential. Further research is required to explore how to carry out a creative and effective design project when multi-cultural teams collaborate. Specifically, if each team has different academic backgrounds and, accordingly, a diverse level of understanding on design activity, these types of researches will be important.

Design researchers are increasingly being approached by industry, and their administrators are encouraging these design researchers to engage more and more with industry-sponsored research for financial reasons. In this vein, this paper address how designers might perform collaboration work better and how they might organize their findings and insights in a way that makes the transfer more effective.

6. Acknowledgment

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